

India's Agriculture and Food Exports

Opportunities and Challenges

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Editors

Debesh Roy | Bijetri Roy



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Foreword



Agriculture and food exports from India crossed the milestone of US \$50 billion during 2021-22, having grown at a robust 20 per cent over the previous year. The achievement in the wake of the second and third waves of the COVID-19 pandemic, reflects the remarkable resilience of our farmers, food processors, traders and exporters, along with policy, financial and technical support from Government of India (GoI), state governments, APEDA, RBI, NABARD, EXIM Bank, banks, research institutions, extension agencies and other stakeholders. GoI's Agriculture Export Policy 2018, has set an agriculture export target of US \$60 billion by 2022 and US \$100 billion, few years thereafter. The landmark achievement of agriculture exports gives us hope to achieve the milestone of US \$100 billion within a reasonable period of time. However, the present geo-political situation and consequent slowdown in the global economy, has created challenges for global trade. Nevertheless, exploring new markets, signing of a host of free trade agreements (FTAs) by India, addressing sanitary and phytosanitary (SPS) and technical barriers to trade (TBT) issues by improving the quality of agri-produce and traceability, increasing the share of value-added agriculture produce in agriculture exports, creating efficient agri-export value chains and agri-export infrastructure, and increasing agri-export finance would facilitate the achievement of the target.

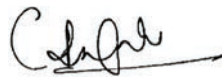
In order to transform the lives of the farming community, GoI has envisioned the achievement of doubling of farmers' income by 2024-25. Promotion of agriculture exports can play a major role in this regard. Majority of our farmers are small and marginal farm holders. The challenge is to bring them into the fold of agri-export value chains, in order to make them more productive and enhance their income significantly. Farmer producer organisations (FPOs) can be energized to become an important conduit between small and marginal holders and the agri-export value chains. We in NABARD have the task of bringing about the overall transformation of agriculture and rural economy. Therefore, promoting agriculture exports forms an important part of our agenda. NABARD, along with SFAC, APEDA

and EXIM Bank have a major role to play in promoting and financing agriculture exports.

India's agri-exports are dominated by primary products. There is a need to give a thrust to value added agri-exports, viz., dairy products; processed fish and meat; and processed cereals, vegetables and fruits. Exports of organic products too need to be given a push. Development of Agri-Export Zones and agri-export clusters and the One District One Product scheme could transform the agri export sector in India.

NABARD promotes research in all areas of agriculture and rural development through our Research and Development Fund. It gives me great pleasure that the Institute for Pioneering Insightful Research and Edutech Pvt. Ltd. (InsPIRE), a start-up research and consultancy firm, has come out with this well-researched book comprising chapters authored by eminent academicians, researchers and professionals. We are happy to support this publication out of our R&D Fund. I hope the research findings and policy suggestions made in the book will be useful for policy makers, practitioners and researchers towards transforming India's agriculture and food exports.

I also take this opportunity to congratulate ex-NABARDian Dr. Debesh Roy and his daughter Bijetri Roy, for founding InsPIRE, and editing this book. I wish InsPIRE success for their future research endeavours.



Dr. G.R. Chintala

Chairman

NABARD, Mumbai, India

19 May 2022

Preface

India is among the top ten exporters of agricultural products in the world. The Agriculture Export Policy (AEP), 2018 of the Government of India, aims at achieving an agriculture export target of \$60 billion by 2022 and US\$ 100 billion within a few years, thereafter. This is indeed a challenging task and would need a resetting of the timelines for achieving the targets. A paradigm shift from a 'business-as-usual' approach to a well-calibrated, comprehensive, strategic, and result-oriented agri-export policy and action plan, is needed to transform agriculture exports. It is imperative to achieve the target of the AEP, especially in the context of the COVID-19 pandemic and the current geopolitical situation, to make India a global power in agriculture while raising farmers' income by harnessing the export potential of Indian agriculture, through suitable policy interventions and technological innovations.

A record achievement of \$50.2 billion exports of agricultural products from India in 2021-22 is a beacon of hope for achieving the target of US\$ 100 billion by 2026-27. Quick and transformative reforms, and India's signing of Free Trade Agreements (FTAs) with its major trade partners, could facilitate the achievement of the target. Further, Government of India has envisioned the achievement of doubling farmers' income by the year 2024-25, and agriculture exports certainly have an important role to play in achieving the same. Development of agri-export infrastructure, and efficient and globally competitive export-oriented agri-value chains, are the right steps for transforming India's agriculture and food exports and doubling farmers' income.

This Book is a collection of chapters authored by reputed academicians, researchers and professionals, which aims at taking a deep dive into various opportunities and challenges related to the exports of agricultural products from India. It also aims at providing policy inputs and a roadmap for achieving the agriculture export target of US\$ 100 billion by a realistic timeline of 2026-27. The Book covers issues related to global regime for agriculture trade and its impact on Indian farmers, Free Trade Agreements (FTAs), Sanitary and Phytosanitary (SPS) measures, Technical Barriers to Trade (TBT), food loss management, agriculture export finance, agriculture export value chains, etc. There are books in India that cover various issues

related to agriculture exports but do not comprehensively cover all major issues related to agriculture and food exports from India. This gap in the literature is expected to be filled up by the Book.

We are confident that the suggestions and recommendations made by the authors would prove to be useful policy inputs for the central and state governments, APEDA, MPEDA, NDDB, RBI, NABARD, EXIM Bank, banks and other financial institutions, as well as research-inputs for academicians and researchers.

Finally, it gives us immense happiness for the fact that this is the inaugural publication of the Institute for Pioneering Insightful Research and Edutech Pvt. Ltd. (InsPIRE) (Website: <https://inspire-solutions.in>), a start-up research and consultancy firm which was set up on 8th June 2021. We shall continue our endeavour to publish well-researched books in a multi-disciplinary setting, with special focus on policy research in the areas of economics and climate change.

Greater Noida, India

Debesh Roy
Bijetri Roy

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We express our sincere gratitude to Dr. G.R. Chintala, Chairman, National Bank for Agriculture and Rural Development (NABARD) for inaugurating the webinar on *India's Agriculture and Food Exports: Opportunities and Challenges*, as the Chief Guest, and also for writing the foreword of this book.

The financial assistance received from Research and Development Fund of NABARD towards publication of this book and organizing the webinar is gratefully acknowledged. We are also grateful to Dr. K.J.S. Satyasai, Chief General Manager, and his colleagues Ms. Balwinder Kaur, Deputy General Manager and Ms. Shivangi Shubham, Assistant Manager, at the Department of Economic Analysis and Research (DEAR), NABARD, for the financial support from NABARD.

We express our sincere gratitude to Dr. Arpita Mukherjee, Professor, ICRIER, New Delhi, for her valuable advice and guidance when we were planning to publish this book and to organize the webinar.

We are sincerely grateful to all the authors and co-authors of this book for contributing their well-researched and analytical chapters, and also for presenting their chapters at the webinar: Dr. Nitya Nanda, Director, Council for Social Development, New Delhi, Dr. Arpita Mukherjee, Professor, ICRIER, New Delhi, Dr. Raka Saxena, Principal Scientist, ICAR-National Institute of Agricultural Economics and Policy Research, New Delhi, Dr. Parthapratim Pal, Professor, IIM Calcutta, Dr. Bibek Ray Chaudhuri, Associate Professor, Indian Institute of Foreign Trade, Kolkata, Dr. Tanu M. Goyal, Consultant, ICRIER, New Delhi, Dr. D.S. Chauhan, Chief General Manager (Retired), NABARD, Mr. S. Prahalathan Iyer, Chief General Manager, EXIM Bank, Mumbai, Ms. Jahanvi Singh, Chief Manager, EXIM Bank, Mumbai, Dr. Subhankar Mukherjee, Assistant Professor, IIT Kanpur, Dr. Hema Yadav, Director, Vaikunth Mehta National Institute of Cooperative Management, Pune, Dr. Sneha Kumari, Assistant Professor, Symbiosis School of Economics, Pune, Dr. Nisha Bharti, Assistant Professor and Head of the Department of Agribusiness Management, Symbiosis Institute of International Business, Pune, Ms. Angana Parashar Sarma, PhD scholar at BITS, Pilani, Dr. Rohit Kumar, Research Associate, ICAR-NIAP, New Delhi, Ms. Sonia Chauhan, Assistant Chief Technical Officer, ICAR-NIAP, New Delhi, Dr. Raman M.S.,

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We express our sincere gratitude to Bloomsbury India for agreeing to publish this book. We convey our sincere thanks to everybody at Bloomsbury involved in this project.

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Her recent work emphasizes on strategies for harnessing the agricultural trade potential for enhancing farm incomes.



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Abbreviations

AAS	Agriculture Advisory Service
ACF	Autocorrelation Function
ADF	Augmented Dickey-Fuller
AEP	Agriculture Export Policy
AEZ	Agri Export Zone
AI	Artificial Intelligence
AIC	Akaike Information Criterion
AIDC	Agriculture Infrastructure Development Cess
AMS	Aggregate Measure of Support
AoA	Agreement on Agriculture
APEDA	Agricultural and Processed Food Products Export Development Authority
APMC	Agriculture Produce Marketing Committee
APTA	Asia-Pacific Trade Agreement
ARDL	Autoregressive Distributed Lag
ASEAN	Association of Southeast Asian Nations
ATARI	Agricultural Technology Application Research Institute
BCD	Basic Customs Duty
BTIA	Bilateral Trade and Investment Agreement
CAGR	Compound Annual Growth Rate
CBAM	Carbon-Border Adjustment Mechanism
CECA	Comprehensive Economic Cooperation Agreement
CEPA	Comprehensive Economic Partnership Agreement
CII	Confederation of Indian Industry
CIPHET	Central Institute of Post-Harvest Engineering and Technology
CLP	Critical Loss Points
CPR	Cédula de Produto Rural
CSA	Climate Smart Agriculture
CUSUM	Cumulative Sum of Recursive Residuals
CUSUMSQ	Cumulative Sum of Squares of Recursive Residuals

DEZ	Dairy Export Zone
DFI	Doubling Farmers' Income
DIT	Department for International Trade
DoC	Department of Commerce
DXI	Export Diversification Index
EEA	European Economic Area
EFSA	European Food Safety Authority
EIC	Export Inspection Council of India
ELG	Export-Led Growth
EME	Emerging Market Economy
e-NAM	Electronic National Agriculture Market
ETP	Enhanced Trade Partnership
EU	European Union
EUROPHYT	European Union Notification System for Plant Health Interceptions
FAO	Food and Agriculture Organization
FAS	Foreign Agricultural Service
FCDO	Foreign, Commonwealth & Development Office
FCI	Food Corporation of India
FICCI	Federation of Indian Chambers of Commerce and Industry
FIG	Farmers' Interest Group
FLM	Food Loss Management
FMD	Foot and Mouth Disease
FPC	Farmer Producer Company
FPE	Final Prediction Error
FPO	Farmer Producer Organisation
FSA	Food Standard Agency
FSSAI	Food Safety and Standards Authority of India
FTA	Free Trade Agreement
FY	Financial Year
GAP	Good Agriculture Practices
GATT	General Agreement on Tariffs and Trade
GCMMF	Gujarat Co-operative Milk Marketing Federation
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GI	Geographical Indication

GLC	Gas-Liquid Chromatography
GLE	Growth-Led Exports
GM	Genetically Modified
GoI	Government of India
GPH	General Principles of Food Hygiene
GVA	Gross Value Added
GVC	Global Value Chains
HACCP	Hazard Analysis and Critical Control Points
HYV	High Yielding Variety
ICAR	Indian Council of Agricultural Research
IMFL	India Made Foreign Liquor
INR	Indian Rupee
IoT	Internet of Things
IP	Intellectual Property
ISCECA	India-Singapore Comprehensive Economic Cooperation Agreement
ISLFTA	India Sri Lanka Free Trade Agreement
KCC	Kisan Credit Card
KII	Key Informant Interview
KVK	Krishi Vigyan Kendra
LC	Letter of Credit
LDC	Least Developed Countries
LLP	Low Loss Points
LPG	Liberalisation, Privatisation and Globalisation
MAI	Market Access Initiatives
MEIS	Merchandise Exports from India Scheme
MEP	Minimum Export Price
MERCOSUR	Southern Common Market – Argentina, Brazil, Paraguay, and Uruguay
MFN	Most Favoured Nation
MIP	Minimum Import Price
MMT	Million Metric Tonnes
MoFPI	Ministry of Food Processing Industries
MoSPI	Ministry of Statistics and Programme Implementation
MoU	Memorandum of Understanding
MPEDA	Marine Products Export Development Authority

MRA	Mutual Recognition Agreement
MRL	Maximum Residue Limit
MSME	Micro, Small and Medium Enterprise
MSP	Minimum Support Price
MT	Million Tonnes
NABARD	National Bank for Agriculture and Rural Development
NBFC	Non-Banking Financial Company
NDDB	National Dairy Development Board
NER	North Eastern Region
NFSA	National Food Security Act
NGO	Non-governmental Organisation
NPOP	National Programme for Organic Production
NSDC	National Skill Development Corporation
NSO	National Statistical Office
NTB	Non-Tariff Barriers
NTM	Non-Tariff Measures
ODOP	One District One Product
OECD	Organisation for Economic Co-operation and Development
OPEZ	Organic Product Export Zone
PACS	Primary Agricultural Credit Society
PEG	Private Entrepreneurs Guarantee
PLI	Production Linked Incentive
PMFBY	Pradhan Mantri Fasal Bima Yojana
PM-KISAN	Pradhan Mantri Kisan Samman Nidhi
PMKSY	Pradhan Mantri Kisan Sampada Yojana
PMKSY	Pradhan Mantri Krishi Sinchayee Yojana
PPP	Public Private Partnership
QR	Quantitative Restrictions
RASFF	Rapid Alert System for Food and Feed
R&D	Research and Development
RBI	Reserve Bank of India
RCA	Revealed Comparative Advantages
RCEP	Regional Comprehensive Economic Partnership
REFP	Rice Export Promotion Forum
RTA	Regional Trade Agreement
SAARC	South Asian Association for Regional Cooperation

SAE	Second Advance Estimate
SAFEX	South African Futures Exchange
SAFTA	South Asian Free Trade Area
SCB	Scheduled Commercial Bank
SCM	Subsidies and Countervailing Measures
SDG	Sustainable Development Goals
SIC	Schwarz Information Criterion
SME	Small and Medium Enterprise
SPS	Sanitary and Phytosanitary
SSA	Shift Share Approach
TBT	Technical Barriers to Trade
TIES	Trade Infrastructure for Export Scheme
TOP	Tomatoes, Onions, and Potatoes
TRQ	Tariff Rate Quota
UAE	United Arab of Emirates
UK	United Kingdom
UKGT	United Kingdom Global Tariff
UKIBC	United Kingdom-India Business Council
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
UNEP	United Nations Environment Program
US	United States
USDA	United States Department of Agriculture
USFDA	United States Food and Drug Administration
VAR	Vector Autoregressive
WDRA	Warehousing Development and Regulatory Authority
WTO	World Trade Organization

Unit Conversion

1 lakh = 100,000

1 crore = 10 million

100 crore = 1 billion

1 lakh crore = 1 trillion

Currency Conversion

US\$ 1 = INR (₹) 75.8071 (31 March 2022)

Introduction

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Achieving India's ambition of US\$ 5 trillion Gross Domestic Product (GDP) would involve turbocharging the economy at 8-9 per cent sustainable growth over the next 4 years (2022-23 to 2026-27). This would have seemed an arduous task after the pandemic-induced sharp dip in the GDP growth to -6.6 per cent in the Financial Years (FY) 2020-21. However, the economy is poised to grow at 8.9 per cent in 2021-22,¹ and the ambition seems achievable, within a reasonable time.¹ The agriculture sector which contributes 15.5 per cent² to the economy, is estimated to grow at 3.3 per cent in FY 2022, which is the same rate of growth as in FY 2021.² It was the only sector that achieved positive growth in the face of negative growth of 4.8 per cent in the Gross Value Added (GVA) in FY 2021. This sector would need to focus on private investments and exports, while targeting an annual agriculture GVA growth of 5 per cent, and contribute towards the achievement of US\$ 5 billion targets by 2025-26.

A focus on reforms in agriculture marketing and agriculture exports for doubling farmers' income by FY 2024, would be an appropriate recipe for stimulating the agriculture sector. Although a daunting task, the reforms, and investments in agri-infrastructure could stimulate the agriculture sector. Linking farmers to the export market is an important strategy to sustainably raise farmers' income.

¹ Second Advance Estimate (SAE) of the Gross Domestic Product (GDP) (at 2011-12 prices) estimated by the National Statistical Office (NSO), Ministry of Statistics and Programme Implementation (MoSPI), Government of India.

² Share of Agriculture, forestry, and fisheries sector in the Gross Value Added (GVA) as per the SAE of National Income by the NSO, MoSPI, GoI.

India is not only self-sufficient to meet the domestic demand for food but is also a net exporter of agricultural products. The country is among the major producers of cereals (wheat and rice), pulses, fruits, vegetables, milk, meat, and marine fish. However, exporters of agri-commodities are not successful in raising their share in global markets because of uncertainty in the existing foreign trade regime.

The country ranks among the top ten exporters of agricultural products in the world. The country's share in global agricultural exports increased from 1.1 per cent in 2000 to 2.2 per cent in 2017, valued at US\$ 39 billion. However, India's share fell to 2.1 per cent in 2019, valued at US\$ 37 billion, and rose again to 2.2 per cent³ in 2020, valued at US\$ 39 billion,⁴ having grown at 4 per cent over the previous year.^{3,4} While Brazil's share increased from 2.8 per cent to 5.2 per cent (US\$ 93 billion), that of China increased from 3 per cent to 4.3 per cent (US\$ 78 billion), between 2000 and 2020.⁵

India's agriculture exports experienced fluctuations during the 10-year period from 2012-13 to 2021-22, due to an uncertain and unstable agriculture trade regime. The 10-year Compound Annual Growth Rate (CAGR) was 1.0 per cent (Figure 1.1). During the first 5-year period from 2012-13 to 2016-17, agriculture exports declined significantly from US\$ 43.1

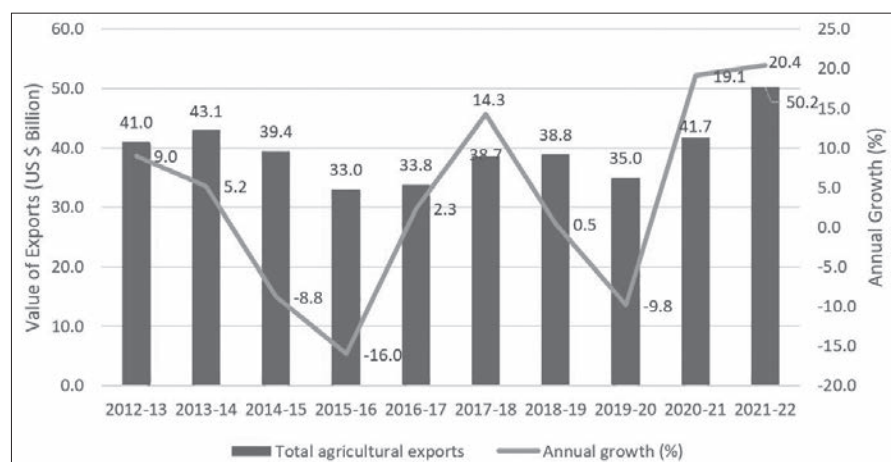


Figure 1.1: India's Exports of Agriculture and Allied Products

CAGR: 2012-13 to 2021-22 = 1.0 per cent; 2012-13 to 2016-17 = -6.3 per cent;
2017-18 to 2021-22 = 6.1 per cent

Source: Authors' calculations based on data accessed from the Economic Survey, Government of India (various issues) and DGCI&S.

³ India's share is 3.1 per cent if intra-EU exports are excluded.

⁴ WTO, World Trade Statistical Review 2021.

⁵ WTO, World Trade Statistical Review 2021.

billion (2013-14) to US\$ 33.0 billion (2015-16), at a CAGR of -6.3 per cent (Figure 1.1). The second 5-year period from 2017-18 to 2021-22, witnessed a strong CAGR of 6.1 per cent. During this period, agri-exports decreased from US\$ 38.7 billion (2017-18) to US\$ 35.0 billion (2019-20), followed by a sharp increase to US\$ 41.7 billion (2020-21), and a record US\$ 50.2 billion achieved in 2021-22 (Figure 1.1). India's agriculture exports grew by a robust 20.4 per cent in 2021-22, to touch US\$ 50.2 billion (Figure 1.1), which is certainly a commendable achievement by farmers and exporters, especially in a year affected by the second and third waves of the pandemic. To catch up with Brazil and China, India needs to bring about comprehensive structural reforms in the agriculture sector, with a focus on agriculture and food exports.

The Agriculture Export Policy (AEP) 2018 of the Government of India (GoI), aims at achieving an export target of US\$ 60 billion by 2022 and US\$ 100 billion within a few years, thereafter. This is indeed a humongous task, even under normal circumstances, and more so in the aftermath of the Covid-19 pandemic. Therefore, there needs to be a realistic resetting of the timeline to achieve the target. Achieving the target should also involve a paradigm shift from a 'business-as-usual' approach to a well-calibrated, comprehensive, strategic, and result-oriented agri-export policy and action plan, as an essential component of comprehensive policy reforms in the agriculture sector. It is imperative to achieve the vision of the AEP, especially in the context of the COVID-19 pandemic, to make India a global power in agriculture while raising farmers' income by harnessing the export potential of Indian agriculture, through suitable policy interventions.

This Book is a collection of chapters authored by reputed academicians, researchers and professionals, which aims at taking a deep dive into various opportunities and challenges related to the exports of agricultural products from India. It also aims at providing policy inputs and a roadmap for achieving the agriculture export target of US\$ 100 billion by a realistic timeline of 2026-27. The Book covers issues related to global trade regime, agriculture export competitiveness, Free Trade Agreements (FTAs), Sanitary and Phytosanitary (SPS) measures and Technical Barriers to Trade (TBT), food loss management, agriculture export finance, agriculture export value chains, etc.

There are books in India that cover various issues related to agriculture exports but do not comprehensively cover all major issues related to agriculture and food exports from India. This gap in the literature is expected to be filled up by the Book.

This Book has a total of 11 chapters, each addressing important aspects of issues related to agriculture and food exports from India. Chapter 2 deals

with the global regime for agricultural trade. It examines if the developing countries have received the expected benefits after more than a quarter of a century since the signing of the Agreement on Agriculture (AoA) under the World Trade Organization (WTO) regime. Agriculture remains highly subsidised in most developed countries, which makes the position of developing countries like India quite imbalanced, in terms of access to markets. The present definitions and interpretations of subsidies and commitments have created problems for countries like India, despite the modest subsidies provided by developed countries. Other issues discussed in the Chapter include low tariff reduction commitments for key commodities by most developed economies. Thus, the AoA has not been of much use in improving market access. India has been able to export more agricultural goods, mainly due to its ability to enhance its supplies.

The trajectory of Indian agricultural exports with reference to competitiveness, diversification, and growth linkages form the essence of Chapter 3. Since 2001, cotton and cereals have been the major contributors to agriculture exports. Also, the share of meat and edible meat offal has consistently increased. Rice, frozen bovine meat, cotton yarn, raw cotton, ginger, pepper, and seed spices remained highly competitive commodities in the last two decades. Crustaceans emerged as highly competitive during recent years. The trade performance of rice is found to be impressive over the years. With the decline of the comparative advantage for Indian tea, the Export-Led Growth (ELG) hypothesis was supported in onion, pepper, rice, fennel, coriander, cumin, and tea. Co-integration in selected commodities was established among the growth and exports which denotes a long-run relationship in exports. To sustain the global presence and enhance competitiveness, policy facilitation is required in terms of a more consistent agricultural export policy. Export-oriented supply chains should be managed more efficiently for making the exports more competitive. Effective international market intelligence efforts would help the country in harnessing the export advantages and global opportunities in agriculture.

In a country like India, agricultural trade liberalisation is a complex subject. While on one hand, it appears that a labour abundant country like India will have a comparative advantage in agriculture, in reality, the situation is different. Indian agriculture is dominated by small and marginal farm holders whose ability to participate in international trade is extremely limited. Many of these farmers are subsistence farmers with very little marketable surplus and most of them suffer from various market failures and structural inefficiencies. On the other hand, international agricultural trade is dominated by large, developed countries who are not always cost-efficient in their production. However, due to the huge amount of subsidisation in

agriculture in these countries they can undercut the low-cost producers from developing countries in a major way. Against the evolving backdrop of India's engagement in agricultural trade, Chapter 4 aims to examine how India's agricultural exports have evolved over the last two decades. A short historical background and the current state of play of export of agricultural commodities from India are presented. The evolution of India's trade policy, a focused analysis of India's agricultural trade policy in the context of various trade agreements followed by an analysis of the patterns of India's agricultural exports with a focus on commodity baskets and export destinations have been discussed in the later sections of this Chapter, followed by the way forward in relation to current and future trade agreements.

Negotiations for an FTA between India and the European Union (EU) have been going on for a long time. It reached a stalemate due to disagreement over issues related to, among other sectors, agriculture. Indian negotiators were sceptical about the impact of the FTA on small farmers and retailers. The big farmers were on the other hand in favour of the Agreement. Given that India has come out of RCEP, the government has now renewed its efforts to sign the Agreements that can be concluded quickly. Against this background, Chapter 5 seeks to assess the threats to the agricultural sector due to a possible India-EU FTA. The analysis has been carried out at a disaggregated level and tries to pinpoint the products which face threat from EU products. Current tariffs imposed by India on EU products have been taken into consideration for analysing the threats among other factors like current imports, export volumes of other countries selling the same products to India, etc. A partial equilibrium trade model has been used to analyse the threat. A secondary objective of the Chapter is to suggest possible tariffs which the GoI can offer to the EU to minimise the threat from the FTA on the agricultural sector in India.

Chapter 6 deals with the challenges and opportunities in India-the United Kingdom (UK) trade in agro-foods. The UK is a major importer of agro-food products from the world but prior to Brexit, the majority of its trade was with the EU. With Brexit, the UK is diversifying its trade markets away from the EU, focusing more on emerging economies, including India. The Enhanced Trade Partnership (ETP) signed between India and the UK in February 2021 is in tandem with leveraging the untapped trade potential between the two economies. Both sides are exploring the priorities and challenges, and food and drinks have been identified as a key sector of interest. In agro-foods and beverages, India had a positive trade balance with the UK in 2020 (at US\$ 0.55 billion) and exports from India to the UK have grown by 55.72 per cent during 2010 and 2020. While there is a potential for enhancing trade, there are some key trade barriers such as high tariffs

in India for the UK's exports and limited market access for select products on both sides. This along with non-tariff measures like stringent food safety conditions or labelling requirements on both sides, are adversely impacting Small and Medium Enterprise (SME) exporters in the food and beverages sector. Given this background, the Chapter provides an overview of the existing and emerging trade patterns in the agro-food sector between India and the UK, focusing on some key products, which are currently exported or can be exported in the future if trade barriers are removed. Identifying a few products such as alcoholic beverages for the UK's export to India, organic foods for both countries, and Basmati rice for India's export to the UK, it analyses and assesses the impact of tariff and non-tariff measures on exports and suggests policy recommendations on three key areas. These are as follows: (a) tariff rationalisation, (b) removal of non-tariff barriers, and (c) sharing of knowledge and cooperation, to address the barriers and strengthen the bilateral trade through the ETP.

Chapter 7 is a critical examination and analysis of the Sanitary and Phytosanitary (SPS) measures and barriers under the WTO regime, and their impact on India's agricultural exports. While the WTO allows countries to have more rigid standards, these standards have to be scientifically proven and should not cause unnecessary trade barriers. Analysing the data of reasons for the rejection by different food products, for the EU from the Rapid Alert System for Food and Feed (RASFF) and EU Notification System for Plant Health Interceptions (EUROPHYT) portals, the Chapter presents the reasons and types of rejection of food products. The rejection can range from relabelling of products, destroying the product, and product ban. The Chapter further examines the impact of the rejection. A recommendation of what needs to be done in the entire export value chain from farmers to producers and exporters to reduce rejections, focusing on what support the government can provide, forms the conclusion and way ahead of the Chapter.

Chapter 8 deals with the issue of promoting agricultural exports and analyses the need for a national-level policy on Food Loss Management (FLM). The Chapter makes an analysis of food security, the issue of farm production levels, India's food growth trajectory, and the differentiation of food loss from food wastage. The Chapter further discusses Critical Loss Points (CLP) and Low Loss Points (LLP). It is high time that the GoI puts in place a comprehensive national policy on 'Achieving SDG 12.3 targets by Minimising Food Loss'. The Policy has to focus not only on minimising food loss but also on leveraging the potential to increase agro-based exports, resulting in augmented farm-level income. These suggestions form the crux of the conclusion, based on the identified CLPs and the available infrastructure, vis-à-vis, the required infrastructure.

Chapter 9 discusses the current scenario and way ahead in relation to financing India's agricultural exports. International trade entails considerable risk, necessitating an enabling environment for producers and firms to manage the risks to engage in trade. One of the chief concerns in international trade is the uncertainty over the timing of payments made by the importer to the exporter. There are five key methods of payment for international transactions—cash-in-advance, consignment, letter of credit, documentary collections, and open account—each with a different associated risk for the buyer and the seller. The Chapter makes an analysis of export finance for agricultural exports in India and the impact of export financing on agricultural exports. The Chapter further discusses strategies for strengthening financing for agricultural exports.

Chapter 10 analyses and deals with modelling agriculture exports in the emerging economy through a cluster-based approach. India's agriculture exports (including marine and plantation products) have beaten the stagnant data registering a growth of 17.34 per cent to US\$ 41.25 billion in 2020-21. The fruits and vegetable exports also rose to INR 11,019 crore (US\$ 1,487 million) in 2020-21 from INR 10,114 crore (US\$ 1,408 million) reported in 2019-20. There has also been a hike in the value of processed fruits and vegetable exports which grew to INR 10,277 crore (US\$ 1,386 million) in 2020-21 from INR 8,315 crore (US\$ 1,164 million) reported in 2019-20. The Agriculture Export Policy announced in 2018, has been framed with a focus on agriculture export-oriented production, export promotion, better farmer realisation for clusters dedicated to horticulture produce. The farmer-centric model of cluster development has been able to boost horticulture production in Tamil Nadu, Maharashtra, Andhra Pradesh, Telangana, Uttar Pradesh, and Bihar. The clusters in the form of Farmer Producer Organisations (FPOs) have actively pursued growth in sales by enabling the farming community, including the small and marginal farmers, to address their production and marketing issues. The research was undertaken to understand the role of clusters subject to FPO and Farmer Producer Company (FPC) in addressing the challenges in supply chain and agri-exports and exploring the opportunities for sustaining agricultural export in India. The Chapter explores the five successful cluster approaches that were the key players in horticulture exports. The findings suggest an aggregate model for boosting agriculture exports. The drivers for the same and their linkages are discussed in the model. The results of this study can provide useful guidance and implications for agricultural exports to cooperatives and policymakers for providing suitable handholding support to clusters in terms of a holistic approach in finance, technology, capacity building, and governance.

Chapter 11 of this Book discusses the way forward to attaining the target of US\$ 100 billion in agriculture and food exports. It presents an analysis of agriculture export reforms, doubling farmers' income, and agriculture marketing reforms. The Chapter further aims to encourage export-oriented research and development. Economic diplomacy is one of the most vital factors which determines India's export performance. Diplomatic efforts are also imperative to promote Brand India. The US, for instance, has imposed stricter norms to check pests and pesticides in the case of exports of mangoes and rice from India. Also, some of India's agricultural product test laboratories are not recognised by Russia. Therefore, intense diplomatic efforts are needed to address these as well as SPS-related issues, with India's major trade partners, viz., the EU, the US, the UK, China, the Association of Southeast Asian Nations (ASEAN), the United Arab of Emirates (UAE), and South Asian Association for Regional Cooperation (SAARC) countries, as well as potential export markets across the globe. The Chapter also makes a positive case for the promotion of FTAs for the growth of agricultural exports and fostering India's agricultural export competitiveness. The Chapter also makes an analysis of efficient export-oriented agri-value chains, including dairy, fisheries and marine products, processed cereals, fruits and vegetables, and organic exports. Investment in rural infrastructure is a pre-condition to enable the acceleration of agricultural growth, the creation of new economic opportunities, and the generation of employment. Robust infrastructure is a critical component of efficient agricultural and agri-export value chains. This includes pre- and post-harvest handling facilities, storage and distribution, cold chain, processing facilities, roads, railways, and world-class exit point infrastructure at ports and airports facilitating quick exports. It is also important to attract private investments in export-oriented activities and infrastructure, in addition to public investment. Further, while the central government may advise and allocate funds, proper implementation of agriculture and market infrastructure reforms lies at the behest of state governments.

This Book has carefully collated different dimensions of India's exports in agricultural products. The chapters have incorporated a survey of valuable literature on the respective subjects covered, and in-depth critical analysis based on existing evidence.

Global Regime for Agricultural Trade: Is it Benefitting Indian Farmers?

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Introduction

Trade in agricultural products has been declining over time and currently accounts for less than 10 per cent of global merchandise trade, though it has grown at a higher annual rate of 3.5 per cent compared to 2.7 per cent for merchandise trade and 2.8 per cent for manufactured goods over the last five years. From the beginning until the conclusion of the Uruguay Round of negotiations, agriculture was virtually left out of the General Agreement on Tariffs and Trade (GATT)/World Trade Organization (WTO) framework, despite the fact that agricultural products, unlike the current situation, accounted for about half the total global merchandise trade when the framework was created (Nanda 2008). Yet, agriculture became among the most contentious issues at the GATT/WTO negotiations that very often makes or breaks the deals in WTO negotiations as a whole.

During the Uruguay Round, negotiations got stuck due to differences in agricultural issues and the Round could be concluded only due to the bilateral agreements between the United States (US) and the European Union (EU)—the Blair House Accord in November 1993 where the main issue was agriculture. In Cancun Ministerial Meeting in 2003, along with the Singapore issues, agriculture played an important role in the washout of the Ministerial Conference. In Bali Ministerial Conference a decade later, negotiations could have been deadlocked but for the agreement between India and the US on the issue of food security. India, of course, refused to ratify the Trade Facilitation Agreement at the Bali Conference until it was agreed that the concession that India could extract at Bali was for an indefinite period.

When GATT was signed it was the US that was calling the shot as the EU was not yet in existence. Havana Charter was intended to provide a comprehensive global trade regime that could not be converted to an

international agreement due to resistance from the US as it ostensibly affected US sovereignty. The US also ensured that its domestic policies and laws were not undermined due to the GATT. The US was the main exporter of agricultural goods which had its Agricultural Adjustment Act of 1933 which enabled its government to resort to tariffs and quantitative controls and export subsidies to stabilise domestic prices of agricultural goods (Hathway, 1997). Most developing countries were still colonised or newly independent and hence could not get their concerns addressed.

Domestic political and social concerns in the US and other developed countries also influenced the way agriculture was treated in GATT. Along with economic and industrial development, agriculture was witnessing relative decline as farmers and farmworkers were finding it difficult to maintain parity with incomes in industry and service sectors. The fact that the perception that agriculture is unique and linked to the food security of a country also and should not be treated like other sectors also played an important role in ensuring that agriculture received major exemptions from GATT rules.

On the face of it, there were not too many exemptions. While member countries were asked to report on subsidies, they were not prohibited and all kinds of subsidies were allowed. Another exemption was in the area of quantitative restrictions on which exemptions meant that they could be used liberally including restrictions due to quality issues. Even tariff binding on agricultural goods was so liberal that it hardly made any impact. This essentially meant that the agriculture sector was virtually exempted from GATT discipline.

Nevertheless, the issue of ensuring fair prices of commodities, agricultural goods, in particular, remained an important part of the global political economy agenda. It was discussed in many international fora including the Food and Agriculture Organization (FAO) and United Nations Conference on Trade and Development (UNCTAD). The problem of commodity prices dominated the first UNCTAD in 1964 and constituted a major part of the Final Act that came out as the outcome of the first UNCTAD. An important initiative in this regard was the international commodity agreements that the countries signed to stabilise the supply and prices of certain commodities. However, none of these could achieve much in terms of stabilising the global markets for agricultural commodities (Dubey, 2018). Given this, a full-fledged inclusion of agriculture in the GATT/WTO framework, though raised some concerns, also brought enormous hope for developing countries, particularly those who were highly dependent on agriculture.

Agriculture: Its Importance and Peculiarities

As noted earlier, when agriculture was brought into the negotiation agenda of the GATT Uruguay Round, developing countries had a mixed feeling. While there was substantial hope that this could herald a new era that could usher in the economic development of developing countries like India, at the same time, there were substantial concerns that if things did not move the way it was expected, it could also jeopardise the livelihoods of millions in developing countries who were dependent on agriculture. While they expected that opening up of markets in the developed world would enhance export opportunities in lucrative markets, opening up of their markets along with continued subsidies in developed countries could also adversely affect their agriculture.

About 80 per cent of those suffering from poverty and hunger live in rural areas and an overwhelming majority of them draw their livelihood from agriculture and work either on their farm or as wage labourer (FAO, 2019). While some of them also earn from non-farm activities, agriculture is their main source of livelihood (Castañeda et al., 2016). According to the World Bank, the potential of agricultural growth in lifting the rural poor out of poverty is two to four times higher than the growth of other sectors of the economy.¹ A cross-country study of developing countries has also shown that agricultural growth is essential not only for accelerating the overall economic growth but also for reducing poverty and inequality (Imai et al., 2016).

It is well-understood that agriculture in most developing countries absorbs the residual labour and in due course, the excess labour has to move to non-farm activities for ensuring reduction in poverty. However, this will take a long time and hence, in the short run, the growth in agriculture is the best way to reduce poverty and inequality in the shortest possible time. Since rural-urban wage differentials play an important role in rural-urban migration, in the absence of agricultural growth, migrant labour in urban areas also get wages that are marginally higher from the low rural wages and remain almost equally vulnerable in urban areas as well. This was displayed in India and many other countries when the 2020 lockdown due to Covid-19 led to huge urban-rural reverse migration as a large section of the migrant workers found it difficult to sustain in cities beyond a few days (Lee et al., 2021).

In contrast with this reality, many developing countries were and still are net importers of food. Over the last few decades, the growth in food

¹ Available at <https://www.worldbank.org/en/topic/agriculture/overview>, accessed on 30 November 2021

production has outpaced growth in population. In 1961, the global food supply was 2,196-kilo calories (kcal) per capita per day which went up to 2,929 kcal per capita per day in 2018, a jump of about 33 per cent (FAO Statistics). Most agricultural products being relatively non-elastic, such growth has adversely impacted the prices of agricultural products. However, more interestingly, during the last three decades of the twentieth century, in developed countries, the supply growth outpaced the demand growth, while in developing countries, the demand growth outpaced the supply growth, even though the agricultural growth rate has been higher in developing countries (FAO, 2002). This is reflected in the fact that a large number of countries remain net food importers despite a majority of their population being engaged in agriculture.

Much of this growth in the food supply has come from the growth in productivity and intensity of cultivation rather than expansions in the area of cultivation, which occurred only in Africa and Oceania. In 2020, the real global food price was lower than that in 1961 (Figure 2.1). While the real food price went up until around the mid-1970s, it declined substantially thereafter, reaching the lowest level during the late 1980s. Unfortunately, despite all these, more than 850 million people remain undernourished most of whom ironically are associated with food production. This is because the productivity growth has come largely through the use of more inputs rather than cost-saving technology.

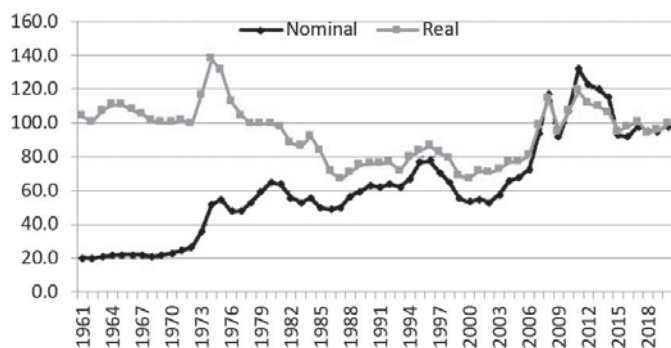


Figure 2.1: FAO Food Price Index (2014–16 = 100) 1961–2021

Source: FAO Statistics

Higher per hectare production or higher per labour unit production can be achieved through excessive use of other agricultural inputs, including fertilizers, pesticides, energy, water, expensive seeds, and intensive use of machines. What appears as high productivity can even turn out to be low productivity if an index of total factor productivity is considered for the assessment of productivity. What is ignored is that productivity cannot

be assessed only in terms of per hectare production or per unit of labour production. In fact, 'higher productivity' almost everywhere, including in some developing country regions, is sustained by high agricultural subsidies (Nanda, 2008, 2021). The fall in prices thus could be achieved due to high subsidies or other types of market distortions.

This is mainly because technology adoption in agriculture fails to bring many benefits to farmers. While it is commonly believed that technological change brings down the cost of production, this might not be true in agriculture. While in industry and services, technology is invented by the producers themselves, in agriculture, technology is invented by agri-business companies who corner the major part of the benefits. Even if the new technology is cost-saving to some extent, the agro-business, with their strong market power as well as the control over the technology, squeeze out the benefits denying the farmers the potential cost advantages. Moreover, higher production due to technology can also increase overall production and thereby bringing down the prices adversely affecting the farmers.

Even the market conditions in agricultural products are not quite favourable to farmers. Distortion in the market for agricultural goods is another source of stress for the farmers. The market for agricultural products is very often considered to be an example of a perfectly competitive market. This is only partly true. There is a large number of farmers and there is also a large number of final consumers for agricultural goods. However, the farmers and final consumers do not interact in the market directly. There is a chain of intermediaries that does not work in a competitive manner. Thus, the final consumers of agricultural products do not get the advantage of a competitive market. There exists a significant gap between the prices the consumers pay and the prices the primary producers receive. This kind of situation is not restricted to particular countries but has become a global feature. These intermediaries abuse their monopolistic dominance in the market for final products, while at the markets for primary products, they abuse their monopolistic dominance. Moreover, farmers also face non-competitive markets when they source their inputs. Some of the inputs they procure, such as high-yielding varieties of seeds are also protected by intellectual property rights and consequently command very high prices.

Globally, about 58 per cent of the labour force was employed in agriculture in 1960, which fell to about 24 per cent in 2019. During the same period, the share of agricultural value-added in Gross Domestic Product (GDP) fell from about 34 per cent to about 10 per cent. In other words, in 1960, about 58 per cent of labour force was responsible for 34 per cent of the GDP indicating that per labourer value addition in non-agricultural sectors was 2.7 times higher than the same in the agricultural sector. In other words,

the ratio of value addition per labourer in the non-agricultural sector to the value addition per labourer in agriculture (let us call it co-efficient of inter-sectoral inequality) was 2.7. In 2019, about 24 per cent of labour force was responsible for about 10 per cent of the GDP indicating that per labourer value addition in non-agricultural sectors was higher than the same in the agricultural sector by about 2.91 times. This indicates that globally, people engaged in agriculture as a whole have suffered inequality and the same has worsened over time.

The situation is far worse in poorer countries. For example, in developing countries, in 1991, about 53.21 per cent of the labour force generated about 19.7 per cent of GDP, which fell to 32.09 per cent and 8.49 per cent, respectively in 2019. This indicates that in developing countries, per labourer value-added in non-agricultural sectors was about 4.64 times higher than the same in the agricultural sector in 1991 and the disparity went up to 5.09 times in 2019. This also indicates that the deprivation of the people engaged in agriculture not only creates inequality within countries but also among countries, also because a larger proportion of people are engaged in agriculture in poorer countries.

In India, of course, the situation is much better. In 1991, 63.32 per cent of the labour force generated 27.33 per cent of GDP, which came down to 42.60 per cent and 16.68 per cent, respectively. This indicates, per labourer value-added in non-agricultural sectors was about 4.59 times higher than the same in the agricultural sector in 1991 and the disparity came down to 3.71 times in 2019. It is to be noted that in 1991, the Indian situation was not very different from average developing countries, but by 2019, such disparity has reduced to a great extent. This is mainly due to the fact that India has seen the large-scale expansion of informal employment in the manufacturing and services sector where wages are marginally higher than those prevailing in agriculture. The Indian employment guarantee programme that generates non-agricultural jobs in rural areas might also have contributed to this process.

Broadly speaking, in India, inter-sectoral inequality seems to have moved in the opposite direction of the movement in the global food price index and the measure of agricultural support (Figure 2.2). High global price, as well as high production support to agriculture, appears to reduce inter-sectoral inequality. However, developing countries, including India, find it difficult to subsidise their farmers to any great extent, the way subsidies have been defined and the provisions in the WTO agreement framed, these countries will find it difficult to subsidise even if they have the resources and the intentions (Nanda, 2017).

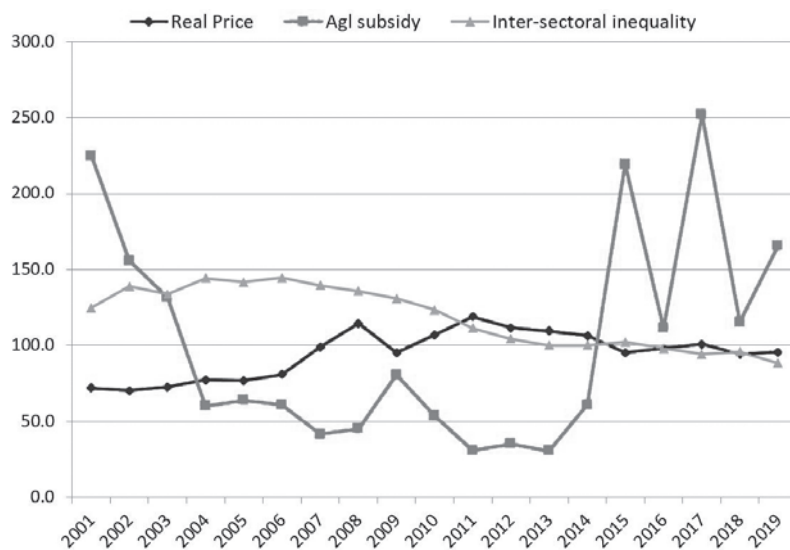


Figure 2.2: Indices of International Food Price, Production Support, and Inter-sectoral Inequality in India 2001-19

Source: FAO, OECD, World Bank

Such a situation of high inter-sectoral inequality has been sustained by high agricultural subsidies in developed countries that keep the prices of agricultural products low even if the costs of cultivation go up. In 2020, the real global food price was lower than that prevailing in 1961 (Figure 2.2). While the real food price went up until around the mid-1970s, it declined substantially thereafter, reaching the lowest level during the late 1980s. Most developing countries find it difficult to provide huge subsidies even if agriculture remains in crisis. As estimated by the Organisation for Economic Co-operation and Development (OECD), in many developing countries, production support in agriculture is negligible and even negative in some cases.

The production support for agriculture in the case of India, as estimated by OECD, remained negative throughout 2001-20 and went down to the extent of -25.97 per cent in 2013. This is the situation in many other developing countries (Nanda, 2021). As a result of this, agriculture in many developing countries including India continues to stagnate. This creates a situation where the share of agriculture in employment remains high as these countries fail to industrialise quickly, the share of value-added in agriculture declines as agriculture does not show high growth. Over the last three decades, the share of agricultural value-added in GDP has declined from 27.33 per cent in 1991, to 16.68 per cent in 2019 (Table 2.1).

Table 2.1: Share of Agriculture in the Gross Domestic Product and Total Employment (%)

Country		1991	2001	2006	2011	2015	2016	2017	2018	2019
India	GDP	27.33	21.62	16.81	17.19	16.17	16.36	16.56	15.97	16.68
	Employment	63.32	59.10	55.08	49.26	45.26	44.56	43.93	43.33	42.60
Global Average	GDP	18.60	13.35	11.66	11.07	10.41	10.32	10.21	9.88	9.99
	Employment	36.05	33.24	30.73	28.24	26.16	25.71	25.31	24.76	24.33
Developing Countries	GDP	19.70	12.83	10.34	9.73	9.13	9.03	8.68	8.34	8.49
	Employment	53.21	47.81	43.12	38.38	34.52	33.94	33.34	32.65	32.09
Developed Countries	GDP	–	1.73	1.33	1.40	1.32	1.29	1.32	1.24	1.20
	Employment	6.44	4.51	3.83	3.36	3.11	3.00	2.91	2.82	2.76

Source: World Bank, World Development Indicators Database

Liberalisation in the Uruguay Round

As a result of the Uruguay Round, agriculture was brought fully under WTO disciplines. While in industrial goods, the focus was on the reduction of tariffs, because of the prevailing situation, subsidies got substantial importance in agricultural liberalisation. It has often been argued that agricultural liberalisation stood on three pillars, namely, the reduction of domestic production support, export subsidies, and tariffs. In that sense, subsidies received greater importance than tariffs or market access in agricultural liberalisation.

There was agreement on the reduction of the level of domestic support, except for the exempted green box² policies and the *de minimis* amounts (amounts below a certain level). Developed countries were to reduce Aggregate Measure of Support (AMS) by 20 per cent (*de minimis* 5 per cent) while developing countries committed to reducing by 13.3 per cent (*de minimis* 10 per cent). A methodology for measuring AMS was also agreed upon. Developing countries were also allowed more flexibility through longer implementation periods, along with lower reduction commitments.

² In WTO terminology, subsidies in general are identified by 'boxes' which are given the colours of traffic lights: green (permitted), amber (slow down, i.e. be reduced), and red (forbidden). The Agriculture Agreement has no red box, although domestic support exceeding the reduction commitment levels in the amber box is prohibited. Any support that would normally be in the amber box, is placed in the blue box if the support also requires farmers to limit production. The green box covers expenditures such as government programmes for research, infrastructure, and building public food stocks, as well as specific kinds of direct payments to farmers, which are supposed to be de-linked from production. The amber box contains measures to support prices, or subsidies directly related to production quantities. The blue box covers grants that are partially de-linked from production requirements.

Developing countries, however, gave very little domestic support, if any. Similarly, export subsidies were required to be reduced by 36 per cent by value and 21 per cent by quantity in the case of developed nations, 24 per cent by value and 14 per cent by quantity for developing nations. Here again, export subsidies were primarily given by developed countries.

On market access, developed countries agreed to reduce bound duties by 36 per cent over 6 years, while developing countries were to reduce bound duties by 24 per cent over 10 years. Additionally, import measures had to be eliminated or converted to tariffs (tariffied), and then subjected to progressive reduction commitments, except for rice and some other staple foods that were subject to minimum access commitments, that is Tariff Rate Quotas (TRQs).

Subsidies: Gainers and Losers

Agricultural subsidies are given to agricultural producers in the form of direct financial support or indirect non-financial support such as government support to agricultural research programmes. According to OECD (2021), 54 countries—all OECD and EU countries, plus 12 key emerging economies—provided on average US\$ 540 billion per year agricultural support from 2018 to 2020. About 60 per cent of this was accounted for by the OECD countries which accounted for about 90 per cent of the same when the WTO came into being (Nanda, 2008). This is not because there has been a substantial change in the OECD countries, but mainly because China has now become a major supporter of agriculture with about 200 US dollars of average support per year. Support by OECD countries has been around the US\$ 300 billion all along. There is, however, a major difference between China and the OECD countries. About three-fourths of OECD support is provided as support to producers directly. In China, it is just the opposite as it mainly consists of market price support.

Given this, much of the subsidies offered by developed countries are real subsidies, while most of the subsidies offered in China are notional. As the estimate of market price support is obtained by comparing the domestic price and the international price, the difference might come up due to various reasons rather than just government support. It is also impacted by tariff barriers and the WTO members have a legitimate right to maintain tariffs. Moreover, such estimates can be credible when most countries do not give subsidies and the international price does reflect the true demand-supply situation. Thus, it is virtually impossible to get the true picture of market price support offered by individual countries.

Nevertheless, India's production support for agriculture has been in the negative for a long time (Nanda, 2021). Argentina and Vietnam are also countries where government policy resulted in implicit taxation of farmers. In India, however, there is extensive support for consumers, which is believed to support agriculture indirectly. Therefore, on balance, Indian agriculture is believed to receive some positive support. In Argentina and Vietnam, these programmes are quite small, resulting in negative net support for agriculture.

In 1995-98, WTO member countries notified export subsidies of US\$ 10 billion. Developed countries accounted for about 90 per cent of the total. This is, however, one area where substantial progress has been made. Agricultural export subsidies have come down substantially and this is not an area of concern anymore.

Net food-importing countries often welcome lower global food prices maintained by agricultural subsidies in developed countries as it keeps their food import price and bill low which they like as food price is a politically sensitive issue in most countries. While it might appear to be a blessing in the short run, it keeps their farmers and the country as a whole perpetually in poverty. The global community must ensure that these countries can ensure access to food for all but at the same time can ensure that their farmers get reasonable returns.

In most developed countries, the proportion of the population depending on agriculture varies between 2 to 7 per cent. Hence, unlike most developing countries, farmers do not wield much political power. Hence agricultural subsidies in developed countries reflect the political power of the industry supplying seed, animal feed, fertilisers, pesticides, and of course, the food industry, rather than the farmers (UN/ESC, 2004). In developed countries, barring a few exceptions, per hectare production is higher compared to developing countries, which is achieved mainly through excessive use of agricultural inputs including fertilizers, pesticides, energy, water, expensive seeds, and intensive use of machines. It is also a fact that 'higher productivity' almost everywhere, including in some developing country regions, is sustained by high agricultural subsidies (Nanda, 2021).

The high-subsidy regions of the developed world, namely, Western Europe, the US, Canada, and Japan consume more than half of chemical fertilizers, pesticides, and commercial seeds, though they occupy less than 20 per cent of the total cropped land. Thus, shifting of agricultural production from developed to developing countries may lead to lesser consumption of these inputs globally. If agricultural production falls in these regions due to a reduction in subsidies, agro-business companies would be badly hit. It is this agro-business industry that is the major beneficiary of agricultural

subsidies in developed countries and not the farmers as such (Nanda, 2008). Moreover, such excessive use of agricultural inputs also harms the environment apart from harming the poor farmers in developing countries (Scown et al., 2020). Given this, cutting down on subsidies or diverting them to environment-friendly agriculture will help achieve sustainable development goals. Even if agricultural production is compromised in the process, it is unlikely to harm food security as a substantial part of agricultural output including food is used for non-food commercial purposes.

Market Access in Agriculture

The global agricultural market is still highly distorted not only due to huge subsidies but high tariffs as well. Developed country markets like the US, EU, the Republic of Korea, and Japan are highly protected markets in this regard. While the average tariff rate could be quite misleading, the Republic of Korea and Norway have quite high average tariff rates as well. The average duty can be misleading as a country can accord high protection to a few products in which it has an interest while keeping the average rate low by maintaining very low tariffs on products that it does not produce. Norway seems to have the highest maximum applied Most Favoured Nation (MFN) duty rate at higher than 1,000 per cent followed by the Republic of Korea at 887 per cent. In both countries, the applied MFN rates are the same as bound rates meaning that they have not reduced the rates even a bit since what they committed at the Uruguay Round which was very high.³ Other countries that have the same MFN applied rates, as well as the maximum bound rates, are Japan, the US, and Russia at 662 per cent, 350 per cent, and 100 per cent, respectively.

In the EU, the applied MFN rate is marginally lower than the maximum bound rate at 146 per cent and 152 per cent, respectively. In India, while the applied maximum rate is at 300 per cent, the maximum applied MFN rate is much lower at 150 per cent only. The coefficient of variation that gives a measure of the degree of intervention (very low duty rates when it suits its interest but a very high rate otherwise) or even arbitrariness is the highest for the US duty rates at 341 per cent for the bound rates and 321 per cent for the MFN applied rates, followed by the Republic of Korea and Japan at 241 per cent and 225 per cent, respectively for their MFN applied rates (Table 2.2).

³ Most Favoured Nation (MFN) rates are the rates of duty that a (WTO member) country imposes on all WTO members on a non-discriminatory basis. These rates are applicable unless it has a preferential agreement with the source country.

Table 2.2: Tariff Structure for Agricultural Goods 2006–2020

Country/ Territory	Simple Average				Maximum Duty				Coefficient of Variation		Number of Tariff Lines
	Bound		MFN Applied		Bound		MFN Applied		Bound	MFN Applied	
Year	2006	2020	2006	2020	2006	2020	2006	2020	2020	2020	2020
Australia	3.4	3.5	1.2	1.2	52	29	26	19	143	173	856
Brazil	35.5	35.4	10.2	10.1	55	55	35	35	31	54	1,064
China	15.8	15.7	15.7	13.8	65	65	65	65	75	85	1,169
European Union	15.4	11.6	15.1	11.2	264	319	229	200	147	138	2,101
United States	5.2	4.8	5.3	5.1	350	350	350	350	341	321	1,705
India	114.2	113.1	37.6	34	300	300	182	150	46	81	1,527
Indonesia	47	47.1	8.2	8.7	210	210	170	150	50	213	1,369
Japan	28.4	17.8	24.3	15.8	958	662	958	662	230	225	1,951
Korea, Republic of	59.3	61.5	47.8	56.8	887	887	887	887	210	241	1,737
Norway	137.6	138.2	61.1	40.1	>1000	>1000	>1000	>1000	121	193	1,410
Russian Federation		10.7	13.5	9.7		100	227	100	116	116	2,703
Indonesia	47	47.1	8.2	8.7	210	210	170	150	50	213	1,369

Source: WTO ITC UNCTAD, World Tariff Profiles, various issues

If Russia has the highest number of tariff lines (2,703), the EU, Japan, and the Republic of Korea are not far behind at 2,101, 1,951, and 1,737, respectively. Even the US has quite a large number of tariff lines at 1,705. Developing countries like Brazil, China, India, and Indonesia have a much smaller number of tariff lines. The number of tariff lines not only indicates how complicated a tariff structure a country has, but it also has an impact on the estimate of the average tariff rate. Since this average is a simple average here, the rate of duty for a large number of tariff lines that may not be relevant for the country can be set to zero or near zero which will substantially lower the average tariff estimate.

Most developed countries (barring exceptions like Norway) have committed to lower tariffs on agricultural goods as they supported their farmers through subsidies rather than import tariffs. Nevertheless, they had to reduce their tariffs, though they still maintain high tariffs on some goods. What is important to note is that during the Uruguay Round of negotiations, all countries including the developing countries accepted the commitment to reduce subsidies as well as tariff barriers. Accordingly, developing countries have also accepted bound rates of tariffs on agricultural goods. India's applied rates for agricultural goods are much lower than the bound rates.

Impacts of World Trade Organization Agreement on Agriculture

The share of agricultural products in total merchandise exports fell from 8.1 per cent in 1995 to 7.3 per cent in 2019. This is primarily due to much higher growth in the trade of non-agricultural products, which was quite natural as demand for non-agricultural products in general increased at higher rates compared to the demand for agricultural goods. Between 1995 and 2019, average food prices rose by about 24 per cent, reversing the earlier trend when food prices saw a substantial decline. However, it is difficult to say whether WTO had anything to do with it or it was essentially due to a rise in global demand for agricultural goods led by China as it became the second-largest importing nation with a share of 12.7 per cent of world imports of agricultural goods compared to just 3.6 per cent share in 1995 (WTO 2020).

India was not among the top ten exporters of agricultural goods in 1995, but it emerged as the ninth largest exporter of agricultural goods in 2019. However, it should also be noted that India was also not among the top ten importers of agricultural goods in 1995, but it emerged as the ninth largest importer of agricultural goods (WTO 2020). Hence, it is difficult to say whether India has benefited from the global agricultural trade regime under the WTO. The only thing that can be said is that the Indian agricultural sector has become more globalised over time. However, this ranking is based on treating the EU as one trader. If all European countries are considered separately, then India does not enter the top ten clubs as several European countries export and import more compared to India. Even tiny Belgium exports and imports substantially more than India.

During 1995-2019, global exports of agricultural goods increased from US\$ 446.12 billion to US\$ 1,459.05 billion—an increase by 3.27 times. During the same period, Indian exports of agricultural goods increased from US\$ 5.35 billion to US\$ 30.99 billion—an increase by 5.79 times (WTO 2020). Thus, it might appear that India has gained substantially. However, during the same period, Indian imports of agricultural goods also increased from US\$ 2.06 billion to US\$ 22.60 billion marking an increase by 10.97 times. Hence, there is no cause for celebration for India.

Region wise, North America held the highest share in exports of agricultural products with 28.8 per cent in 1995. But in 2019, Asia took the place of North America with almost the same share the latter had in 1995 with 28.7 per cent. Europe also saw a decline in its share from 22.4 to 20.3 per cent over the same period. South and Central America also saw a rise in share from 14.5 per cent to 17.6 per cent, almost similar to Asia in terms of gain in percentage points. The share of the African region remained the same at 5.1 per cent.

In terms of imports, Europe's share of world imports of agricultural products went down from 26.2 per cent in 1995 to 17.7 per cent in 2019—a loss of 8.5 per cent of the share. The share of South and Central America also decreased marginally, by 1.2 percentage points. The shares of all other regions increased. Asia's share in global imports showed distinct growth—from 34.9 per cent to 39.3 per cent (WTO 2020). The share of North America also saw an increase from 15.7 per cent to 19.5 per cent—with all three countries in the region contributing to the growth. In Asia, the import growth was primarily led by China with its share increasing from 3.6 per cent in 1995 to 12.7 per cent in 2019, while the share of Japan witnessing a massive decline from 13.3 per cent in 1995 to 5.6 per cent in 2019. While the share of India witnessed a modest growth, the Korean share declined marginally over the same period.

Hence, it can be reasonably argued that the rise in global trade in agricultural goods was fuelled mainly by Chinese economic growth as both Europe and Japan saw a massive decline in their share. The decline in the share of Europe was largely because of trade diversion due to European integration as the intra-EU import rose from US\$ 154.17 billion in 1995 to US\$ 405.7 billion in 2019. Thus, growth in agricultural trade was predominantly a South-South phenomenon rather than a North-South one, confirming that the WTO played a minimal role in the process.

The fact that the share of Africa in world exports remained the same at 5.1 per cent while its share in world imports increased substantially from 5.3 per cent to 7.0 per cent indicates that it has seen import surges in developing countries during the implementation process of AoA. One sided-liberalisation of agriculture, namely, reduction of tariff barriers but no reduction of subsidies resulted in a negative impact on food security, livelihood, and rural development of poor countries in Africa.

Moreover, while traditional trade barriers in agriculture such as tariffs continue to decline, the use of technical and regulatory barriers is on the rise. In recent years, Sanitary and Phytosanitary (SPS) measures and Technical Barriers to Trade (TBT⁴) have emerged as the greatest threat to poor countries' exports. By their very nature, both of these agreements may result in restrictions on trade. All governments accept the fact that some trade restrictions may be necessary and appropriate to ensure food safety and animal and plant health protection; however, developed countries are increasingly and arbitrarily using these measures.

⁴ Sanitary and Phytosanitary (SPS) measures are imposed by countries to protect human, animal and plant health by preventing entry of harmful pathogens and invasive alien species, while Technical Barriers to Trade (TBT) are used to ensure safety in general and also to ensure compatibility of technical standards prevailing in the country.

Doha Round: The State of Play

In the Doha Round of trade negotiations, agricultural negotiations became an essential component of WTO negotiations. Ultimately, agriculture proved to be the dealmaker at Doha when the EU compromised its stance on agriculture subsidies. The Declaration recognised the progress in negotiations in agriculture mandated by the Uruguay Round Agreement and proposed comprehensive negotiations aimed at substantial improvements in market access to phase out all forms of export subsidies and substantially reduce trade-distorting domestic support measures. However, the EU also got its pound of flesh as it got stronger language on the environment and the Singapore issues. The Cancun Ministerial Meeting, first after the launch of the new round in 2001, failed because of the stand-off between the EU and the newly formed G20 alliance over farm subsidies but also due to the Singapore issues.⁵ In the so-called July Package, however, commitment to liberalise agricultural trade could be made while dropping three of the Singapore issues (competition policy, investment and government procurement), which developing countries never wanted.

At the Hong Kong Ministerial Conference, the situation was no different. A fierce tri-partite battle involving the EU, the US, and the G20, was witnessed over the end date for the elimination of export subsidies and disciplining food aid. However, WTO members did not want to repeat Cancun and hence put together some tentative arrangements. In effect, the stalemate was postponed. After the Hong Kong Conference, however, the focus became more on market access, compared to subsidies. As developing countries may have to face more obligations, they gave more emphasis on Special Products (SPs) and Special Safeguard Mechanism (SSM).

The negotiations on agriculture took a completely new turn afterwards, particularly in the run up to the Bali Ministerial Conference in 2001. With time it became quite apparent that the method of estimating the AMS was quite problematic. It is found by comparing the current price with the international reference price for that product that prevailed during the base year from 1986 to 1988. The reference price itself was questionable as the prices of staple crops during 1986 and 1988 were among the historically lowest and were highly subsidised. In 2009, food prices were 24 per cent above their respective level in 1995 (WTO, 2010). Costs of agricultural inputs have also increased substantially since 1988. Hence sticking to

⁵ This G20 was different from the current G20 that was formed after the global financial crisis of 2007. It was a coalition of developing countries on agriculture and the members were Argentina, Bolivia, Brazil, Chile, China, Cuba, Egypt, India, Indonesia, Mexico, Nigeria, Pakistan, Paraguay, the Philippines, South Africa, Thailand, Tanzania, Uruguay, Venezuela, and Zimbabwe.

an international reference price based on 1986-88 prices is quite absurd. Moreover, while developing countries can keep AMS up to 10 per cent, compared to only 5 per cent for developed countries, developing nations have more restrictions in this regard. For developed countries, the limit is for all crops taken together enabling them to support individual crops at a much higher level, for developing countries, the limit is for both aggregates as well as individual crops.

Realising that these provisions can endanger agriculture and food security, particularly in developing countries who have followed a different kind of policy environment to support agriculture and now would find it difficult to switch to a system akin to the US and other developed countries so that much of their support can be considered as green box type, India and other developing countries demanded reform in these provisions. In Bali Ministerial Meeting (2013), keeping all other issues aside, the WTO members decided to proceed with the trade facilitation agreement. However, raising a strong objection, India refused to sign a trade facilitation agreement without addressing the domestic support issue. Eventually, India was able to extract a peace clause of 4 years with respect to India or other countries potentially violating provisions on domestic support.

The next year, the government changed in India and it took a harder stance on the issue and refused to ratify the trade facilitation agreement unless the peace clause was extended to an indefinite period from 4 years until the time the issue of domestic production support was not amicably settled at the WTO. India's demand was finally accepted and the indefinite peace clause was officially accepted at the Nairobi Ministerial Conference in 2015. The Nairobi meeting also adopted a few more decisions on agriculture. It decided to fully eliminate export subsidies and create a mechanism that would allow developing countries to temporarily increase tariffs on agricultural products in cases of import surges or price declines. A decision was also taken to find a permanent solution to the AMS issue to enable countries to buy agricultural products and administer prices to build public stockholding and ensure food security.

Since then, discussions on agriculture have been at a low ebb. There has been some progress recently after the Chair of agriculture negotiations, Ambassador Gloria Abraham Peralta, tabled an 'initial draft text' at the end of July 2021. The text focuses on the so-called trade-distorting subsidies. It thus ignores the reality that those who subsidise their agriculture heavily are also large exporters yet their subsidies fall mostly under the green box. There is also ample evidence that green box subsidies are also trade-distorting. In the absence of a review of the green box subsidies, justice for developing countries will remain elusive.

As regards market access, the proposal is essentially based on the submission of a few WTO members, which seeks to introduce enhanced 'transparency and predictability in the application of ... applied tariff rates', or the actual tariffs. Currently, WTO rules are based on maximum or bound tariffs. The applied tariffs for most developing countries are much lower than the bound tariff rates. This offers them a policy space that enables them to raise tariffs during import surges. Shifting the focus from bound tariffs to applied tariffs would change the rules of the game and can have far-reaching implications.

In agriculture, Public Stockholding for Food Security Purposes (PSH) is the most crucial issue for India. The AoA considers providing subsidised foodstuffs to the poor as market-distorting and, therefore, implementing the National Food Security Act (NFSA) in 2013 could mean that might breach the 10 per cent limit of production subsidy. Two proposals that have been included in the text can be problematic for India. The first is that a developing country like India would have to limit its total procurement to 15 per cent of the domestic production of 'traditional staple food crops' to implement public stockholding programmes for food security purposes. This would make it impossible for India to implement its Food Security Act. It would also mean that it would be impossible to guarantee minimum support prices for a range of crops that Indian farmers are demanding. Thus, the best way to address this concern of India would be to bring this subsidy under the green box. The second proposal states that countries maintaining public food stocks must not allow exports from such stocks. The second proposal was tabled by the G-33, a developing country grouping in which India has played a major role in the past. So now it would be impossible for India to oppose it. But implementing this proposal can also be challenging if India has to guarantee minimum support prices.

Conclusions

For most developing countries, the nature and peculiarity of the agricultural sector and its role in food security pose a huge challenge to deal with the policy issues surrounding agriculture. While high food price can pose a serious challenge to food security, the fact that the majority of the poor draw their livelihood from agriculture, low food prices can also create vulnerability to people engaged in agriculture—both owner-farmers and wage earners. Food security concerns also prevent from switching over to non-food crops and import food that might be available in the global market generally at cheaper prices, but often subject to high volatility. Often farmers are of course constrained by a lack of technical knowledge and adequate market information.

Given this, the AoA signed in 1994 along with several other agreements of WTO was expected to herald a new era in agricultural trade and bring much relief and prosperity to commodity-dependent countries, particularly because, until the Uruguay Round of GATT, agriculture was virtually out of the global trade framework. The new agreement gave a comprehensive treatment to agriculture as it dealt with tariffs on agricultural commodities as well as the subsidies that have impacted agricultural trade and prices.

However, after more than a quarter of a century since the signing of the Agreement, agriculture remains highly subsidised in most developed countries making it extremely difficult for developing countries including India to access their markets. Moreover, the way subsidies have been defined, and the way the related commitments have been framed, has created problems for countries like India even though the subsidies that these countries provide are quite modest. Tariff reduction commitments of most developed countries are also quite low, and most of them have also stuck to the bound levels of tariffs for key commodities. On the contrary, most developing countries now maintain tariffs that are now much lower than their bound levels.

Doha Round was meant to address some of the concerns of developing countries. However, there has been relatively little discussion on agriculture, and WTO has been adopting and negotiating new issues yet the issues that remain pending for decades are not discussed. Trade facilitation came much later on the table and WTO already has an agreement on it. A similar approach can be seen even now. Developed countries are not showing much interest in the Doha Round including agriculture, but want to move fast on newer issues like e-commerce and fisheries subsidies. The initial text prepared by the Chair of Agriculture Negotiations also does not inspire much confidence, and the proposals put forward, if finally adopted, will bring new challenges for India.

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Trajectory of Indian Agricultural Exports: Competitiveness, Diversification, and Growth Linkages

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Background

The role of agricultural trade in achieving economic growth, alleviating poverty, and achieving food security is incalculable for developing countries like India. However, to safeguard the food security of the continuously rising population of the country, it is a prime agenda to ensure an efficient and sustainable domestic production system. The country has attained self-sufficiency in the majority of the crops by raising agricultural output. The increasing output is creating huge surpluses in some commodities, which need to be effectively channelised to alternative destinations. This is extremely important in the regime where all government policies and agendas are directed towards enhancing the farmers' income. The target of doubling farmers' income can be achieved by providing an efficient trading environment that will promote, not only competition within the nation but also provide opportunities to the farmer to draw benefits in international markets. Besides, policies are required to economically divert the surplus produce within the country towards the international markets enhancing the farmers' income.

The importance of India in the international market can't be denied. Over the years, India has developed export competitiveness in certain specialised products (ITA, 2021). Ever since the economic reforms began in 1991, India has maintained its position as a net exporter of agricultural products exporting around Rs. 2.52 lakh crore worth of agricultural products in Financial Year (FY) 2019-20. With the changing dietary pattern, a significant change in the composition of the exported agricultural products

has been observed. There has been a sharp increase in the export of Indian marine products over the last few years and its share of total agricultural exports has increased from 14.5 per cent in 2015-16 to 19 per cent in 2019-20 (GOI, 2021). Besides, there has been a rising demand for Indian Basmati rice, non-basmati rice, spices, and sugar as evident by their rising share of the total agricultural export. It makes evident the rising demand for Indian agricultural products. This accentuates the need for a close examination of export diversification across commodities and geographies.

Despite the increasing trends in agricultural exports, we have not been able to tap the desired potential. There exists huge untapped export potential, which could be tapped through appropriate interventions. It has been reported that export in developing countries is highly responsive to the quality of transport facilities, availability of trade-related infrastructures (Moisé et al., 2013). The role of policies targeting constraints related to governance, infrastructural facilities, and education for improving agricultural trade performance has been highlighted by many researchers (Moisé et al., 2013). Further, trade-growth linkages have attained due attention in global trade research. Few studies have been carried out to examine the Export-led Growth (ELG) and have established the hypothesis that it depends on the country's stage of development and its participation in trade. A study conducted in the United Arab Emirates (UAE) validates a bi-directional causality between manufactured exports and economic growth in the short-run and the Growth-Led Exports (GLE) in the long run (Kalaitzi and Cleeve, 2018). Likewise, it has been estimated for Nigeria that a unit increase in agricultural exports would bring a more than proportionate increase in the real gross domestic product (Gbaiye et al, 2013). Besides, the empirical support for ELG can be deduced from the success of the four East Asian Tiger economies (South Korea, Hong Kong, Singapore, and Taiwan) (Palley, 2012).

Considering these, this study provides a snapshot of Indian agricultural exports. The study has examined the trends and composition along with the performance of agricultural exports. It has also focused on geographical diversification to understand the export dynamics. In addition, the study drew inferences about the causality and export-growth relationships. The inferences would be useful in developing appropriate strategies for better targeting and managing Indian agricultural exports.

Data and Approach

The study focuses on examining the trends and growth in major agricultural exports of the country. The study also computed diversification indices for

the selected commodities. Also, the study examined export-growth linkages. This section discusses the data sources and approach followed for studying these important dimensions pertaining to agricultural exports.

Data

This chapter has sourced its data from the United Nations (UN) Comtrade database at HS 02 and HS 04 digits from 1988 to 2019. The detailed analysis was carried out for major agricultural commodities (including livestock and fisheries) based on the export values and shares in agricultural exports. The ELG and GLE hypothesis was examined for major crops based on their share in agriculture at HS 04 level classification. The detailed list of commodities covered for analysis is given in Appendix 1.

Examining the Structural Breaks

The study identified the structural breaks in the Indian agricultural exports from 1990-91 to 2019-20 (post-economic reform). Tests for parameter instability and structural change have been an important part of time series and regression analysis. Initially, Chow (1960) tested for regime change at a time series using an F-statistic. Quandt (1960) modified the Chow framework to consider the F-statistic with the largest value over all possible break dates. Andrews (1993) and Andrews and Ploberger (1994) derived the limiting distribution of the Quandt and related test statistics. Bai (1997) and Bai and Perron (1998, 2003) further extend the Quandt-Andrews framework by allowing multiple unknown breakpoints. We applied global information criteria to estimate breakpoints using global minimisers of the sum of squared residuals. The Liu, Wu, and Zidek (LWZ) (1997) and Schwarz Criterion (SC) criteria were chosen as the selection criterion for the optimum number of breaks. According to Bai and Perron (2003), LWZ (1997) method performs better than the other two criteria under the no-break null hypothesis.

Export Competitiveness

The Revealed Comparative Advantage (RCA) index was used to examine export competitiveness. This is driven by economic factors, operational change, enhanced global demand, and trade concentration (Batra and Khan, 2005). By using Balassa's (1965) index, RCA for the selected commodities was calculated as follows:

$$RCA_{ij} = \frac{\left(\frac{X_{ij}}{\sum_{j=1}^k X_{ij}} \right)}{\left(\frac{X_{wj}}{\sum_{j=1}^k X_{wj}} \right)}$$

Where,

RCA_{ij} = Revealed Comparative Advantage for i^{th} country in j^{th} product,

X_{ij} = Value of export of j^{th} agricultural product from i^{th} country,

$\sum_{(j=1)}^k X_{ij}$ = Value of agricultural export of i^{th} country,

X_{wj} = Value of global export of j^{th} product, and

$\sum_{(j=1)}^k X_{ij}$ = Value of global agricultural exports

RCA value lies between 0 to ∞ . An i^{th} country is said to have a comparative advantage in the production of j^{th} product if the value of RCA_{ij} exceeds '1'.

Export Diversification Index

To reap the benefits of trade, a country must expand its export basket in terms of the goods offered and also markets accessed. A country must not always rely on a set of countries only to export the product. In case of a volatile policy environment in the importing nation, the exporting country may incur a huge loss. So, a country must continue to keep adding new markets for the products. Diversification into new primary export products is generally viewed as a positive development. Hence, Export Diversification Index (DXI) reveals the export strength of a country in terms of markets and products, both. The DXI for India is defined as follows:

$$DXI_j = (\sum |h_{ij} - x_i|)/2$$

Where h_{ij} is the share of i^{th} commodity in the total exports of j^{th} country and x_i is the share of the commodity in world exports. The related measure used by the United Nations Conference on Trade and Development (UNCTAD) is the concentration index or Hirschman (H) index, which is calculated using the shares of all selected agricultural products in a country's exports:

$$H_j = \sqrt{\sum (x_i / X_t)^2}$$

Where x_i is j^{th} country's exports of i^{th} product and X_t is j^{th} country's total exports. The lower the index, the less concentrated are a country's exports.

Examining the Growth Linkages

The study attempted to establish the causal relationship between major agricultural exports and economic growth of the country. It employed systematic time series analysis to draw reliable insights for policy inputs. The detailed approach is illustrated below:

Checking the Stationarity of the Data

The first step in the times series analysis, before testing for co-integration and causality, is to examine the stationarity of each time series selected for the

analysis. Augmented Dickey-Fuller (ADF) unit root test (Dickey and Fuller, 1979) was considered to examine the stationarity. A time series is said to be 'stationary' if a constant mean and constant variance with its Autocorrelation Function (ACF) is not significantly different from zero through time. The test is applied for the parameter ρ in the auxiliary regression.

$$\Delta_1 y_t = \rho y_{t-1} + \alpha_1 \Delta_1 y_{t-1} + \varepsilon_t$$

Where, Δ_1 denotes the differencing operator, i.e. $\Delta_1 y_t = y_t - y_{t-1}$.

The relevant null hypothesis is $\rho = 0$, i.e. the original series is non-stationary and the alternative is $\rho < 0$, i.e. the original series is stationary.

Vector Autoregressive Process

Let us consider a univariate time series, arising from the model

$$y_t = v + \phi_1 y_{t-1} + \phi_2 y_{t-2} + \dots + \phi_k y_{t-k} + u_t, u_t \sim \text{IN}(0, \sigma^2) \quad \dots(1)$$

Where, u_t is a sequence of uncorrelated error terms and $j, j = 1, 2, \dots, k$ is the constant parameters. This is a sequentially defined model; y_t is generated as a function of its past values. This is a standard autoregressive framework or AR (k), where k is the order of the auto-regression. If a multiple time series y_t of n endogenous variables is considered, the extension of (1) will give the Vector Autoregressive (VAR)(k) model (VAR model of order k), i.e. it is possible to specify the following data generating procedure and model y_t as an unrestricted VAR involving up to k lags of y_t and can be expressed as follows:

$$y_t = v + A_1 y_{t-1} + A_2 y_{t-2} + \dots + A_k y_{t-k} + u_t, u_t \sim \text{IN}(0, \Sigma) \quad \dots(2)$$

Where, $y_t = (y_{1t}, y_{2t}, \dots, y_{nt})'$ is $(n \times 1)$ random vector, each of the A_i is an $(n \times n)$ matrix of parameters, v is a fixed $(n \times 1)$ vector of intercept terms. Finally, $u_t = (u_{1t}, u_{2t}, \dots, u_{nt})'$ is a n -dimensional white noise or innovation process, i.e. $E(u_t) = 0$, $E(u_t u_t') = \Sigma$ and $E(u_t u_s') = 0$ for $s \neq t$. The covariance matrix Σ is assumed to be non-singular. Using lag operator (L), (2) can be written as follows:

$$(I_n - A_1 L - \dots - A_k L^k) y_t = v + u_t$$

The process y_t is said to be stable if the roots of the polynomial, $|I_n - A_1 L - \dots - A_k L^k| = 0$ lie outside the complex unit circle, i.e. have a modulus greater than one.

Examining Long-Term Causality

To conduct the Granger causality test, a VAR model is estimated, by including the optimal lag length. VAR Granger Causality/Block exogeneity wald test was applied, to verify the causal relationship between the variables. According to Granger (1969), X is said to Granger cause Y, if the past and the present value of X helps to predict Y and vice versa, which examines

how one variable explains the latest value of another variable. Accordingly, if a variable Y is Granger caused by variable X, it means values of variable X helps in predicting the values of variable Y and vice-versa. The causality relationship among rice export, tea cotton, cotton yarn, agriculture Gross Value Added (GVA), pepper, onion, groundnut, fennel, coriander, and cumin exports were tested using the VAR Granger causality procedure. ELG and GLE hypothesis were based on the direction of a causal relationship between economic growth which is represented by total GVA and earlier mentioned agricultural exports.

Co-integration Analysis

Co-integration depicts the long-term relationship between the variables. It means that even if two or more series are non-stationary, and become stationary after differencing of the same order, they are said to be co-integrated. Johansen's (1988) multivariate co-integration approach was used to examine co-integration between the fennel, coriander and cumin, onions, pepper, rice, tea, and the total GVA.

Johansen's co-integration assumes that the series are integrated of the same order. If the series are all integrated of order d, i.e. I (d) and a vector β can exist so that the series will be linearly combined to produce residuals integrated of order zero I (0), i.e. residuals that are stationary, then there exists a long-run relationship among the variables. The long-run relationship could be stated as follows:

$$\beta_1 X_{1t} + \beta_2 X_{2t} + \beta_3 X_{3t} + \beta_4 X_{4t} + \beta_5 X_{5t} = 0$$

Where X_{1t} , X_{2t} , X_{3t} , X_{4t} , and X_{5t} stand for selected variables for integration test in time period 't'. Johansen (1988) and Johansen and Juselius (1990) described two separate methods, namely, trace statistics and maximal Eigenvalue test to find out the number of co-integrating vectors. The maximal Eigenvalue test is the likelihood ratio test for the null hypothesis, presence of 'r' co-integrating vector against the alternative hypothesis r + 1 co-integrating vector which can be stated as follows:

$$\lambda_{\max}(r, r + 1) = -T \ln(1 - \lambda_{r+1})$$

The second procedure is also based on the likelihood ratio test. Trace statistic verifies the increasing tendency of the trace as a result of the addition of more Eigenvalues beyond the rth vector. The null hypothesis based on λ trace verifies if the presence of co-integration vector is less than or equal to 'r' against the alternative hypothesis, the presence of more than 'r' co-integrating vectors. It can be estimated as follows:

$$\lambda_{\text{trace}} = T \sum_{i=r+1}^m \ln(1 - \lambda_{r+1})$$

Where, $\lambda_{r+1} \dots \lambda_m$ are m-r smallest estimated Eigenvalue.

Structural Breaks in Agricultural Exports

Multi-structural breaks in agriculture exports from 1990-91 to 2019-20 were obtained from the global information criterion developed by Bai and Perron (2003). We selected a maximum of five breaks for break-test options to identify the multiple breaks in the agricultural exports from 1990-91 to 2019-20. Both, Schwarz and the LWZ information criteria suggested two breaks (2006-07 and 2011-12) during the period. The selection of optimum breaks was based on the lowest Schwarz and LWZ criterion values (Table 3.1). Though 1995 did not emerge as a breakpoint in the statistical analysis, it was selected on account of strategic reasons as a structural breakpoint as the country joined the World Trade Organization (WTO) in this year. Finally, the study confined to three major structural breaks with four phases in agriculture exports, the first was from 1990-91 to 1994-95, the second was from 1995-96 to 2005-06, the third was from 2006-07 to 2010-11, and the fourth was from 2011-12 to 2019-20. (Figure 3.1)

Table 3.1: Multi-structural Breaks in Agriculture Exports after Economic Reforms

Multiple breakpoint tests Compare information criteria for 0 to M globally determined breaks Date: 11/24/21 Time: 11.53 Sample: 1 30 Included observation: 30 Breaking variables: C Break test options: Trimming 0.15, Max. breaks 5					
Schwarz criterion selection breaks:				2	
LWZ criterion selected breaks:				2	
Breaks	# of Coefs.	Sum of Sq. Resids.	Log-L	Schwarz* Criterion	LWZ* Criterion
0	1	2.73E+11	-386.5202	23.04351	23.09435
1	3	2.28E+10	-349.3021	20.78905	20.94522
2	5	9.95E+09	-336.8559	20.18605	20.45303
3	7	8.18E+09	-333.9315	20.21783	20.60209
4	9	6.70E+09	-330.9227	20.24400	20.75210
5	11	5.95E+09	-329.1545	20.35287	20.99592
* Minimum information criterion values displayed with shading					
Estimated break dates:					
1: 22					
2: 17, 22					
3: 13, 18, 22					
4: 13, 18, 22, 27					
5: 6, 14, 18, 22, 27					

Source: Computed by Authors

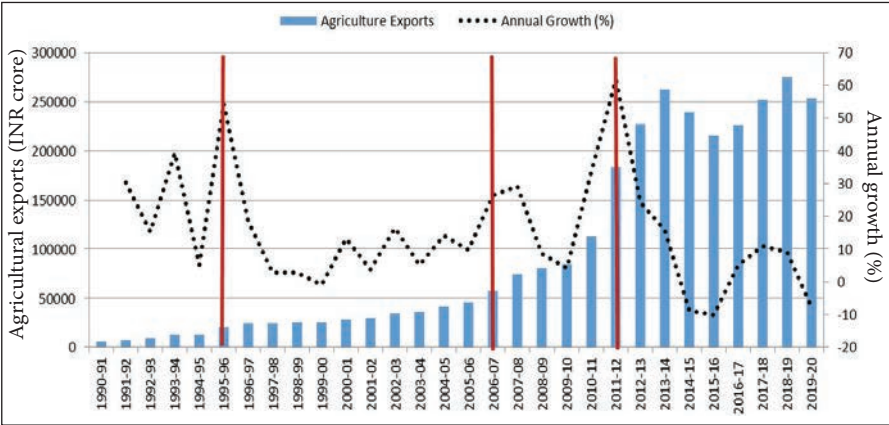


Figure 3.1: Delineation of Phases in Agricultural Exports

Source: Based on the data from Directorate of Economics and Statistics

Trends in Agricultural Trade

India has always been a net exporter in the case of agriculture despite the initial phases of attaining self-sufficiency in most of the commodities. The exports of agricultural commodities picked up after 1970-71; however, a kick start was attained only after 1994-95 with the launch of global trade reforms and trade integration with the establishment of WTO. Over the last 25 years since India’s liberalisation, foreign trade has expanded multifold and seen significant structural shifts in product mix as well as geographic spread. Liberalisation in trade policies related to easing of several trade restrictions. Reduction in tariff levels across different products along with other trade reforms has assisted the growth of foreign trade, especially in the first two

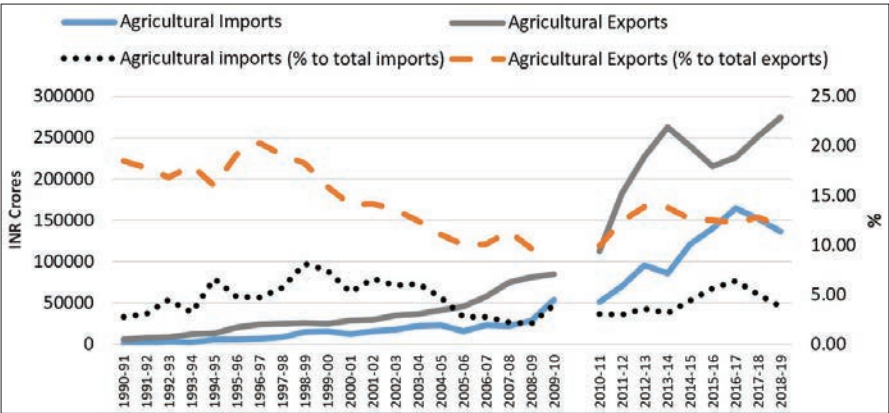


Figure 3.2: Contribution of Agricultural Trade to Total Trade

Source: Based on the data from Directorate of Economics and Statistics

Table 3.2: Trends in Agricultural Trade of India

Years	Agriculture Exports (Rs crore)	Total Exports (Rs crore)	Agriculture Exports to Total Exports (%)	Agriculture Imports (Rs crore)	Total Imports (Rs crore)	Agriculture Imports to Total Imports (%)	Net Trade (Rs crore)	Net Agricultural Trade (Rs crore)
1965-66	335	806	42	536	1,394	38.43	-589	-201
1970-71	565	1,535	37	604	1,642	36.80	-107	-39
1975-76	1,686	4,042	42	2,142	5,265	40.68	-1,223	-457
1980-81	2,376	6,683	36	2,300	12,549	18.32	-5,866	76
1985-86	3,271	10,895	30	3,889	19,657	19.78	-8,763	-618
1990-91	6,013	32,527	18.49	1,206	43,171	2.79	-10,644	4,807
1995-96	20,398	1,06,353	19.18	5,890	1,22,678	4.8	-16,325	14,508
2000-01	28,657	2,01,356	14.23	12,086	2,28,307	5.29	-26,950	16,571
2005-06	45,711	4,56,418	10.78	15,978	6,60,409	3.26	-2,03,991	29,733
2010-11	1,13,047	11,36,964	10.28	51,074	16,83,467	3.41	-5,46,503	61,973
2015-16	2,15,396	17,16,378	12.55	1,40,289	24,90,298	5.63	-7,73,920	75,107
2017-18	2,51,563	19,56,514	12.86	1,52,095	30,01,033	5.07	-10,44,514	99,469
2018-19	2,74,571	23,07,726	11.90	1,37,019	35,94,674	3.81	-12,869	1,37,551
2019-20 (P)	2,52,976	22,19,854	11.40	1,47,445	33,60,954	4.39	-11,41,100	1,05,530

Source: Compiled by authors from Directorate of Economics and Statistics

P: Provisional

decades of post-liberalisation. India's total exports increased from Rs 0.32 lakh crore in 1990-91 to Rs 22.19 lakh crore in 2019-20, the total imports also enhanced from Rs 0.43 lakh crore in 1990-91 to Rs 33.60 lakh crore in 2019-20 (Table 3.2). The composition of exports has gone substantial changes during post-liberalisation. India's export basket is now diversified with non-traditional items and differential products are also gaining importance. Agricultural exports and imports have also increased considerably during the last 25 years. There can be seen marked surge both in the export and import of agricultural commodities after 2005-06. The absolute agricultural trade has expanded and also the share of agricultural exports has increased in recent years (Figure 3.2).

Agricultural Exports

This study includes 17 agricultural commodities, namely, the meat of bovine, crustaceans, molluscs, onions, tea, spices (pepper fennel, coriander, cumin), rice, groundnuts, other oil seeds and oleaginous fruits, vegetable saps, extracts fixed vegetable fats and oils, cane or beet sugar, cotton, cotton yarn, and cotton fabric. Cereals particularly rice, cotton, fish and crustaceans, coffee, tea, and spices hold a major share in agriculture exports. Furthermore, meat and meat offal have increasingly found a place in India's basket of agricultural exports. Since 2001, cotton and cereals have been the highest contributors to India's export of agricultural goods. The performance of cereal exports from India is more or less stable due to the prevalence of rice as the major exported product in the group. It has been observed that the share of exports of cotton has declined from 25 per cent in 2001 to less than 20 per cent in the last 5 years. Meat and edible meat offal and fish and crustacean exports have performed well. The share of meat and edible meat offal has increased from 3.2 per cent in 2001 to approximately 9 per cent in 2018. India is the largest exporter of crustaceans in the world followed by Ecuador. The export shares of coffee, tea, and spices were quite stable from 2001 to 2018.

India is the second-largest producer of rice and wheat, globally. India's export policy for cereals has remained unstable due to their contribution to the country's food security. The major export destinations for Indian cereals are Bangladesh, Nepal, Pakistan, Saudi Arab, and the UAE. Rice has always been the main exported cereal crop of India. India's quest for expanding the footprint of cereals exports through exploring new opportunities in countries or markets has started to yield results. In terms of rice (basmati as well as non-basmati) exports especially in 2020-21, India shipped non-basmati rice to nine countries, namely, Timor-Leste, Puerto Rico, Brazil, Papua New Guinea, Zimbabwe, Burundi, Eswatini, Myanmar, and Nicaragua, where exports were carried for the first time or earlier the shipment was smaller in

volume. The total volume of export of rice to these nine countries was only 188 metric tonne and 197 metric tonne in 2018-19 and 2019-20, respectively, while the volume shipment rose to 1.53 lakh tonne in 2020-21 (Ministry of Commerce & Industry, 2021).

India's overall exports of cereals have seen a sharp spike in 2020-21 with the export of non-basmati rice growing by 136.04 per cent to US\$ 4,794.54 million; wheat by 774.17 per cent to US\$ 549.16 million, and other cereals (millets, maize, and other coarse grains) by 238.28 per cent to US\$ 694.14 million (Ministry of Commerce & Industry, 2021). The sharp spike in rice exports especially during a phase where globally the COVID19 pandemic has disrupted supply chains of many commodities has been attributed to the government taking prompt measures to ensure exports of rice and other cereals. APEDA has been promoting rice exports through collaborations with various stakeholders in the value chains. The government had set up the Rice Export Promotion Forum (REPF), under the aegis of the APEDA. REPF has representations from the rice industry, exporters, officials from APEDA, the Ministry of Commerce, and directors of agriculture from major rice-producing states including West Bengal, Uttar Pradesh, Punjab, Haryana, Telangana, Andhra Pradesh, Assam, Chhattisgarh, and Odisha (Ministry of Commerce & Industry, 2021).

The export of animal products has a significant contribution to Indian agriculture. Frozen bovine meat forms the major share (88 per cent in 2021) in meat export for India. There is an increasing demand for carabeef in the international market. Vietnam, Malaysia, Egypt Arab Republic, Iraq, and Saudi Arabia are the main markets for Indian carabeef and other animal products. India ranks first in the production of buffalo meat and exports around 70 per cent of its total production of buffalo meat. Hong Kong has emerged as the largest importer of buffalo meat in 2021.

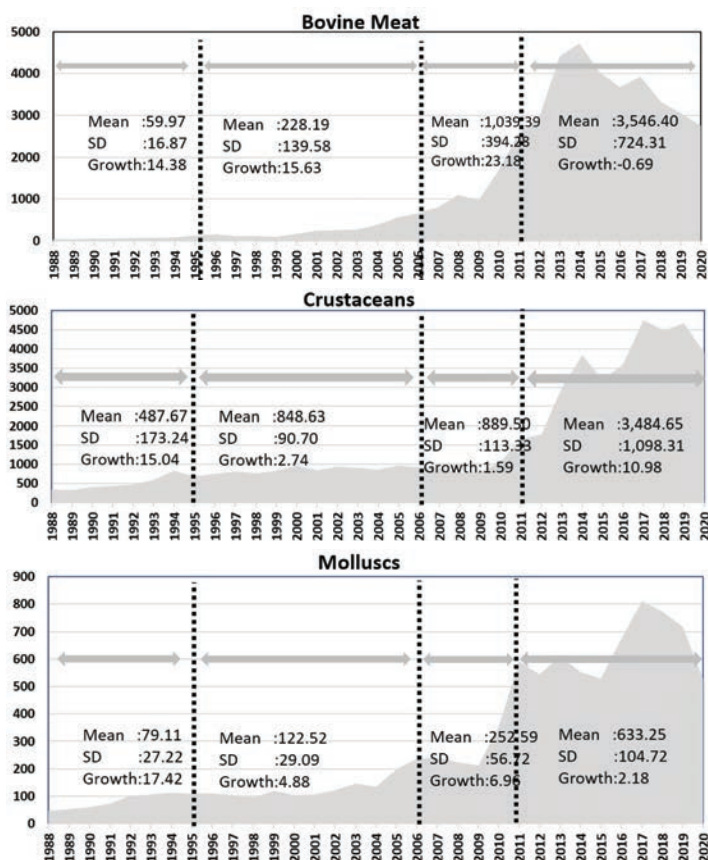
Fish and fish products hold significant importance in global trade. These will remain the highly traded commodities with around 31 per cent of the total global production going to export in 2024 (Sumaila et al, 2016). Fisheries is an emerging and promising sector for the Indian economy. India's presence in the world fish market is significant as India contributes to around 5 per cent of the total global fish export. A vast coastline provides huge scope for India to expand in the international markets. Crustaceans are the highest exported fish product from India contributing around 75 per cent (in 2021) of the total export value of fish products followed by molluscs. The technology advancement can help India to harness the export potential of fish and fish products.

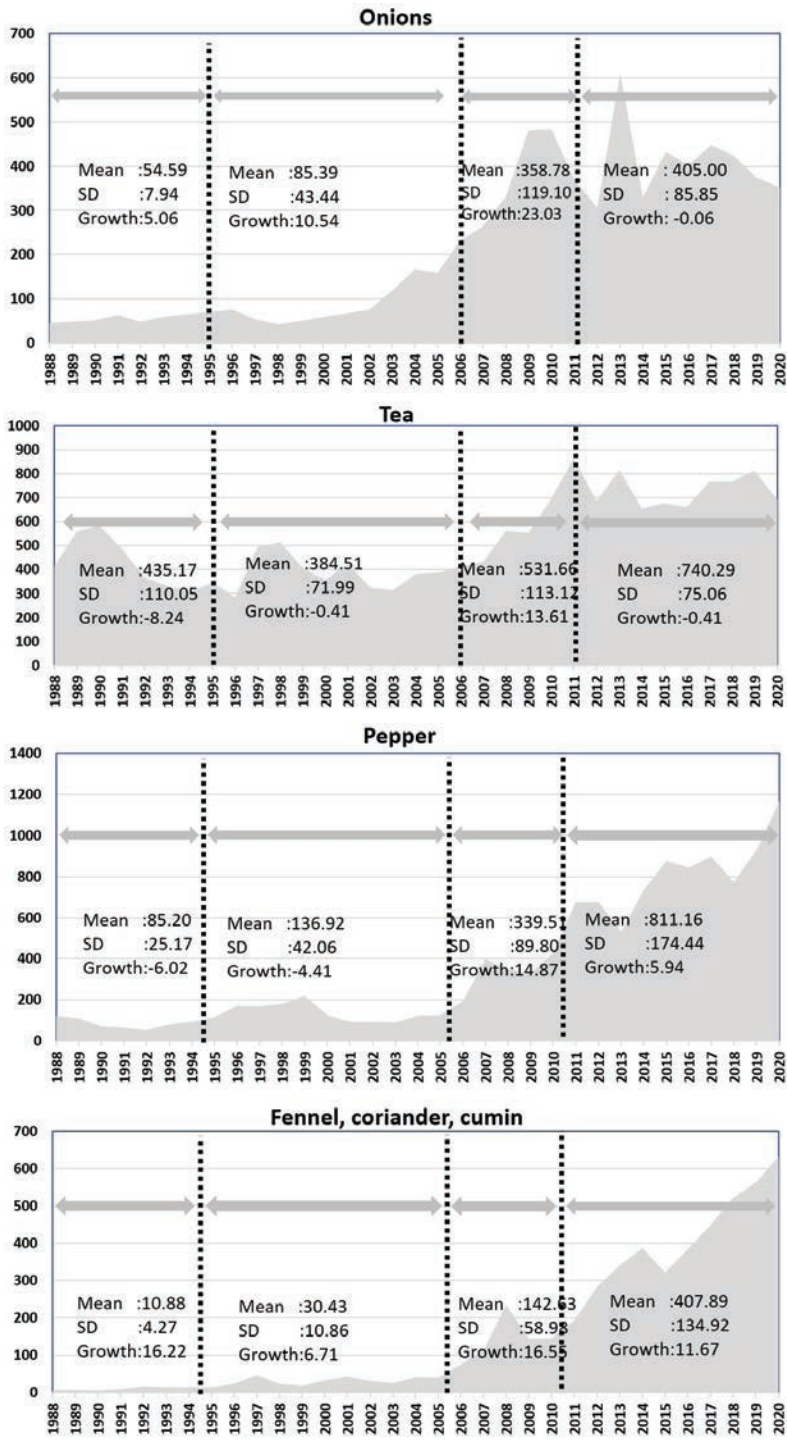
India is the largest producer, consumer, and exporter of spices and spice products in the world. The country produces more than 50 spices and

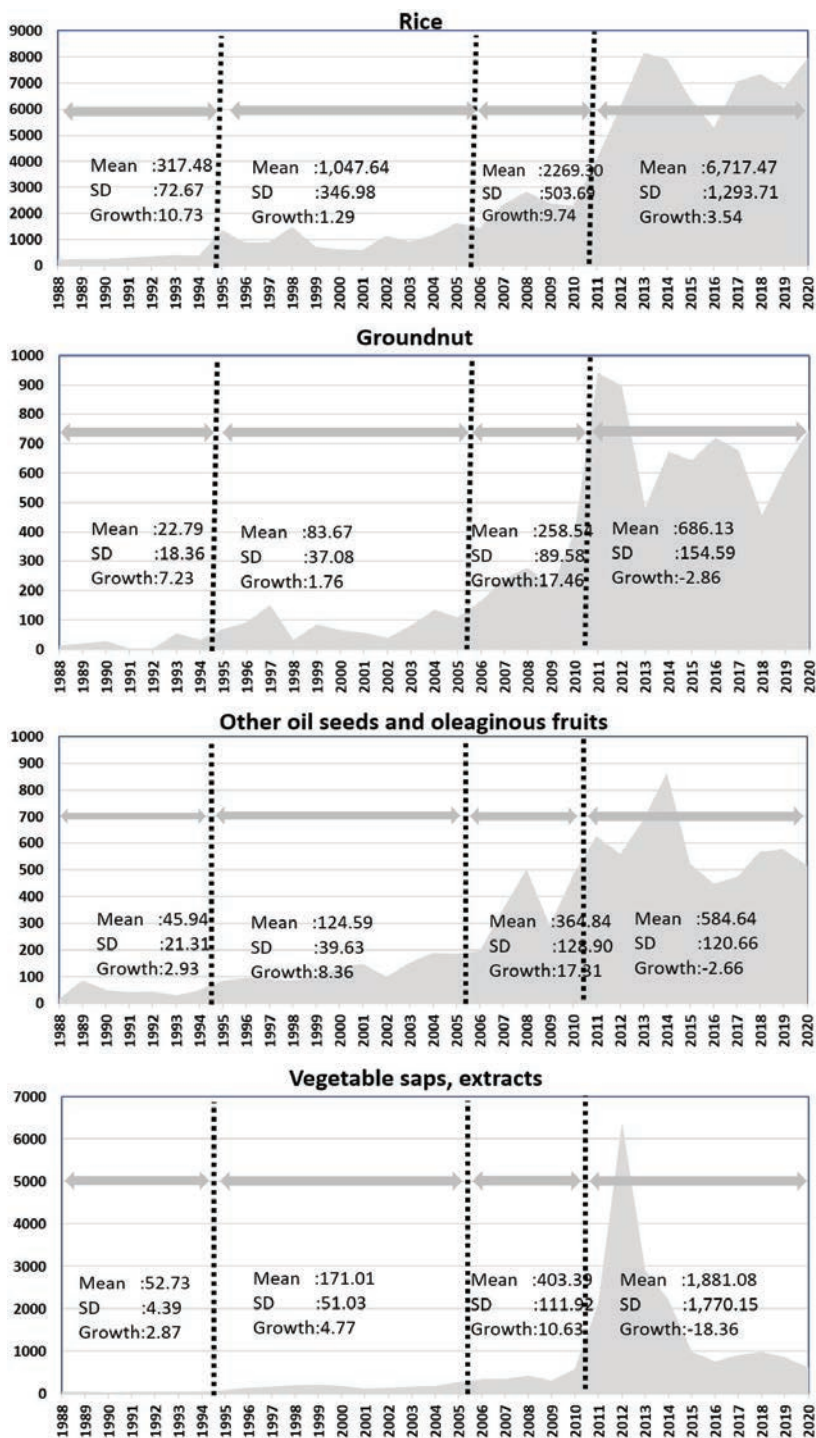
is also the largest producer of tea and coffee. The challenges faced by the tea industry are from both the supply and demand side. Tea consumption has declined the world over with people shifting to healthier versions and looking forward to organic versions too, coupled with a lack of investment in technology, infrastructure, community development, and research into new agricultural inputs in India. One of the strong challenges tea and coffee growers face is climate change which has affected the yields and increased the costs leading to a rise in local and international prices. Ginger, saffron, turmeric, seeds of a few spices and nutmeg, mace, and cardamoms are the emerging products under this category. Cotton has been an important fibre crop and has played a dominant role in the country's economy and meeting export and import demand (Mahadevaiah et al., 2005). India is amongst the largest producers of cotton in the world and the cotton from India is exported in different forms. Cotton yarn (HS 5205) and cotton woven fabrics (HS 5210 and HS 5209) form a major share in exports of cotton products. The export value of various cotton products from 1988 to 2019 showed an overall increasing trend. Cotton exports were highest in 2013 (highest area and production till date), continued to decline afterwards till 2016, and then started to increase. Raw cotton (HS 5201) is an emerging product. China is the biggest buyer of India's cotton. The decline in the exports of cotton was noticed around 2014 and 2016 and happened due to the attack of pink bollworm which destroyed a huge crop in India and affected the domestic and exportable surpluses. Further, China introduced an embargo on Indian cotton in 2015-16 due to its growing stocks.

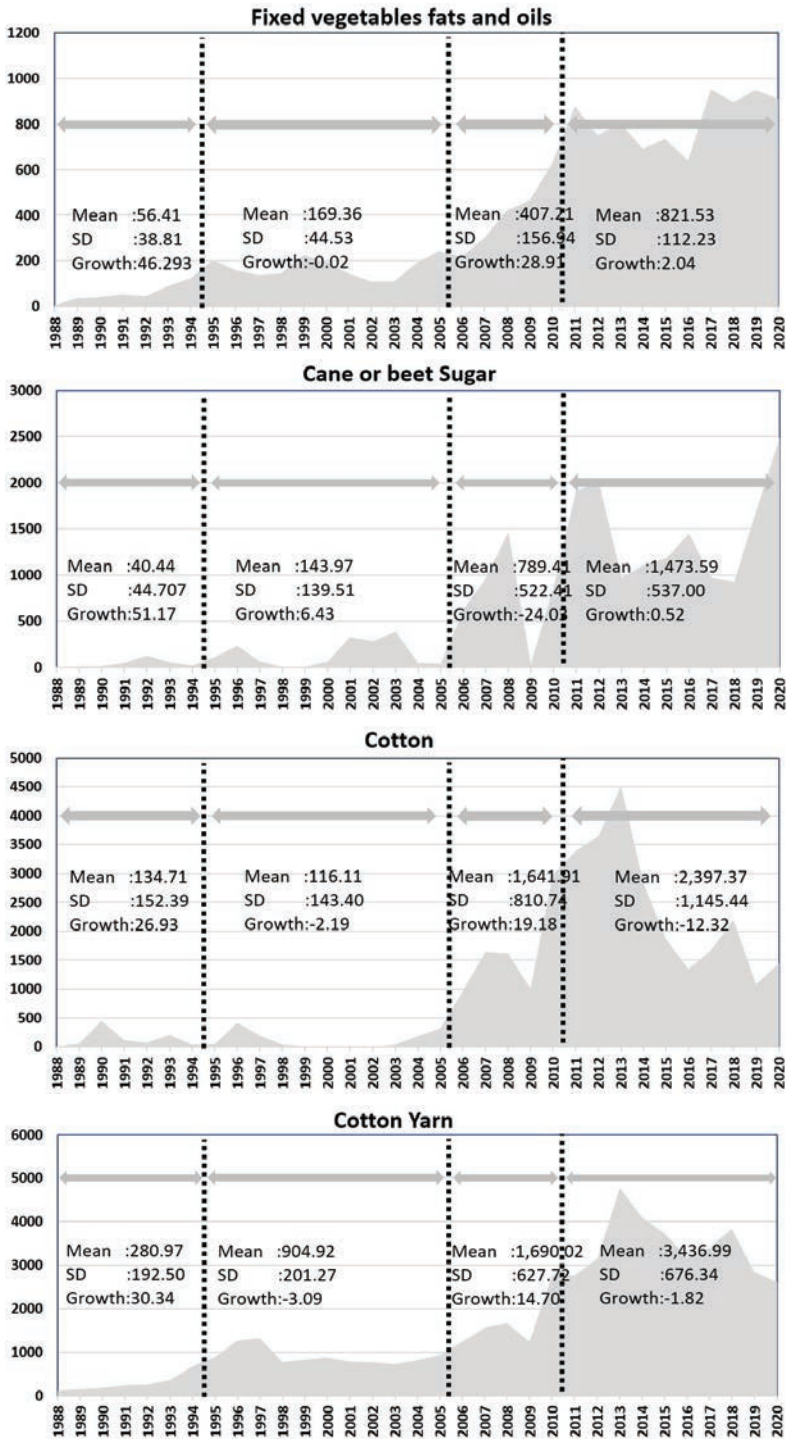
The export of major commodities like rice, sugar, and cotton was adversely affected by WTO. Growth of export of rice, sugar, cotton, molluscs, and cotton fabric registered deceleration after 1994. The export of bovine meat, onion, tea, spices, vegetable oil, and saps accelerated after 1994. The export of rice, vegetable saps, and cotton registered high volatility over the recent period. The export of bovine meat registered a growth of 14.38 per cent annum during the pre-WTO period. The export got momentum and kept on increasing. The period from 2006 to 2011 recorded the highest growth more than 20 per cent. India exported bovine meat was of the highest value in 2014 and thereafter it declined. The recent decade showed even negative growth. The crustaceans export was US\$ 826 during 1994 and recorded a growth of 15 per cent from 1988 to 1994. After signing WTO, the export of crustaceans declined over the years. Albeit it accelerated during the recent period and obtained a growth of 10 per cent. The growth of molluscs declined over the last two decades. The export of onion picked up after the pre-WTO period but could not sustain for the recent period.

India is known for its spices for long. The export of pepper after the WTO period picked up and the growth becomes positive from negative growth of 6 per cent. Even for fennel and coriander, the growth remained positive throughout the selected periods. Though India is the leading exporter of Basmati rice to the global markets, Indian rice export is highly volatile. The export of rice registered a growth of 10.73 per cent in pre-WTO and declined to 1.29 per cent. It rose to 9.74 per cent in 2006 and 2011 and declined to 3.54 per cent in the recent decade. India imports a huge quantity of edible oils to meet its domestic needs. The export of groundnut, other oil seeds, oleaginous fruits, and fixed vegetable fats, oils and vegetable saps recorded a growth of 10-30 per cent in 2006 and 2011, but it could not be sustained in the recent decade. The item vegetable saps showed high volatility among all selected oil items. Among the selected commodities, the export of sugar was affected most adversely. The growth which was more than 50 per cent in the pre-WTO period became less than 1 per cent in the recent period. Export of cotton and cotton yarn also declined in the post-WTO period (Figure 3.3).









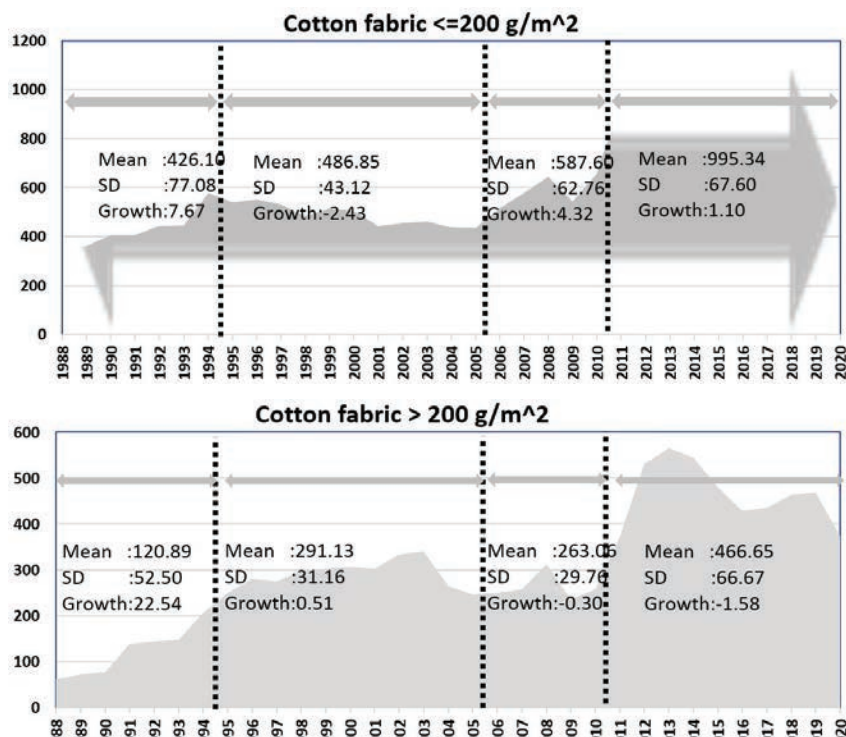


Figure 3.3: Trends in Exports of Major Agricultural Products from India (US\$ Million)

Source: Authors' computations

Export Competitiveness

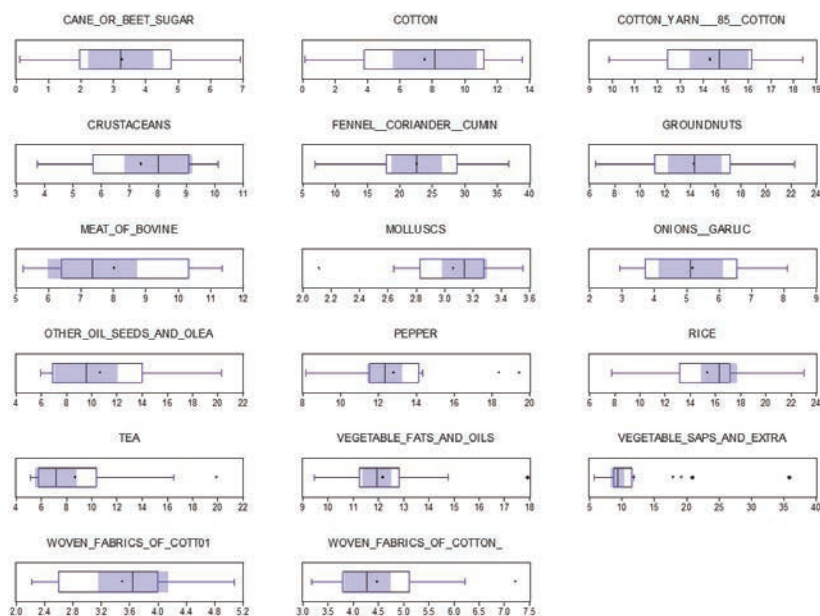
The pattern of trade flows of agricultural commodities is presented in Table 3.3. The results portray that the RCA of agricultural commodities at a 4-digit harmonised system. The results exhibit fennel, coriander, cumin as the leading exported agricultural product which shows a gradual increase in trade advantage. The reason behind this is that the grade for Indian spices appeals sound in the international market. Henceforth, India is the net exporter of spices especially fennel, coriander, and cumin. This is closely followed by cotton yarn $\geq 85\%$ cotton and fixed vegetable fats and oils. The index values suggest that India enjoys comparative advantages in all the selected commodities.

Table 3.3 and Figure 3.4 represented the RCA of agricultural commodities exports during 2001-2020. Indian tea declined in terms of RCA indices. India needs to strengthen the tea exports supply chain and conduct a detailed comparative analysis to hold its traditional presence in the global market. The trade performance of rice is found to be impressive over time.

Table 3.3: The Revealed Comparative Advantage of Agricultural Commodities Exports

<i>Major Exportable Products</i>	2001	2005	2010	2015	2020
Meat of bovine	6.52	6.71	7.83	11.14	6.46
Crustaceans	9.85	7.40	4.23	8.44	9.02
Molluscs	3.18	3.33	2.79	2.86	2.87
Onions, garlic	5.60	6.10	5.07	4.43	2.98
Tea	19.91	10.91	7.34	5.78	5.46
Pepper	14.04	11.29	12.69	10.81	18.40
Fennel, coriander, cumin	14.77	17.66	18.36	25.36	32.55
Rice	12.69	16.73	7.77	17.13	19.45
Groundnuts	10.34	11.48	17.05	17.27	11.41
Other oil seeds and oleaginous fruits	20.32	12.41	10.19	6.50	5.93
Vegetable saps and extracts	9.92	10.96	9.20	11.25	5.97
Fixed vegetable fats and oils	17.92	11.84	14.76	11.44	12.98
Cane or beet sugar	4.71	0.29	1.98	3.22	6.71
Cotton	0.21	3.45	13.38	9.98	6.39
Cotton yarn > = 85% cotton	15.51	11.53	14.81	18.39	15.97
Woven fabrics of cotton, weighing <= 200 g/m ²	7.22	3.83	3.18	4.45	5.52
Woven fabrics of cotton, containing weighing > 200 g/m ²	5.08	2.65	2.22	3.86	4.93

Source: Authors' computation based on International Trade Centre, 2020

**Figure 3.4:** Revealed Comparative Advantages (RCA) of Agricultural Commodities Exports during 2001–2020

Source: Authors' computations

Export Diversification

To construct the DXI, the Herfindahl-Hirschman (HH) Index was employed to examine India's export diversification of agricultural products. Table 3.4 portrays the product DXI of selected agricultural products. Figure 3.5 represents the product DXI of selected agricultural products from 2001 to 2020. A higher HH Index indicates that India already exports to a large number of existing markets, while a low HH value indicates concentration and shows the potential for expansion. For products like 'woven fabrics of cotton, weighing ≤ 200 g/m² and other oil seeds and oleaginous fruits', export destinations were expanded over time indicating higher geographical diversification. During 2020, the highest HH Index was observed for 'other oil seeds and oleaginous fruits, woven fabrics of cotton, weighing ≤ 200 g/m², rice, cane or beet sugar, and tea. The DXI for rice rose gradually from 56.59 per cent in 2001 to 77.13 per cent in 2020. However, the DXI for unprocessed cotton gradually declined during the period.

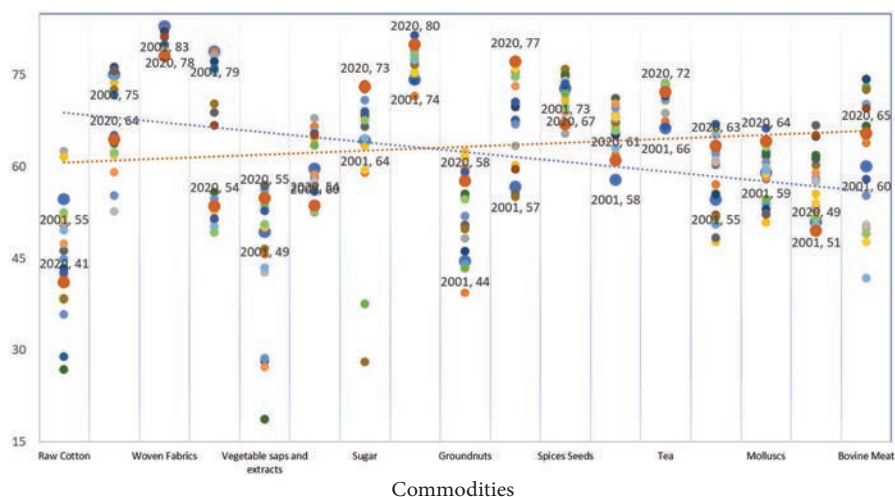


Figure 3.5: Product Diversification Index

Source: Computed by Authors

Table 3.4: Product Diversification Index of Selected Agricultural Products

Products	2000	2005	2010	2015	2020
Meat of bovine	60.01	70.15	72.52	50.38	65.30
Crustaceans	50.86	57.72	60.18	57.47	49.46
Molluscs	58.91	53.85	58.48	59.81	64.08
Onions, garlic	54.56	50.55	51.69	60.92	63.33
Tea	66.21	70.91	71.99	71.84	72.18

<i>Products</i>	<i>2000</i>	<i>2005</i>	<i>2010</i>	<i>2015</i>	<i>2020</i>
Pepper	57.81	65.47	67.21	67.89	60.90
Fennel, coriander, cumin	72.71	68.89	75.88	73.92	66.87
Rice	56.59	67.34	54.96	74.62	77.13
Groundnuts	44.45	44.03	49.77	61.31	57.63
Other oil seeds and oleaginous fruits	74.18	76.73	76.60	78.06	79.85
Vegetable saps and extracts	49.30	56.75	46.53	42.62	54.85
Fixed vegetable fats and oils	59.55	65.63	57.05	57.51	53.56
Cane or beet sugar	64.17	68.23	27.97	69.10	73.04
Cotton	54.61	44.83	38.23	50.75	41.05
Cotton yarn $\geq$ 85% cotton	74.99	74.76	72.50	52.58	64.37
Woven fabrics of cotton, weighing $\leq$ 200 g/m ²	82.87	81.57	79.49	78.67	77.95
Woven fabrics of cotton, containing weighing $>$ 200 g/m ²	78.71	0.57	70.26	52.61	53.52

Source: Computed by authors

Product-Country Export Concentration

It is noted from Table 3.5 that India is a significant exporter of cane or beet sugar and fixed vegetable fats and oils to Sudan, Iran, and Indonesia. In addition, processed cotton-like woven fabrics of cotton, weighing $\leq$ 200 g/m² and $>$ 200 g/m² was much dominated in the Bangladesh market with 9 per cent and 44.7 per cent, respectively. Onion and garlic were dominant in Bangladesh, Malaysia, and Sri Lanka markets with 26.4, 16.4, and 12 per cent share in 2020. Tea export is mainly centred to Iran, Russian Federation, and the US markets. Pepper lost its dominance in the US market and diversified toward China and Thailand during the selected period. Indian spices (fennel, coriander, and cumin) exports have diversified from the US market to China from 2001 to 2020 Vietnam and Indonesia market. Globally and in India, the rising importance of marine export has been evident. The export of crustaceans was much dominant in the US market.

Table 3.5: Percentage Distribution of the Value of India Exports

<i>Products</i>	<i>Major Destinations in 2020</i>	<i>2001</i>	<i>2010</i>	<i>2020</i>
Meat of bovine	Hong Kong, China	0	0.1	22.8
	Viet Nam	0	14.4	14.5
	Malaysia	29	12.2	13.7
Crustaceans	United States of America	25.7	30	46.7
	China	3	1.5	15.3
	Japan	40.9	23.3	7.9

<i>Products</i>	<i>Major Destinations in 2020</i>	<i>2001</i>	<i>2010</i>	<i>2020</i>
Molluscs	Spain	35.9	34.9	25.1
	Thailand	1.1	4.3	14.5
	Italy	10.7	17.2	12.5
Onions, garlic	Bangladesh	19.3	40.2	26.4
	Malaysia	31.8	23.1	16.4
	Sri Lanka	17.5	9.6	12
Tea	Iran, the Islamic Republic of	4.3	9.3	19.1
	Russian Federation	25.6	15.5	12.7
	United States of America	4.2	7	8.6
Pepper	China	0.1	2.4	33.2
	Thailand	0.3	1.6	10.5
	United States of America	38.9	16	9.6
Fennel, coriander, cumin	China	0.1	0	27.8
	Bangladesh	3.3	2	11.9
	United States of America	13.1	10.1	8.3
Rice	Saudi Arabia	39.4	29.9	13.7
	Iran, the Islamic Republic of	0	16.1	11
	Iraq	0	0.9	7.4
Groundnuts	Indonesia	52.5	44.1	34.4
	Viet Nam	0	0.4	19.8
	China	0	2.9	9.9
Other oil seeds and oleaginous fruits	United States of America	14.5	8.3	12.3
	Korea, Republic of	3.8	12.9	7.9
	Nepal	0.2	1.2	4.7
Cane or beet sugar	Sudan	0	0	14.4
	Iran, the Islamic Republic of	0.6	0.7	13.8
	Indonesia	21.7	0	8.2
Fixed vegetable fats and oils	China	3.2	35	42
	The Netherlands	19.4	16	11.8
	United States of America	15.3	8.5	10.8
Vegetable saps and extracts	United States of America	49.1	52	42.7
	Germany	6.4	6.5	7.3
	China	7	7.3	6.6
Cotton	Bangladesh	23.5	11.2	48.3
	China	0	59.5	31.8
	Viet Nam	0.9	4.1	10.4

<i>Products</i>	<i>Major Destinations in 2020</i>	<i>2001</i>	<i>2010</i>	<i>2020</i>
Cotton yarn	Bangladesh	15	18.6	25.2
	China	4.8	11.6	21.9
	Viet Nam	0.3	1.3	5.4
Woven fabrics of cotton, containing $\geq 85\%$ cotton by weight, ≤ 200 g/m ²	Bangladesh	4.9	3.2	9.7
	Korea, Republic of	0.8	0.4	8.4
	Sri Lanka	3.1	11.8	8.1
Woven fabrics of cotton, containing $\geq 85\%$ cotton by weight, > 200 g/m ²	Bangladesh	7.5	21.6	44.7
	United States of America	7.7	8.9	6.9
	Sri Lanka	4.6	11.9	4.8

Growth Linkages

The effect of exports on economic growth has been established in several studies. This is due to the impact on economies of scale, the adoption of advanced technologies, and an improvement in capacity utilisation (Abou-Stait, 2005; Al-Yousif, 1997; Balassa, 1978; Emery, 1967; Feder, 1982; Lucas, 1988; Michaely, 1977; Vohra, 2001). Although many advanced economies and even some Asian countries, including Hong Kong, Singapore, Korea, and Taiwan, have benefited from EL Growth policies since the 1980s, this trend has made India's policymakers shift towards an outer orientation of the economy. During the mid-1980s, a change in policy stance was realised, which was subsequently implemented in the 1990s in form of Liberalisation, Privatisation, and Globalisation (LPG) reforms. Trade relations are being established bilaterally and multilaterally in several ways. Studying exports and economic growth in India over the period 1950 to 1992, Ghatak and Price (1997) have found no evidence of ELG; instead, they found evidence of GLE. Subsequently, Dhawan and Biswal (1999), re-examining the ELG hypothesis in a multivariate cointegration framework, report that GDP growth and terms of trade growth contribute to export growth. Similarly, Mallick (2002) finds evidence for the GLE proposition for the period 1950-1995, but not ELG. Using the 1990-1996 period for pre-liberalisation as well as the 1996 Q2 to 2012 Q4 periods for the post-liberalisation, Agrawal (2014) examined the role of exports in India's economic growth. According to the study, exports have not caused GDP during the pre-liberalisation period, but have been caused by GDP. However, in the post-liberalisation period, exports are bi-directionally causal. A weaker variant of ELG operated in India according to the study. It is quite interesting to note that the LPG reforms have induced India to the ELG hypothesis.

Sectoral exports and economic growth relations have also been studied by many researchers. Faridi (2012) quantified the contribution of agricultural

exports to economic growth in Pakistan. Osabohien et al. (2019) used the Autoregressive Distribution Lag (ARDL) technique to analyse the long-run relationship and the impact of agricultural exports on Nigeria's economic growth. Though India is an agriculture dominant country and contributes a major share in global agriculture export, still, there was no study on agriculture export and economic growth linkage across time series. This section is focused on agriculture export and economic growth relation in India after liberalisation and globalisation reforms.

Agricultural exports from India have undergone significant change in terms of trends, composition, and diversification. Utilising econometric time series techniques, we attempted to detect a causal relationship between agricultural exports and economic growth. Cotton, cotton yarn, fennel, coriander and cumin, groundnuts, onions, pepper, rice, tea, exports were considered as these hold the major chunk in agriculture exports. Total Gross Value Added (GVA) was selected to indicate economic growth. ADF test results for stationarity indicated all variables have unit roots in their levels (Table 3.6). However, all variables are stationary in their first differences. After ensuring stationarity, VAR analysis was applied to examine the causality. VAR lag selection was based on Akaike Information Criterion (AIC) and Schwarz Information Criterion (SIC). Lag 2 was best for this VAR equation system (Table 3.7).

Table 3.6: Testing of Stationarity

Null Hypothesis: Variable has a unit root Exogenous: Constant, Linear Trend		
	<i>At Level</i>	<i>At 1st difference</i>
	<i>Prob.</i>	<i>Prob.</i>
Cotton	0.66	0.00
Cotton Yarn	0.58	0.00
Fennel, Coriander, and Cumin	0.98	0.02
Groundnuts	0.19	0.00
Onions	0.12	0.00
Pepper	0.72	0.00
Rice	0.36	0.00
Tea	0.37	0.00
Total GVA	1.00	0.05

Vector Auto-regression exogenous causality results are presented in Table 3.8. Our causality tests uncovered little support for the GLE hypothesis; only onions, fennel, and coriander exports indicated the GLE hypothesis (Figure 3.6). It is also noteworthy that onion, fennel, coriander, and cumin exhibited bidirectional causality with the economic growth (total GVA).

ELG hypothesis was supported by most of the agriculture exports including, i.e. onion, pepper, rice, fennel, coriander, cumin, and tea. Table 3.9 shows the co-integration among the variables which denotes the long-run relationship among variables. Co-integration analysis was conducted after establishing causality relations among variables. It reveals that five vectors are co-integrated which shows the strong long-run relationship among the selected variables.

Table 3.7: VAR Lag Selection

Endogenous variables: TOTAL_GVA RICE TEA COTTON COTTON_YARN AGRICUL... Exogenous variables: C Sample: 1988 2020 Included observations: 31						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	-5890.657	NA	1.0E+153	380.6876	381.1501	380.8384
1	-5565.585	419.4484	6.9E+146	366.1668	371.2551	367.8254
2	-5308.474	165.8779*	3.7e+143*	356.0306*	365.7447*	359.1971*
* Indicates lag order selected by the criterion LR: Sequential modified LR test statistic (each test at 5% level) FPE: Final prediction error AIC: Akaike information criterion SC: Schwarz information criterion HQ: Hannan-Quinn information criterion						

Table 3.8: Confirmation of ELG and GLE Hypothesis for Selected Commodities

	Onion	Pepper	Rice	Ground-nuts	Fennel, Coriander	Tea	Cotton Yarn	Raw Cotton
ELG Hypothesis: Exports causing growth (Causality results between exports and total GVA)	0.00	0.02	0.00	0.09	0.00	0.02	0.13	0.10
GLE Hypothesis: Growth causing exports (Causality results between total GVA and exports)	0.01	0.92	0.58	0.49	0.00	0.83	0.07	0.42



Figure 3.6: ELG Versus GLE in Indian Agriculture Exports

Table 3.9: Co-integration Test

<i>Unrestricted Cointegration Rank Test (Trace)</i>				
<i>Hypothesised No. of CE(s)</i>	<i>Eigenvalue</i>	<i>Trace Statistic</i>	<i>0.05 Critical Value</i>	<i>Prob.**</i>
None *	0.905561	208.9935	117.7082	0.0000
At most 1 *	0.829532	138.1995	88.80380	0.0000
At most 2 *	0.690497	85.12326	63.87610	0.0003
At most 3 *	0.521638	49.93964	42.91525	0.0086
At most 4 *	0.480144	27.81801	25.87211	0.0283
At most 5	0.238956	8.191924	12.51798	0.2364
Trace test indicates 5 cointegrating eqn(s) at the 0.05 level				
* Denotes rejection of the hypothesis at the 0.05 level				
** MacKinnon-Haug-Michelis (1999) p-values				

Source: Authors' computations

Conclusions and Implications

The role of agricultural trade in achieving economic growth, alleviating poverty, and achieving food security is incalculable for developing countries like India. The importance of India in the international market is continuously increasing and the country has developed export competitiveness in certain specialised products. There has been a rising demand for Indian Basmati rice, non-Basmati rice, spices, and sugar as evident by their rising share of the total agricultural export. Considering these, the study examined the trends, composition along with performance of agricultural exports. It also focused on geographical diversification to understand the export dynamics. In addition, the study drew inferences about the causality and export-growth relationships. The inferences would be useful in developing appropriate strategies for better targeting and managing Indian agricultural exports. The study also identified the structural breaks in the Indian agricultural exports from 1990-91 to 2019-20 (post-economic reform) and confined to three major structural breaks with four phases in agriculture exports, first from 1990-91 to 1994-95, second from 1995-96 to 2005-06, third from 2006-07 to 2010-11, and the fourth from 2011-12 to 2019-20.

Agricultural exports and imports have also increased considerably during the last 25 years. The composition of exports has gone substantial changes during post liberalisation. India's export basket is now diversified with non-traditional items and differential products are also gaining importance. Since 2001, cotton and cereals have been the highest contributors to India's export of agricultural goods. The performance of cereal exports from India is more

or less stable due to the prevalence of rice as the major exported product in the group. It has been observed that the share of exports of cotton has declined from 25 per cent in 2001 to less than 20 per cent during 2015-20. Meat, edible meat offal, fish, and crustacean exports have performed well. The share of meat and edible meat offal has also increased. India is the largest exporter of crustaceans in the world followed by Ecuador.

The revealed comparative advantage of agricultural commodities exhibits fennel, coriander, and cumin as the leading exported agricultural product which shows a gradual increase in trade advantage. This is closely followed by cotton yarn ≥ 85 per cent cotton and fixed vegetable fats and oils. The index values suggest that India enjoys comparative advantages in all the selected commodities. Indian tea declined in terms of RCA indices. India needs to strengthen the tea exports supply chain and conduct a detailed comparative analysis to hold its traditional presence in the global market. The trade performance of rice is found to be impressive over time. The HH index was employed to examine India's export diversification of agricultural products. For products like 'woven fabrics of cotton, weighing ≤ 200 g/m² and other oil seeds and oleaginous fruits', export destinations were expanded indicating higher geographical diversification. During 2020, the highest HH Index was observed for 'other oil seeds and oleaginous fruits, woven fabrics of cotton, weighing ≤ 200 g/m², rice, cane or beet sugar and tea. Rice was tapped more because of its relative advantage in terms of low perishability, corresponding to which the DXI rose gradually from 56.59 per cent in 2001 to 77.13 per cent in 2020. However, the DXI for unprocessed cotton gradually declined during the period.

The effect of exports on economic growth has been established in several studies. This study also attempted to examine the causal relationship between agricultural exports and economic growth. Cotton, cotton yarn, fennel, coriander and cumin, groundnuts, onions, pepper, rice, and tea exports were considered as these hold the major chunk in agriculture exports. Total GVA was selected to indicate economic growth. It is also noteworthy that onion and fennel as well as coriander and cumin exhibited bidirectional causality with the economic growth (total GVA). ELG hypothesis was supported in most of the agriculture exports including onion, pepper, rice, fennel, coriander, cumin, and tea.

The country needs to focus on stable trade policy, particularly in those commodities with greater trade potential. Also, the Sanitary and Phytosanitary (SPS) measures should be taken care of strictly adhering to international standards. Export-oriented production through the development of clusters and dedicated supply chains will help to enhance the global image of Indian products. Export-oriented supply chains should be efficiently

managed to reduce the costs and make exports more competitive. With the government's focus to double agricultural exports and an Agricultural Export Policy in place, India needs to find effective solutions to become a global leader in agricultural exports too. Commodity outlook and market intelligence hold the key to success. Appropriate diagnostics will help in the selection of the right markets, appropriate segmentation, positioning, and targeting, and will also facilitate relevant market linkages and regional crop planning exercises.

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Appendix-I

HS_Code	Commodities
0202	Meat of bovine animals, frozen
0306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine, ...
0307	Molluscs, fit for human consumption, even smoked, whether in shell or not, live, fresh, chilled, ...
0703	Onions, shallots, garlic, leeks and other alliaceous vegetables, fresh or chilled
0902	Tea, whether or not flavoured
0904	Pepper of the genus Piper; dried or crushed or ground fruits of the genus Capsicum or of the ...
0909	Seeds of anis, badian, fennel, coriander, cumin or caraway; juniper berries
1006	Rice
1202	Groundnuts, whether or not shelled or broken (excluding roasted or otherwise cooked)
1207	Other oil seeds and oleaginous fruits, whether or not broken (excluding edible nuts, olives, ...
1302	Vegetable saps and extracts; pectic substances, pectinates and pectates; agar-agar and other ...

<i>HS_Code</i>	<i>Commodities</i>
1515	Fixed vegetable fats and oils, incl. jojoba oil, and their fractions, whether or not refined, ...
1701	Cane or beet sugar and chemically pure sucrose, in solid form
5201	Cotton, neither carded nor combed
5205	Cotton yarn other than sewing thread, containing $\geq 85\%$ cotton by weight (excluding that put ...
5208	Woven fabrics of cotton, containing $\geq 85\%$ cotton by weight and weighing $\leq 200 \text{ g/m}^2$
5209	Woven fabrics of cotton, containing $\geq 85\%$ cotton by weight and weighing $> 200 \text{ g/m}^2$

Agriculture Trade of India and Implications for Current and Future Trade Agreements

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Introduction

In a country like India, agricultural trade liberalisation is a complex subject. While on one hand, it appears that a labour abundant country like India will have a comparative advantage in agriculture, in reality, the situation is different. Indian agriculture is dominated by small and medium farmers whose ability to participate in international trade is extremely limited. Many of these farmers are subsistence farmers with very little marketable surplus and most of them suffer from various market failures and structural inefficiencies. On the other hand, international agricultural trade is dominated by large, developed countries who are not always cost-efficient in their production. However, due to the huge amount of subsidisation in agriculture in these countries they can undercut the low-cost producers from developing countries in a major way.

Artificially cheap imports and structural weakness of agriculture in India mean that trade liberalisation in this sector bears the risk of negatively affecting livelihood security and food security. As a very high proportion of India's workforce is still dependent on agriculture, the Government of India has been traditionally cautious about opening this sector. However, over the years India has achieved self-sufficiency in food grains production and now it's also largely food secure. Consequently, India's aspiration to become a larger player in global agricultural trade is gaining ground. The *Agricultural Trade Policy of 2018* published by the Ministry of Commerce (MOC, 2018) highlights this more proactive role of the government in promoting agricultural exports.

India's traditionally cautious approach towards agricultural trade is also reflected in the trade agreements signed by India. In the World Trade Organization (WTO) Agreement on Agriculture (AoA), India kept bound

tariff rates on agricultural products up to 300 per cent to protect its domestic agriculture. Also, due to the balance of payment crisis the country faced in 1991, India maintained quantitative restrictions on many agricultural commodities. Similarly, in most of the Free Trade Agreements (FTAs), signed by India, the country has taken a more defensive approach on the agriculture sector and kept quite a few agricultural commodities in the 'Negative List'. Even for the agricultural commodities for which India has committed tariff liberalisation, for many commodities India has committed a long time horizon to implement the tariff cuts.

However, with improving technology, better control over-irrigation and logistics, and increased production of agricultural goods India is becoming more competitive in global agricultural trade. India is currently the biggest producer of cereals, milk, sugar, fruits and vegetables, spices, as well as eggs and seafood products in the world (MOC, 2018). But only recently India has been increasing its footprint in global agricultural trade. For example, according to WTO (2021), India is now the ninth biggest exporter of agriculture in the world. Also, India has emerged as the top big exporter of rice.

Against this evolving backdrop of India's engagement in agricultural trade, this chapter aims to examine how India's agricultural exports have evolved over the last two decades. The next section deals with a short historical background and the current state of play of the export of agricultural commodities from India. The evolution of India's trade policy, a focused analysis of India's agricultural trade policy in the context of various trade agreements followed by an analysis of the patterns of India's agricultural exports with a focus on commodity baskets and export destinations have been discussed in the later sections of this chapter. The last section deals with the conclusion and the way forward in relation to current and future trade agreements.

India's Trade in Agricultural Commodities: A Short Historical Account and the Current State of Play

From ancient times to the advent of colonialism, India was one of the dominant exporters of agricultural commodities and related products in the world. Historically, spices and cotton goods have been exported from India to the rest of the world. However, the quest for spices by the European powers also brought India under colonial rules. Mercantilist policies followed by the colonial rulers ensured that India went through a phase of major deindustrialisation and was pushed into being an exporter of primary commodities. One of the most remarkable developments of international trade during the eighteenth century was that the Europeans managed to

alter the commodity composition of Indian trade completely during this period. India was a major producer of textiles in the early eighteenth century. In 1750, India produced nearly 25 per cent of the world's textile output. But by 1900, this figure drastically declined to only 2 per cent (Simmons, 1985). By the middle of the nineteenth century, India had lost all its export market and a very significant part of its domestic market. India experienced secular deindustrialisation from 1750 to 1860. Since the 1860s, India's deindustrialisation slowed down and there was some sort of a reversal. The 'reindustrialization' of India was ushered primarily by the jute and cotton textiles industries but in spite of its revival, cotton goods never regained the position they had in India's export basket over many centuries.

At the time of independence, India's export pattern was very similar to other poor colonial countries. India used to export primary commodities like agricultural cash crops and minerals ores, and some low-value manufactured goods like cotton and jute piece goods. Indian policymakers rightly believed that high dependence on exports of primary commodities may be damaging for the country's long-term development strategy. Theoretical support for this Policy came in the form of a thesis by two eminent economists, namely, Raul Prebisch and Hans Singer. Their work, called the 'Prebisch-Singer Hypotheses', dealt with the long-term deterioration of poor countries' terms of trade. Using time-series data they demonstrated that in the long run, the average price of primary products tended to decline relative to that of manufactured goods. Based on this observation, they argued that developing countries should avoid specialisation in primary commodities and adopt policies to develop their manufacturing sector. There were also other reasons for moving away from primary commodity exports. As mentioned before, value-addition in primary commodities is low and exports of primary commodities are also highly price sensitive. The transformation of India during the British rule to a primary commodity exporter exposed India to these problems. Moreover, during this period, India's two major exports, viz., products made up of cotton and jute, were facing strong competition from synthetic polymer fibres like nylon and polyester.

During the 1960s, India witnessed another shift in government policy against agricultural exports. Attaining food self-sufficiency or 'food sovereignty' became a key policy objective. Consequently, exports of most agricultural commodities were regulated to ensure adequate domestic availability of important agricultural items and to keep the agricultural prices stable in the domestic market. There was an increased focus on domestic agriculture through research, development, and technology transfer that led to a vast improvement in domestic agricultural production. This increased production significantly reduced India's imports of food grains and helped

India in attaining self-sufficiency in food production. This agricultural turnaround is also known as the 'Green Revolution' in India.

As India started gradually liberalising its trade since the 1980s, agricultural trade was kept largely insulated. Imports were restricted by the use of quantitative restrictions or quotas. Agricultural exports did not do well largely due to restrictions on the external trade of most of the agricultural commodities and treatment of the export market as a residual one. Two events changed India's attitude towards international trade in the 1990s. The first one is the financial crisis of 1991 and the next one is the signing of the WTO trade agreement.

The policies to avert the financial crisis led to the deregulation of international trade to a significant extent. India's exchange rate was also devalued and became flexible and (to some extent) market determined. However, the agriculture sector continued to be under protection. Then, in 1995, India signed the WTO Trade Agreement. The Uruguay Round AoA brought agricultural trade, for the first time, under the purview of a multilateral trading system. Agriculture was included in the original 1947 GATT Agreement, but on the insistence of the United States (US), was given a special status.¹ As a result, prior to the Uruguay Round, trade in agriculture was highly distorted. Price fluctuations, depressed market prices due to massive domestic and export subsidies, and impenetrable import barriers were pervasive. Despite being low-cost producers of agricultural items, agricultural exporters from developing countries could not compete with the subsidised exports from developed countries. It was expected that the WTO AoA would bring significant change in the global agricultural trade.

India and Agricultural Trade Since 1995

A watershed year for India's international trade was 1995 when the WTO was launched. The signing of the WTO Agreement led to the gradual removal of trade barriers in agriculture, and lowering of its applied tariffs.² Over the years, India has signed several other Preferential and FTAs. The country has

¹ The United States (US) signed GATT in 1947 under the condition that there should be exceptions (Section XI of GATT) in the rules for agricultural products. These exceptions allowed the US to continue with the use of its Article 22 of the Agricultural Adjustment Act (AAA), which allowed the imposition of import quotas and other quantitative restrictions to isolate its domestic market. Flexibility was also allowed with respect to domestic and exports subsidies. In the next 40 years, agriculture retained its special status, and successive General Agreement on Tariffs and Trade (GATT) rounds did little to impose disciplines on agricultural trade.

² India continued its protective stance on agriculture and kept very high tariff rates on agricultural imports. Till 2000, India also had Quantity Restrictions (QRs) on a number of agricultural products, which had to be removed after India lost a dispute in WTO.

also signed a few deep integration agreements, such as the Comprehensive Economic Partnership Agreements (CEPAs) with Japan and South Korea and Comprehensive Economic Cooperation Agreement (CECA) with Malaysia.

The WTO AoA was supposed to provide better access to the international market for developing countries like India. Moreover, some of India's FTA partners are middle-income and high-income countries. Many of these countries were going through a phase of economic and demographic transition, leading to increased demand for processed and semi-processed agricultural goods and value-added food products. India being a big producer of a diverse range of agricultural products, signing the WTO AoA and the preferential trade agreements opened up a significant opportunity for the country to export primary as well as processed agricultural products to the rest of the world.

On the expected lines, since the joining of WTO, India's agricultural exports did increase significantly. From US\$ 6.3 billion in 1995, India's agricultural exports have reached US\$ 39 billion in 2020.³ According to WTO (2021), India is now the ninth-largest agricultural exporter in the world with a global market share of 3.1 per cent.⁴

However, India does not appear to have fared well in its agricultural exports, relative to other sectors. Figure 4.1 shows India's exports of agricultural and manufacturing goods since 1980. The graphs show that while exports of agricultural goods have risen steadily from 1995, it has grown more rapidly since 2005-06. However, the growth of exports of manufactured goods has been much higher. Consequently, the share of agricultural goods in India's total merchandise exports has come down over the years. While agricultural exports had a share of 20.6 per cent in 1995, it came down to 9.9 per cent in 2009 and then recovered to around 14 per cent in 2020. It is also evident from Figure 4.1 that the Covid crisis has affected manufacturing exports much more than agricultural exports.

India is largely self-sufficient in agriculture and runs a small trade surplus in this sector (Figure 4.2). More than 50 per cent of India's total agricultural imports is due to imports of edible oil and, to some extent, pulses. India is the largest producer of edible oil and pulses in the world, but due to high domestic

³ World Trade Statistical Review 2021, Table A14, available at wto.org, accessed on 5th January 2022.

⁴ It is to be noted that the country shares in WTO (2020) are calculated excluding the intra-trade of the European Union (EU). India's share in global agricultural exports is 3.1 per cent excluding intra-EU trade. However, in the Annexure of the same Report, data are also presented including intra-EU trade. If intra-EU trade is included, then India's share in global exports is 2.2 per cent. In this paper, we will follow the convention used in the WTO (2020) and report market shares excluding intra-EU trade.

demand, India runs a big trade deficit in both these commodities.⁵ Apart from these two items, India is mostly self-reliant in food products, however, in years with unusual weather conditions, India has intermittently imported certain agricultural commodities to ease up pressure on domestic prices. The latest data on agricultural imports suggests that cashew (unshelled), fresh fruits, and spices are other important import items for India.⁶

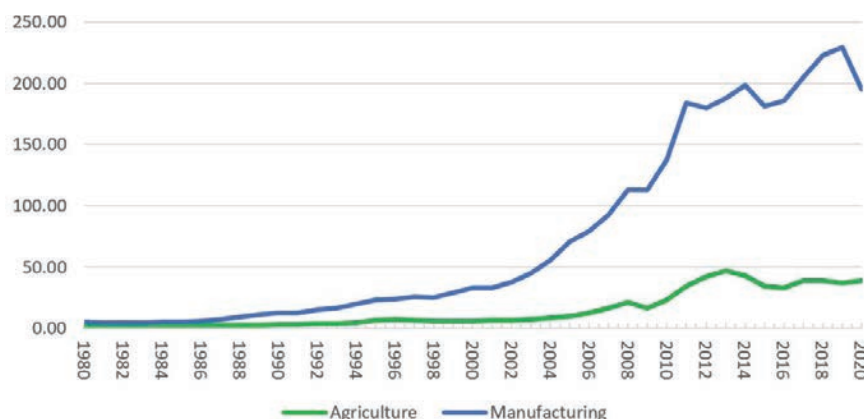


Figure 4.1: India's Total Exports of Agricultural and Manufacturing Goods (Billion US\$)

Source: WTO Database, <https://stats.wto.org/>, accessed on 7th January 2022.



Figure 4.2: India's Trade in Agricultural Goods: Exports, Imports and Trade Balance (Billion US\$)

Source: WTO Database, <https://stats.wto.org/>, accessed on 7th January 2022.

⁵ Around 60 per cent of the domestic demand for edible oil is met through imports. India is also the biggest importer of edible oil in the world. India's share in global imports of pulses was around 13.8 per cent in 2020 (Exim Bank, July 2021)

⁶ Import and Export from Agricultural Sector, available at pib.gov.in, accessed on 5th January 2022.

India's Agricultural Trade Policy

Even after participating in several international FTAs, India's agricultural sector remains more protected than its manufacturing sector. In the Uruguay Round, India bound all its tariff lines related to agricultural products at rates ranging from 10 per cent to 300 per cent. The highest bound rates apply to oils seeds, fats, and oils and their products (product category HS 15). As was mentioned in the previous section, 'Edible Oils' account for a huge share in India's agricultural imports. As per the WTO Trade Policy Review of India, the average applied Most Favoured Nation (MFN) tariff for WTO agricultural goods is 34.8 per cent, while the average applied MFN tariff for non-agricultural goods is 12.3 per cent only (Table 4.1). It is to be noted that India's average tariff rate for agricultural goods has gone up in 2020-21. It should be noted that according to the WTO rules, the government can raise applied tariff rates to the bound tariff rates committed against each product. Along with high applied tariffs, India also has Tariff Rate Quotas (TRQs), Minimum Import Price (MIP), and import prohibitions on certain agricultural commodities. The general arguments for protecting the agriculture sector have been centred around protecting the livelihood of a large number of small and marginal farmers who are dependent on agriculture. Also, as agriculture is globally a highly distorted sector due to the widespread use of domestic and export subsidies, some amount of protection is warranted for a developing country like India.

Table 4.1: Tariff Structure, 2014-15, 2019-20, and 2020-21

	<i>MFN Applied Rate</i>		
	<i>2014-15 (HS12)</i>	<i>2019-20 (HS17)</i>	<i>2020-21 (HS17)</i>
Simple average rate (%)	13.0	13.9 (14.9)	14.3 (15.4)
WTO agricultural products	36.4	34.8	36.5
WTO non-agricultural products	9.5	10.8 (12.0)	11.1 (12.3)
Duty-free (% of all tariff lines)	2.7	3.0	2.7
Simple average rate of dutiable lines only (%)	13.4	14.3 (15.3)	14.7 (15.8)
Non-ad valorem tariffs (% of all tariff lines)	6.1	6.0	6.1
Tariff quotas (% of all tariff lines)	0.0	0.0	0.0
Domestic tariff peaks (% of all tariff lines)	2.7	2.5 (3.5)	3.1 (3.7)

Source: WTO, 2020

In most cases in the FTAs that India has signed, sensitive agriculture products have been kept on the 'negative list'. Moreover, for the agriculture sector, preferential tariff rates are not significantly lower than the MFN tariff rates at this point. As India gradually reduces tariff rates in the future

according to the timeline committed in the respective trade agreements, preferential tariffs will come down and preference margins will open up. However, at this point, most preferential rates are close to MFN tariff rates

Table 4.2: Summary Analysis of Preferential Tariffs, 2019-20

	Preferential Lines (% of all tariff lines)	Total		WTO Agriculture		WTO Non-agriculture	
		Average (%)	Duty Free (%)	Average (%)	Duty free (%)	Average (%)	Duty Free (%)
MFN		14.9	3.0	34.8	4.9	12.0	2.7
APTA	27.2	13.5	4.9	32.4	4.9	10.7	4.9
Bangladesh	27.4	13.5	5.0	32.4	4.9	10.7	5.0
Lao, People's Dem. Rep.	0.8	14.8	3.1	34.8	4.9	11.9	2.9
ASEAN	84.0	5.0	73.7	21.4	51.1	2.6	77.0
Philippines	83.9	5.4	64.7	22.2	41.1	2.9	68.1
MERCOSUR	3.1	14.8	3.0	34.8	4.9	11.9	2.7
SAFTA non-LDCs	75.8	7.1	3.0	14.8	4.9	6.0	2.7
SAFTA LDCs	96.2	0.8	99.2	6.1	93.5	0.0	100.0
Afghanistan	0.3	14.8	3.1	34.4	5.3	12.0	2.7
Chile	9.2	14.1	3.0	33.2	5.3	11.3	2.7
Japan	81.0	5.4	22.9	21.8	6.9	3.0	25.2
Korea, Rep. of	76.7	6.0	66.9	24.6	6.3	3.2	75.8
Malaysia	84.3	4.9	73.8	21.2	51.3	2.6	77.1
Nepal	93.7	1.1	96.7	7.4	87.9	0.2	98.0
Singapore	45.5	10.7	27.7	32.6	13.0	7.5	29.9
Sri Lanka	87.8	4.2	79.4	8.6	89.6	3.5	77.9
Thailand	1.9	14.7	4.9	34.6	5.5	11.8	4.8
LDCs	94.3	1.9	94.2	13.2	76.6	0.3	96.7
<i>Memorandum:</i>							
Afghanistan	96.2	0.8	99.2	6.1	93.5	0.0	100.0
Bangladesh	96.2	0.8	99.2	6.1	93.5	0.0	100.0
Korea, Rep. of	78.6	5.8	68.8	24.3	6.3	3.1	77.9
Malaysia	84.5	4.9	73.9	21.2	51.5	2.5	77.2
Nepal	96.2	0.8	99.2	6.1	93.5	0.0	100.0
Singapore	86.5	4.4	77.6	21.4	53.5	2.0	81.1
Sri Lanka	91.2	2.4	79.5	5.7	89.6	1.9	78.0
Thailand	84.1	4.9	74.1	21.2	51.6	2.6	77.4

Source: WTO, 2020; see Table 3.5, page 53 of the original source for more detail on the Table.

in the agriculture sector. As can be seen from Table 4.2, only for certain countries of South Asia, and Least Developed Countries (LDCs) the applied tariffs on agricultural goods are low. For other countries, including non-LDC preferential trade partners, India's agriculture sector is well protected.

As far as exports are concerned, for certain agro-commodities, the government still sees them as the residual sector where exports are seen mostly as surplus over domestic demand. Consequently, facing inflationary pressures, the government often imposes restrictions on exports of such agricultural commodities. A myriad variety of trade policy instruments including export taxes, export restrictions and prohibitions, and Minimum Export Prices (MEPs) are used to maintain domestic price stability. For example, in recent times, export restrictions on onions were imposed to control domestic demand-supply imbalance.

The Government of India also has a plethora of export promotion schemes for the agriculture sector. As reported by the Minister of Commerce, the government has several schemes like the Trade Infrastructure for Export Scheme (TIES), Market Access Initiatives (MAI) Scheme, Merchandise Exports from India Scheme (MEIS), etc. In addition, assistance to the exporters of agricultural products is also available under the Export Promotion Schemes of Agricultural & Processed Food Products Export Development Authority (APEDA), Marine Products Export Development Authority (MPEDA), Tobacco Board, Tea Board, Coffee Board, Rubber Board, and Spices Board.⁷ The government also has certain export subsidy schemes including Transport and Marketing Assistance for Specified Agriculture Products and export incentives for certain agricultural exports. Presently, there is a dispute (DS580 and DS581) going on in WTO, where a number of countries have alleged that export subsidies given by India to its sugar and sugarcane producers are inconsistent with India's obligations under the AoA. The WTO initial panel ruling has gone against India, but India has challenged this ruling in the WTO.⁸ While it is unclear what the final verdict will be, one inference is that India will have to be more judicious about using export promotion through subsidies in the future.

Till 2017, India was insulated from these threats from other WTO Members as India gained immunity under a 'Special and Differential Treatment' for developing countries and LDC under the Subsidies and Countervailing Measures (SCM) Agreement. Article 27.2 of the SCM Agreement exempts LDCs and developing countries with a per capita income of less than US\$ 1,000 from the prohibition of export subsidies. The

⁷ Available at <https://pib.gov.in/Pressreleaseshare.aspx?PRID=1578144>, accessed on 6th January 2022.

⁸ WTO, Dispute Settlement: The Disputes, DS581.

list of countries that were eligible for this exception is given in Annexure VII of the SCM Agreement. However, India has graduated from this List in 2017. Based on the notification issued by the Committee on Subsidies and Countervailing Measures dated 11 July 2017 (G/SCM/110/Add.14), India can no longer qualify for this exception which it earlier received as a developing country. Therefore, after 2017, any export-linked incentives given to merchandise exports can now face action under the WTO rules.⁹

Global Agricultural Trade Scenario Since the World Trade Organization Agreement on Agriculture

A WTO report has thrown some useful insights into the global agricultural trade scenario since the inception of the WTO AoA (WTO, 2021). It is important to take stock of the global agricultural trade because it was expected that bringing agriculture under the effective rules of the multilateral trading system will fundamentally alter the trading pattern of agricultural commodities across the world. This Report shows that while there are certain fundamental changes in agricultural trade, a few things have remained the same.

The Report shows that, in value terms, agricultural exports have increased by more than four times from 1995 to 2019. From US\$ 286 billion in 1995, it reached around US\$ 1,051 billion in 2019. However, the share of agricultural exports in merchandise exports came down from 8.1 per cent in 1995 to 7.3 per cent in 2019. This is not surprising because since 1995, trade in intermediate goods has gone up manifold and to-and-fro movements of components across borders may have contributed to the high growth of manufacturing exports.

The Report also shows that the developed countries continue to dominate agricultural exports in the world. North America and Europe accounted for more than 51 per cent of the total exports in 1995. The US was the biggest exporter with 22.2 per cent market share and the EU was the second-largest exporter with a market share of 19.4 per cent. In 2019, the US and the EU continue to be the top two agricultural exporters of the world with the EU overtaking the US as the largest exporter. In 2019, the EU and the US had

⁹ India has contested this view in WTO and has argued that it is still under the protective clause, but the panel report mentioned earlier has rejected India's claim. It says: 'It is undisputed that India has graduated from Annex VII(b) of the SCM Agreement. Our interpretation of Article 27.2(b) leads us to conclude that the transition period set forth in Article 27.2(b) expired on 1 January 2003, including for Members graduating from Annex VII(b). We, therefore, find that Article 27 no longer excludes India from the application of Article 3.1(a) of the SCM Agreement.' Paragraph 7.322, p. 106, Document Number WT/DS579/R, 14 December 2021.

market shares of 16.1 per cent and 13.8 per cent, respectively. The dominance of developed countries even in 2019 indicates that the reforms initiated by the AoA to reduce distortion in agricultural trade may not have been very effective as high-cost exporters are still dominating agricultural exports even after 25 years of implementation of AoA.

Among developing countries, Brazil (7.8 per cent), China (5.4 per cent), Argentina (3.5 per cent), India (3.1 per cent), and Thailand (2.9 per cent) are other top countries in agricultural exports.¹⁰ To reiterate India's position, the WTO (2021) shows that India has emerged as the ninth biggest exporter of agricultural commodities in the world in 2019. India was not in the top 10 in 1995.

One of the most staggering data in the WTO report is the changing behaviour of China in the agricultural trade market. In 1995, China was a net exporter of agricultural commodities. However, in 2019, China has emerged as the biggest net importer of agricultural commodities in the world with an agricultural trade deficit of nearly US\$ 79.5 billion. This huge demand coming out of China has altered the global product mix of agricultural trade in a major way.

Table 4.3 shows the top 15 most imported products in global agricultural trade in 1995 and 2019, respectively. The Table shows that in 2019, soyabeans have become the biggest agricultural import. 'Coffee, coffee husks/skins, etc.' was the biggest imported item in 1995 and 2019, the same item got relegated to the eleventh spot. Overall, the Table shows that there have been significant changes in the product composition of agricultural commodities during the WTO regime. As far as soyabeans are concerned, global imports of soybeans increased around 7.1 times between 1995 and 2019. Specifically, China's import of soyabeans increased from US\$ 0.09 billion in 1995 to US\$ 35.34 billion in 2019, registering a 392.6 times growth during the same time.

As far as India is concerned, the country has an export presence among some of the top imported agricultural products in 2019. For example, India is the number one exporter of Rice in the world, with a global market share of more than 32 per cent in 2019. For Cotton, India is the third-largest exporter with an export share of 7.6 per cent. In Meat and Edible Meat (Offal), India has a 4 per cent market share. India's share in global Soyabeans export is small (0.1 per cent), but it is among the top 10 exporters of soyabeans in the world.^{11,12} India is also a big exporter of Spices (HS 0910). According to data for 2019, India is the second-largest exporter of Spices in the world

¹⁰ Op. Cit. (2).

¹¹ WTO, 2021.

Table 4.3: Top 15 Imported Agricultural Products, 1995 and 2019
(Percentage shares)

<i>Agricultural Products</i>	<i>Share in 1995 (in %)</i>	<i>Agricultural Products</i>	<i>Share in 2019 (in %)</i>
Coffee, coffee husks/skins	5.3	Soya beans	5.5
Wheat and Meslin	4.1	Food preparations, not elsewhere specified	3.1
Cotton, not carded or combed	3.6	Wheat and Meslin	2.8
Maize	3.2	Maize	2.6
Solid cane or beet sugar	2.9	Meat of bovine animals	2.4
Soya beans	2.9	Liquor, spirits, etc.	2.4
Cigars, cigarettes, etc	2.5	Grape wines	2.2
Liquor, spirits, etc.	2.3	Palm oil and its fractions	2.0
Bananas	2.1	Meat of swine	1.9
Tobacco unmanufactured	1.9	Baked bread, pastry, etc	1.7
Soya beans oil cakes and other solid residues	1.8	Coffee, coffee husks/skins	1.5
Meat of swine	1.8	Malt extract, flour, dairy preparations, lo cocoa	1.5
Rice	1.6	Animal feed	1.4
Meat of bovine animals	1.6	Soya beans oil cakes and other solid residues	1.4
Palm oil and its fractions	1.6	Cotton, not carded or combed	1.4

Source: WTO, 2021

with a market share of 13.5 per cent.¹² Though Sugar is no longer among the top exported items in the world, according to Foreign Agricultural Service (FAS)/United States Department of Agriculture (USDA) statistics, India enjoys a market share of 11.5 per cent in global Centrifugal Sugar exports in 2020-21.¹³ Among the non-AoA products, India is a big exporter of marine products and according to the MOC, India is the fifth largest exporter of Fish and Fishery Products in the world (US\$ 6.6 billion) and accounts for a 4.1 per cent share in world Seafood exports.¹⁴

¹² Available at <https://oec.world/en/profile/hs92/spices#exporters-importers>, accessed on 6th January 2022.

¹³ Available at <https://apps.fas.usda.gov/psdonline/circulars/sugar.pdf>, accessed on 7th January 2022.

¹⁴ Available at <https://commerce.gov.in/about-us/divisions/export-products-division/export-promotion-marine-products/>, accessed on 7th January, 2022.

Analysis of India's Exports of Agricultural Commodities in Recent Years

As discussed in Section 3, India's agricultural exports have increased almost steadily since 1995. However, over the years, India's export composition and export destinations have gone through some changes. First, we look at India's agricultural export composition from 2009-10 to 2020-21. In this section, we will be following the definition of agricultural goods from an Indian point of view and hence will include marine products in the analysis. Table 4.5A, 4.5B, and 4.5C show India's top 10 agricultural export items for 2009-10, 2018-19, and 2020-21. Detailed data for the entire period is given in Annexure Tables A1 and A2.

Table 4.5A: India's Top 10 Agricultural Exports in 2009-10

<i>Product Name</i>	<i>2009-10</i>	<i>Share (in %)</i>
Basmati Rice	2,289.35	12.79
Marine Products	2,095.28	11.70
Cotton Raw Including Waste	2,050.76	11.45
Oil Meals	1,658.83	9.26
Spices	1,257.86	7.02
Buffalo Meat	1,163.54	6.50
Tobacco Unmanufactured	763.33	4.26
Fresh Vegetables	637.16	3.56
Other Cereals	625.71	3.49
Tea	623.29	3.48
Top 10	13,165.11	73.52
Total Agri Exports	17,906.24	

Source: APEDA¹⁵

Table 4.5B: India's Top 10 Agricultural Exports in 2018-19

<i>Product Name</i>	<i>2018-19</i>	<i>Share (in %)</i>
Marine Products	6,796.37	17.63
Basmati Rice	4,712.62	12.23
Buffalo Meat	3,587.15	9.31
Spices	3,308.27	8.58
Non-Basmati Rice	2,999.51	7.78
Cotton Raw Including Waste	2,104.41	5.46
Oil Meals	1,491.73	3.87
Sugar	1,359.58	3.53
Castor Oil	883.76	2.29
Tea	830.9	2.16
Top 10	28,074.3	72.84
Total Agri Exports	38,541.68	

Source: APEDA

¹⁵ Available at ReportList (apeda.gov.in), accessed on 7th January 2022.

Table 4.5C: India's Top 10 Agricultural Exports in 2020-21

<i>Product Name</i>	<i>2020-21</i>	<i>Share (in%)</i>
Marine Products	5,962.43	14.46
Non-Basmati Rice	4,796.02	11.63
Basmati Rice	4,018.65	9.74
Spices	3,984.75	9.66
Buffalo Meat	3,171.13	7.69
Sugar	2,790.05	6.77
Cotton Raw Including Waste	1,897.20	4.60
Oil Meals	1,575.54	3.82
Castor Oil	917.24	2.22
Miscellaneous Processed Items	864.21	2.10
Top 10	29,977.22	72.69
Total Agri Exports	41,240.06	

Source: APEDA

Table 4.5A, 4.5B, and 4.5C show that over the period under consideration, the top 10 agricultural export items have consistently contributed to around 72-73 per cent of India's total agricultural exports. For 2020-21, Marine products, rice, spices, and buffalo meat make up for around 53 per cent of India's total exports. This indicates that India's export basket is not very diversified, and it largely consists of primary and low value-added products. This shortcoming has been recognised in India's Agricultural Export Policy 2018 and the government has shown interest in promoting exports of higher value items, including perishables and processed food.

Among the top exported items, Basmati rice, marine products, cotton, oil meals (which includes soyabeans), spices, and buffalo meat have been in the top 10 in all three tables. On the other hand, tobacco, fresh vegetables, and other cereals lost their place in Table 4.5B and 4.5C. The share of tea has gradually come down and in 2020-21, tea was only the twelfth largest exported agricultural product with a share of 1.8 per cent in total agricultural exports.

It is also notable that the share of non-Basmati rice has increased sharply in India's agricultural trade basket. From only 0.42 per cent share in 2009-10, the share jumped to 4.6 per cent in 2011-12 and 11.63 per cent in 2020-21. Exports of Sugar and Miscellaneous Processed Items also increased over the years. It is notable that global data suggests that Miscellaneous Processed Items has emerged as one of the most exported categories of agricultural goods in 2019 and India is taking advantage of that. It is also important to note that Miscellaneous Processed Items is a value-added category of agricultural goods and it will be dealt within more detail later in this section.

Table 4.6: Top 5 Export Markets for Each of India's Top 10 Agricultural Exports in 2020-21

<i>Basmati Rice</i>	<i>Buffalo Meat</i>	<i>Marine Products</i>	<i>Miscellaneous Processed Items</i>	<i>Non-Basmati Rice</i>	<i>Oil Meals</i>	<i>Spices</i>	<i>Sugar</i>	<i>Cotton</i>	<i>Castor Oil</i>
Saudi Arab Iran Iraq Yemen UAE	Hong Kong Vietnam Malaysia Egypt Indonesia	US China Japan Vietnam Thailand	US UAE Nepal Malaysia Indonesia	Benin Nepal Bangladesh Senegal Togo	US Bangladesh Vietnam Korea Indonesia	China US Bangladesh UAE Thailand	Indonesia Sudan Iran Sri Lanka Somalia	Bangladesh China Vietnam Indonesia Taiwan	China Netherlands US France Japan
Share of top 5 export destinations (in %)									
62.80	73.51	70.13	42.82	37.01	53.55	55.28	56.34	92.78	81.90
Memo item: Share of top 10 export destinations (in %)									
79.92	88.80	81.99	61.34	56.73	77.54	69.03	77.60	97.58	90.62

Source: APEDA

Table 4.6 shows the top 5 destinations for India's top 10 agricultural export items based on 2020-21 data. It shows that India's agricultural export items are mostly destined for developing countries, Japan, and the US, among the developed countries. Only two European countries, the Netherlands and France feature in this list. Among the countries featured in Table 4.6, a large number of countries are with which India has a preferential trading agreement or framework agreements. For example, Saudi Arabia and the United Arab of Emirates (UAE) are part of Gulf Cooperation Council (GCC), Vietnam, Malaysia, Indonesia, and Thailand are part of the Association of Southeast Asian Nations (ASEAN), Bangladesh, Nepal, Sri Lanka are part of South Asian Free Trade Area (SAFTA), etc. India also has standalone FTAs with some of these countries like Sri Lanka and Thailand. India has deep integration agreements with Japan and South Korea, which go beyond FTAs, and also include provisions for investment, Intellectual Property Rights (IPR), and other modes of economic cooperation. Currently, negotiations are going on with the EU, the US, the United Kingdom (UK), Australia, the UAE, and Taiwan for signing up of preferential trade agreements.

Table 4.6 also shows that market diversity varies considerably among the top 10 crops. For example, the top 5 countries account for around 93 per cent of India's total cotton exports but the top 5 countries only account for 37 per cent of India's total non-Basmati rice exports. This shows that India's non-Basmati export is much more diversified and reaches a much larger number of export destinations. For a clearer exposition of market concentration and diversity, the share of the top 10 countries for these products is also given in Table 4.6.

As highlighted in Section 2, the export of primary commodities, in the long run, is detrimental to the economic development of a country. Therefore, strategies for economic development should focus on exports of more value-added products and processed products, given the relative prices of such commodities increase, vis-à-vis, primary commodities over time. As mentioned in Exim Bank (2021), the food processing sector covers fruits and vegetables; spices; meat and poultry; milk and milk products, alcoholic beverages, fisheries, plantation, grain processing, and other consumer product groups like confectionery, chocolates, cocoa products, soya-based products, mineral water, high protein foods, etc. However, an analysis of India's agricultural exports of value-added products over the last two decades does not show an encouraging picture. For this analysis, we consider HS Chapters 7, 8, 16, 20, and 21 in value-added agricultural products, following the definition given in India's Agriculture Export Policy 2018.¹⁶

¹⁶ Op. cit. (5).

Our analysis shows that while the total values of agricultural exports have increased from around US\$ 5 billion to over US\$ 37 billion (in nominal terms), the share of value-added products has not kept pace with it. Rather interestingly, the share of exports of value-added products has declined over the last 20 years – from over 21 per cent in 2001, to around 13 per cent in the 2021 financial year – at an average annual rate of –1.2 per cent.

Figure 4.3 shows India's total agricultural exports in US\$ million (left axis) as well the share of value added in overall exports (right axis) from 2000-01 to 2020-21. An inspection of the chart reveals the following two points: first, the share of value added resembles a U-shape. From 2001 till 2013, there was almost a secular decline in the share, from 21 per cent to around 9 per cent. However, post that period, the share has increased, even though gradually, to just over 13 per cent. Second and more strikingly, the value of total agricultural export and the share of value added tend to move in opposite directions. From 2001 to 2013, while the total agricultural exports increased, the share of value added in it declined. The opposite happened post-2013, with a rise in the share of value added, even when the total declined. The correlation coefficient between the two series is –0.87.

Given that the income elasticity of demand for value-added products is hypothesised to be higher compared to primary goods, the stagnation in value-added agricultural exports may be ascribed to the supply side issues, rather than lack of demand from the rest of the world. Lack of uniformity in quality of products, lack of standardisation, and leakage in the agricultural value chain may be ascribed as plausible reasons for India's lacklustre performance in this sector. Moreover, as Table 4.7 shows, the annual average growth rate in nominal value of export for the value-added agricultural products vary widely, from merely 4 per cent for preparations of meat of fish, to over 13 per cent for preparations of vegetables. Future trade policies, therefore, may be concentrated toward the products with relatively high growth potential. The Agricultural Export Policy 2018 has taken cognisance of the importance of India's prospects in value added and processed agricultural goods and suggested that India has strong export potential in some value added and processed food. The Report has suggested such a list of products. This is shown in Table 4.8.

Data from the last 2 years show that India's processed food exports are showing some promise. Despite the massive disruption of international trade due to the Covid crisis and the follow-up problems related to shipping disruptions and container shortage, India has managed to export processed foods to a number of countries. Using data from APEDA, EXIM Bank (2021) shows that exports of jaggery, confectionery products, alcoholic beverages, milled products, miscellaneous products, and processed vegetables

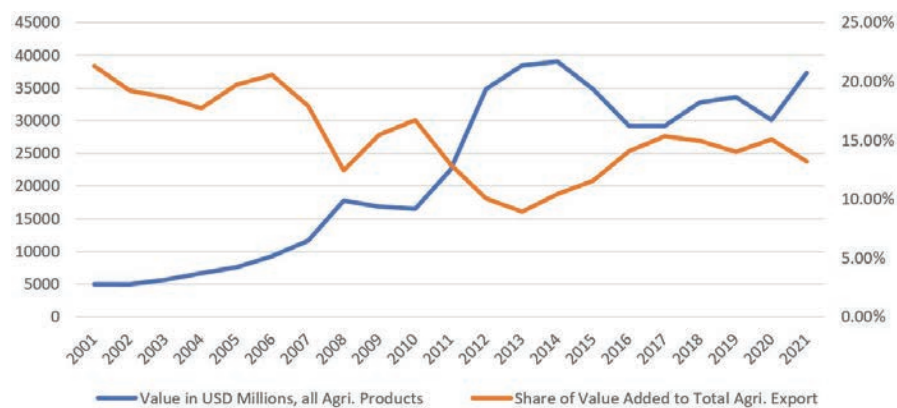


Figure 4.3: Total Agriculture Exports and Share of Value Added for India (2000-01 to 2020-21)

Source: CMIE TradeDx Database

Table 4.7: Average Annual Growth Rate of Value-Added Agricultural Products by HS Code Chapters

HS Chapter of Agricultural Value-Added Product	Commodity Name	Average Annual Growth Rate in Nominal Value of Export from 2001 to 2021 (%)
7	Edible Vegetables and Certain Roots and Tubers	9.33
8	Edible Fruit and Nuts; Peel of Citrus Fruit or Melons	4.93
16	Preparations of Meat of Fish or Crustaceans, Molluscs or Other Aquatic Invertebrates	4.28
20	Preparations of Vegetables, Fruits, Nuts or Other Parts of Plants	13.57
21	Miscellaneous edible preparations	11.04

registered a high growth rate of exports in 2020-21. The main markets for India's processed agricultural exports are the US, the UAE, Indonesia, Nepal, the UK, Vietnam, and China (Figure 4.4). But India seems to be increasing its exports in the smaller markets as well. The thrust of India's agricultural export policy appears to have yielded results through increased penetration of value-added products in previously unpenetrated or underpenetrated African markets. EXIM Bank (2021) highlights the following:

Growth in exports of processed food from India during 2020-21 was primarily driven by the increase in demand for pulses, processed fruits

and vegetables, milled products, cereals preparations, and other processed items, particularly from the developing markets of Asia, and the Middle East region. Further, India's exports of processed food to several previously under-penetrated markets also increased substantially in 2020-21, particularly to African countries like Djibouti, Rwanda, Central African Republic, Sierra Leone, Cameroon, and Mali, among others, where India's exports more than doubled in 2020-21.

Table 4.8: Processed Food with Export Potential as Suggested by Agricultural Export Policy 2018

Product	Present Level of Exports (million)	Projected Exports in the Next 3 Years (million)	Potential Markets
Biscuits and Confectionery	\$ 185	\$ 350	Angola, the US, Haiti, Namibia, Uganda, the UAE, Nigeria, Kenya
Indian Ethnic Foods	\$ 114	\$ 200	The US, Australia, Canada, the UAE, Nepal
Cereal Preparations	\$ 471	\$ 800	The US, Bangladesh, the UK, Nepal, the UAE, Angola
Dehydrated Onion, Other Vegetables and Frozen Vegetables Including Gherkin	\$ 207	\$ 400	The US, Germany, Belgium, Russia, France
Processed Fruits, Juices, Concentrates	\$ 338	\$ 600	Saudi Arabia, the Netherlands, Yemen, the UK, the US, Algeria, Kenya

Source: MOC, 2018

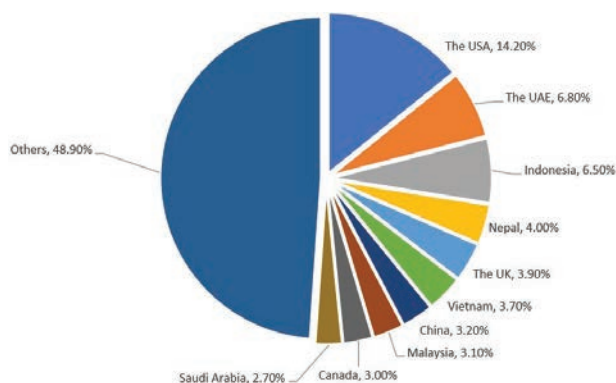


Figure 4.4: Export Destination of India's Processed Food for 2020-21

Source: EXIM Bank (2021) quoting data from APEDA

The Production Linked Incentives (PLIs) introduced by the Government of India from the 2021-22 financial years is expected to aid further in capacity building in the food processing sector.

An Analysis of Destinations of India's Agricultural Exports

A look at the data of the last 12 years shows that India's exports of agricultural commodities go to a large number of countries but the top 20 largest export markets account for around 68-70 per cent of its total exports. In the last few years, the US and China have emerged as the top two export destinations for India. Bangladesh, the UAE, Vietnam, Saudi Arabia, Indonesia, and Nepal are other big export markets of India (Table A3 in the Annexure).

A closer look at the individual country shares shows some drastic changes over the years. For example, exports to Pakistan have almost completely disappeared. In 2010-11, India exported US\$ 1,047.21 million worth of agricultural goods to Pakistan. In 2020-21 the value of agricultural exports is US\$ 68 million only, implying a 94 per cent decline in exports.

Another dramatic change happened with India's agricultural exports to Vietnam. The share of Vietnam in India's agricultural exports was around 5.3 per cent in 2010-11. It sharply shot up to 13.81 per cent in 2017-18. For a period of 4 years, from 2014-15 to 2017-18, Vietnam was India's largest market for agricultural exports. The country was importing a significant amount of meat products (HS 02), fish and marine products (HS 03), coffee, tea, mate, and spices (HS 09), and cotton (HS 52) from India. This suddenly reversed from 2018-19 and Vietnam's share in India's total agricultural exports dropped to 3.92 per cent. A look at the commodity level data shows that in the last few years, India lost a significant amount of market in HS 02, HS 03, and HS 09 in Vietnam. It is worth highlighting that India has lost

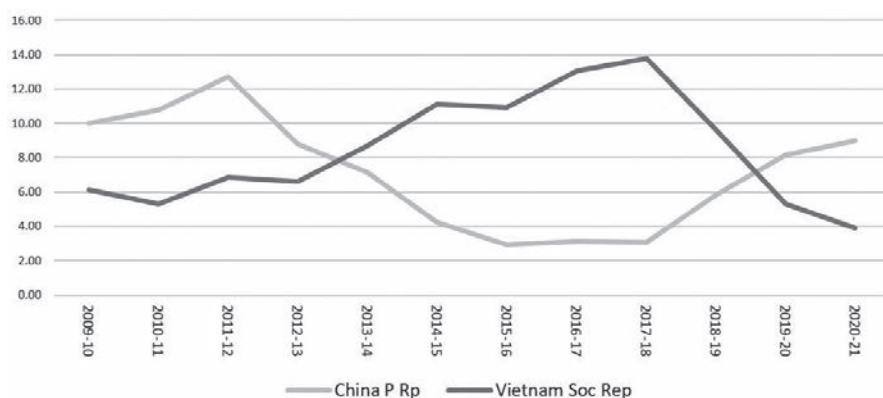


Figure 4.5: Share of China and Vietnam in India's Total Agricultural Exports (in %)

Source: APEDA, calculated from Table A3 in the Annexure

market in Vietnam in spite of preferential access to Vietnam through the India-ASEAN FTA. Curiously, there seems to be a strong negative correlation between Vietnam's and China's share in India's agricultural exports over the years (Figure 4.5).

Another feature of India's agricultural exports is that India's market in African countries seems to be on the lower side. Apart from Egypt, a very small proportion of India's agricultural exports goes to other African nations. There is ample opportunity to export agricultural commodities, especially value-added commodities to these markets.

The data also show that India predominantly exports to developing countries. If we divide India's agricultural export destinations into developed (including Russia and countries of the erstwhile USSR) and developing (including the LDCs), then on average for the last 10 years, developed countries have accounted for about around 28 per cent of India's total agricultural exports, whereas around 72 per cent of exports have gone to the developing countries (Table 4.9). One possible reason can be that as India's agricultural exports are at the lower end of the value chain, the market for such products might be more in developing countries than developed countries. It is also possible that Indian agricultural exporters find it relatively difficult to meet the Sanitary and Phytosanitary Standards (SPS) and Technical Barriers to Trade (TBT) standards in developed countries. However, as value realisation is typically higher in developed countries, Indian agricultural exporters might be incentivised to explore more market access opportunities in the developed country markets.

Table 4.9: India's Agricultural Exports: Share of Developed and Developing Countries (%)

	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
Developed Countries	29.72	28.20	24.32	26.54	27.00	28.18	29.75	28.07	29.92	26.47
Developing Countries	70.28	71.80	75.68	73.46	73.00	71.82	70.25	71.93	70.08	73.53

Source: Authors' calculation based on data from APEDA

To understand the impact of FTAs and other economic cooperation agreements, we divide India's top 20 export destinations (top 20 based on 2020-21 data) into two groups of countries. Depending on the year, these 20 countries account for 65-70 per cent of India's agricultural exports. In the first group, we include countries with whom India has at least one preferential trade agreement or economic cooperation agreement. This group includes Bangladesh, the UAE, Vietnam, Saudi Arabia, Indonesia, Nepal, Malaysia,

Japan, Thailand, and Sri Lanka. The group consists of countries with whom India trades only on an MFN basis and without any preferential trade agreement (we are ignoring the General System of Preference (GSP) between India and the US). This group contains the following countries: the US, China, Iran, Hong Kong, Iraq, the Netherlands, the UK, Canada, Germany, and Egypt. By some coincidence, each group has 10 countries. The aggregate market shares of these two groups of countries are shown in Figure 4.6. From the figure, it is not clear that Indian agricultural exports have performed better for countries with economic cooperation agreements or FTAs. It appears that agricultural exports have gone up more in countries with which India trades only on an MFN basis. This result is not unexpected as increasing market share in countries with which India has FTAs may not be easy as these markets have low MFN tariffs and are relatively open. Consequently, India may face competition from other agricultural exporters in these markets. Also, as discussed in chapters 6 and 7 in this book, Indian exporters may face a host of Non-Tariff Measures (NTMs) in these countries. Compliance with SPS and TBT standards might be another important impediment facing Indian exporters in these markets.

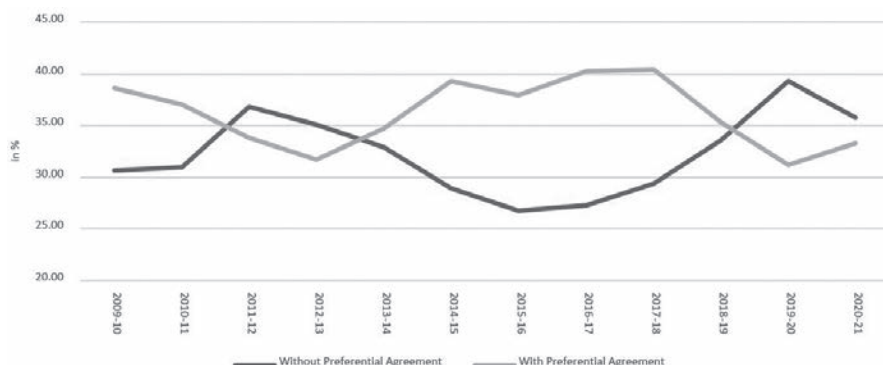


Figure 4.6: Share of India's Top 20 Export Destinations for Agricultural Goods Divided into Countries with which India has Preferential Trade Agreements and with which India Trades Only on MFN Basis

Source: Authors' calculation based on data from APEDA

Concluding Observations

Since the WTO AoA was signed in 1995, it is evident from data that the domination of high-cost producers in global agricultural trade continues. The US and the EU are still the top two exporters of agricultural commodities in the world. No new disciplines on domestic subsidies have been implemented since the AoA and agriculture continues to remain a distorted sector. Even though the removal of QRs in most countries has opened up

better market access for agricultural exporters, there are challenges. Though the average applied MFN tariff in most countries, especially in developed countries, is low, there are tariff peaks and tariff escalations. Low average tariff often hides tariff peaks and tariff escalation pushes countries towards low value-added exports. On top of these, many developed countries are allegedly using Standards including SPS and TBT as trade-restrictive measures.

India's FTAs and CEPAs, however, do not appear to have affected agricultural trade in a significant way. India has protected many of its sensitive agricultural products by keeping them on the negative list. Also, the preferential tariff reductions have so far not kicked in a major way and the preference margins are either slim or non-existent. On the other hand, Indian agricultural exports also have not got any major boost in the countries with whom India has signed the FTAs. As we have discussed India has lost market in a major way in Vietnam (an FTA partner) but has increased exports to the US and China (both trade with India on an MFN basis only).

However, overall, India seems to be doing better in international trade in agriculture. The country has been consistently running a trade surplus in agriculture since 1995. Thanks to India's drive towards self-reliance since the mid-1960s, and conservative approach towards imports, India is now food secure and to a large extent food sovereign country. India should continue to focus on food security, livelihood security and food self-sufficiency, and treat the essential food sector exports mostly as a vent for surplus. However, for cash crops, commercial crops, and value-added and processed food, there is significant potential for Indian exporters. India's market penetration is low in most developed country markets and in many of the markets in Africa India's presence is very limited. Also, India's exports are mostly low-value-added primary commodities.

As the Agricultural Export Policy, 2018 rightly focuses on the increase in value-added exports, India needs to focus more on food processing and value-addition. One way of attaining this can be the creation of agricultural value chains in the country. To make these effective, Indian policymakers must ensure that the large majority of small and marginal farmers are well integrated into the development of these value chains. In this context, the Farmer Producer Organisations (FPOs) can be effectively used for giving farmers a scale advantage and improving the access of smaller producers to investments, technology, and markets. To emerge as a high-value exporter of agricultural goods, it will be important for India to develop branding and marketing of processed products that can adhere to the standards of the target markets and build brand reputation and recognition.

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India-European Union Free Trade Agreements: Possible Threats to Indian Agriculture

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Introduction

Agricultural trade has been a contentious issue given its consequences for the well-being of low-income categories. Developing and less developed countries have been especially sensitive to the liberalisation of agricultural trade. The major bone of contention is the huge subsidies given by developed countries to their farmers. This makes it difficult for the poor country farmers to compete with products originating from such countries. During the years before the formation of the World Trade Organization (WTO), the developed countries pressurised the other countries to liberalise the agricultural trade which culminated in the Agreement on Agriculture (AoA). The developing and less developed countries were allowed a slower pace of liberalisation and most of them retained Quantitative Restrictions (QRs). In terms of Regional Trade Agreements (RTAs), agricultural produce has been mostly kept in sensitive lists. In the case of a prospective Free Trade Agreement (FTA) with the EU, the Indian agricultural produce faces both tariff escalation and non-tariff barriers. Tariffs are in general low. So, while thinking about liberalising agricultural trade this aspect has to be kept in mind by India. Unduly liberalising agricultural trade can lead to import surge whereas not much export surge is expected in this category of products. Sun and Reed (2010) find that FTAs are trade creating for agricultural products.

European Union (EU)-India FTA negotiations have attracted much attention among trade policymakers. In contrast to most of the developing economies, India is regarded as a country with significant supply-side capacity. This means that in response to any meaningful trade concessions

resulting from a bilateral deal, Indian suppliers can substantially increase their exports to the EU, perhaps at the cost of other developing countries and EU domestic suppliers. In this way, the likely trade diversion in the EU may result in reduced imports from other developing and least developed countries and increased imports from India. On the other hand, India's tariff protection on a range of products is relatively high. Therefore, taking advantage of exchanged tariff concessions under the FTA, EU suppliers may replace India's imports from other sources, resulting in trade diversion for third party countries. Consequently, the overall welfare gains for India will depend on the impact on producers due to import competition, on consumers because of price reduction and higher variety of goods to choose from and finally, on the government owing to import revenue changes. This chapter assesses the potential implications of the EU-India FTA for India's agricultural sector. Specifically, the chapter will look at the likely threat that may occur due to tariff concessions given to EU agricultural products. This has important implications for negotiations and designing an appropriate tariff structure to minimise the impact on domestic agricultural goods producers.

Literature Review

There has been considerable debate in academic circles about the impact of FTA on member countries and on the rest of the world through trade creation and trade diversion that are explained using a partial equilibrium approach. The trade creation effect of FTAs improves resource allocation within a region and income for member countries by reducing trade barriers. It makes consumers better off by giving them greater choice as they can buy goods from the most efficient supplier at the lowest cost. The trade diversion effect, on the other hand, means that the FTA would replace imports of highly efficient non-member countries with imports from less efficient FTA members. Trade creation results in an improvement in resource allocation and economic welfare, while trade diversion worsens efficiency and resource allocation. Besides, trade diversion has a negative impact on non-members as they lose an exporting opportunity. Thus, while consumers in FTA member countries may have increased welfare as the FTA enables them to buy imports at lower prices, an FTA member country overall may face a loss if the decline in government's tariff revenue exceeds the consumer's gain. In general, an FTA would lead to some amount of trade creation and trade diversion. If the trade diversion is sufficiently large relative to the trade creation effects, the FTA could conceivably end up being harmful to the non-member countries. Successful regional agreements might be expected

to increase trade between partners relative to those countries' trade with the rest of the world. RTAs violate the MFN clause which is a building stone of WTO. Article XXIV allows the formation of RTAs between WTO member countries for substantially all trade causing minimal impact on non-member countries, especially, in terms of trade and other conditions of trade.

In this study, the impact of FTA between India and the EU (28-nation bloc) on the agricultural sector is analysed. The potential threat from EU imports is ascertained by identifying the products which can be targeted for tariff liberalisation by EU countries. A method has been devised first to identify potential threat products. In the second stage, the extent of the threat is estimated through partial equilibrium tariff simulations. As a result, an idea about the likely import surge can be conceived. The results can then give a direction to the negotiators about how to minimise the threat while discussing tariff concessions in agricultural products.

Several studies done on this subject are mostly qualitative. They have tried to analyse the possible impact of FTAs for the partners and the related countries.

Ramesh Chand (1998) looks at the implications of removing QRs and quotas on the trade of agricultural goods in India. The Indian policymakers fear that liberalisation of agricultural imports would hit Indian producers and impair the growth prospects of the farm sector. Further, price volatility might increase to a great extent due to increased linkage to world commodity markets. Price fluctuations may also result from the dumping of products that are produced in excess by the exporting country or due to a shortage of domestic supply in the home country (through exports without restrictions) which can pose a major threat to food security. The paper (Chand 1998) also suggests strategies and policies that India should follow to minimise the adverse impact of QR removal on the agricultural sector.

Grain (2019) analyses the possible threat that the Indian dairy sector could face from the opening of trade between India and the EU. It concludes that developing countries like India can only protect their dairy sectors from the ravages of this distorted global market by instituting high tariff and non-tariff barriers. Without these measures, the small-scale dairies would be rapidly wiped out and taken over by global dairy giants. India's import tariff on dairy products from the EU is relatively high. There is a chance now that the signing of the FTA between these two partners will lead to the elimination of tariffs or any other kind of trade barriers. Since the EU is a major trading partner of India for dairy products as opposed to India being one among the several suppliers to the EU market, the opening up of trade can adversely affect the producers of the dairy sector at home by influencing

the price. The import of dairy products from the EU at a lower cost thus can put downward pressure on domestic prices.

Roy and Mathur (2016) attempts to analyse the effects of trade liberalisation on the bilateral trade structure between India and the EU and the consequent welfare effects. The paper considers both the United Kingdom (UK) as a member of the EU and the situation when the country exits the monetary union. The study found that when the UK is a member of the EU, both India and the EU gain more from the situation when the UK exits the EU due to Brexit. India is estimated to experience a decline in Gross Domestic Product (GDP) growth rate from 1.1 to 0.5 per cent while the EU, from 0.1 to -0.5 per cent.

Selim Raihan (2009) performs a detailed analysis in terms of welfare, macroeconomic, and trade impacts on a number of low-income economies as a result of the proposed bilateral FTA between the EU and India. A global general equilibrium modelling technique was applied for analysing the consequences. A scenario depicting a full FTA between India and the EU was conducted. The results showed that the EU-India FTA would result in welfare gains for both India and the EU. In absolute terms, the gains of the EU would be much higher than those of India. However, in terms of share in GDP, the gains of India would be much larger than that of the EU. India's welfare gain would mainly be driven by the gain in terms of trade, whereas the EU's welfare gain would primarily be due to a gain in allocative efficiency. Most of the low-income countries under consideration in the analysis would experience falls in exports, to both the EU and Indian markets, mainly because of losses in preferences and diversion of trade.

Assessing the potential impact of an EU-India trade agreement, Navarra (2020) provides an estimate of the potential effects of an FTA that partly liberalises trade in goods and services between the EU and India. Effects are measured both for the welfare and trade volumes. The model used belongs to the group of new quantitative trade models, where the demand for goods and services is defined by a 'structural gravity equation' that links trade flows to country-specific characteristics and bilateral trade costs between countries. The gains for both sides are estimated to be in the range of € 8 to € 8.5 billion. A reduction in tariffs by almost 90 per cent and a symmetric reduction in non-tariff measures by around 3 per cent have been assumed to estimate these gains.

Various studies have also examined the impact of FTAs on trade at disaggregated sector levels, keeping in mind the difference in impact depending on the products being traded. A study conducted by Shanping (2014) on the trade effects of the Association of Southeast Asian Nations (ASEAN)-China FTA revealed a significant amount of trade creation in

agricultural and manufactured goods. Taguchi (2015) analyses the trade effects of ASEAN-plus-one FTA with a sample of 14 countries for 20 years and the results revealed that differences in general tariff rate and preferential tariff rates are the reason for the variation in the degree of trade creation in different agreements. Some agreements are recorded with significant trade creation, while others with relatively less significant effects. Varma and Abhyaratne (2016) examined the India Sri Lanka Free Trade Agreement (ISLFTA) and found evidence of trade creation but no trade diversion. Varma et al. (2017) examines the trade creation and trade diversion effects of two regional agreements, namely, the Asia-Pacific Trade Agreement (APTA) and the India-Singapore Comprehensive Economic Cooperation Agreement (ISCECA) from the viewpoint of India as a participating country. The results reveal that the agreements have not led to any trade creation, possibly due to the presence of a cluster of smaller, economically less influential countries, high cost of intraregional trade, and prominence of South-South integration. Also, APTA's structure is characterised by the limited scope of agreements, overlapping memberships leading to confusion in objectives and rules of origin which are anyhow stringent, acting as some of the reasons why the Agreement has not been able to create substantial trade among the members.

India-European Union Trade

India has a keen interest in accessing the EU market, as the region is India's biggest market (the top export market for its 10 biggest export commodities). EU-India trade rose from € 28 billion in 2003 to € 55 billion in 2007 (which now stands at € 88.1 billion in 2021), pushing the two to start negotiations on a bilateral trade agreement in 2007. Although the share of India's exports to the EU in its total exports had declined over time, its share remained well above 20 per cent in 2007 (As of the year 2020 it stands at only 14%). Exports from India to the EU increased quite considerably over time. In 1990, the export value increased from US\$ 6,252 million in 1990 to US\$ 35,517 million in 2007 to US\$50,037 million in 2021. Also, the share of India's exports to the EU's total imports increased as well during this period. In 1990, this share was 0.4 per cent, which increased to 0.66 per cent in 2007 (Presently it stands at 2.2%). On the other hand, an increasing trend is observed in the share of EU exports to India in total EU exports. In 1990, the share was 0.06 per cent which increased to 0.08 per cent in 2007 which increased to 1.9% in 2021. The EU's exports to India increased substantially during the 2000s. In 2000, they totalled US\$ 10,690 million, increasing to US\$ 44,020 million in 2007 and further to US\$ 45,686 million in 2021. Although the share of imports from the EU in India's total imports declined over time, in 2007 the

share was still as high as 17.6 per cent. It stands at around 9% in 2021. There are products from the agricultural sector where India's imports from the EU have been significantly increasing. Some of them include vegetable seeds, fresh fruits, oils, beer, natural honey, and so on.

Market access for goods remains the core component of any FTA. In the initial proposal, the EU's exclusion list included 226 products, mostly chemicals, petrochemicals, plastics, ceramics, and glassware. On the other hand, India proposed an exclusion list of about 150 agricultural goods and 250 manufactured products. The agricultural goods included processed food, dairy products, sugar, fruit and vegetables, meat products including poultry, maize, honey, mushrooms, egg products, saffron, coriander seeds, vanaspati, and cocoa powder. Trading relations since 2013, haven't progressed much between India and the EU, unless in the recent couple of years, where the two have engaged in some initial round of discussions to start for a Bilateral Trade and Investment Agreement (BTIA) including an Early Harvest Agreement. A list of products has been identified and shared by the Department of Commerce (DoC), wherein the EU has expressed its desire to explore market access through a rapid reduction in the existing tariff rates. Such products primarily include items from the Indian food processing sector such as wines and spirits, apart from other minor food items like olive oil, pasta, etc.

India has a trade surplus in the food processing as well as the agri-food sector, with respect to the EU (excluding items such as meat and edible meat offal, certain products of animal origin, vegetable plaiting materials, and other vegetable products (n.e.s)). During 2019-20, India recorded a trade surplus in the agri-food sector of US\$ 2,118.9 million, with exports worth US\$ 2,994 million and imports of US\$ 825.1 million. The food processing sector too, witnessed a surplus of US\$ 177.40 million during the same period, with exports of US\$ 728.20 million and imports worth US\$ 550.8 million. However, the imports of processed food from the EU constituted a higher share of 66.8 per cent of the total agri-food imports compared to the exports of the same to the EU, which constituted a share of 24.7 per cent of the total agri-food exports.

In this chapter, the import threat from the possible India-EU FTA is analysed. Table 5.1 presents the top 10 import items in 2018. The growth rate between 2011 and 2018 shows that turbo jet, liquified natural gas, and light vessels have experienced the highest growth during this period. In terms of the EU's share in India's imports from the world significant improvement is observed for light vessels, liquified natural gas, silver, and parts and accessories for tractors and motor vehicles.

Table 5.1: Top Imports of India from EU

<i>Product Code</i>	<i>Product Label</i>	<i>Growth Rate (2011-18)</i>	<i>Share of World 2011</i>	<i>Share of World 2018</i>
71023100	Non-industrial diamonds unworked or simply sawn, cleaved, or bruted (excluding industrial diamonds)	-33.06	66.63	35.24
71069100	Silver, including silver plated with gold or platinum, unwrought (excluding silver in powder form)	9.92	27.41	35.02
84111200	Turbojets of a thrust > 25 kN	1,976.93	39.29	29.20
87089900	<i>Parts and accessories, for tractors, motor vehicles for the transport of ten or more persons,...</i>	49.74	25.00	34.49
71081200	Gold, including gold plated with platinum, unwrought, for non-monetary purposes....	-62.60	3.22	1.90
76020010	Waste and scrap, of aluminium (excluding slags, scale, and the like from iron and steel production) ...	52.49	32.16	23.83
89059090	<i>Light vessels, fire-floats, floating cranes and other vessels, the navigability of which is subsidiary to their main function (excl. seagoing vessels, dredgers, floating or submersible drilling or production platforms; fishing vessels and warships)</i>	372.88	8.47	27.36
27111100	<i>Natural gas, liquefied</i>	1206.64	0.59	4.25
85238020	Media for the recording of sound or other phenomena, whether or not recorded, including matrices ...	-58.25	68.78	48.58

Source: Created by the Authors

In the event of negotiation in the FTA between India and the EU, the same products may have an ever increasing share in India's imports with a resultant threat to domestic producers of those items in India. In turn, it can adversely affect the prices of domestically produced agricultural goods and hence the export demand of India.

Motivation

The signing of this FTA between India and EU-28 can have both positive and negative impacts for consumers as well as producers of India. Along

with the welfare gain that this will bring there will also be some implications of this on the livelihoods of several million people here. The focus will mainly be on threats that this FTA can pose to the local producers producing and exporting the same products which can be imported from the EU 28 at lower tariff rates after the signing of this Agreement. This kind of trade liberalisation can also widen inequality as distributive effects between the factors of production are ignored in measuring welfare because it assumes that labour and capital shares of income as constant. Another channel through which trade liberalisation can affect inequality is the relative change in prices that have different effects on consumers and producers through price volatility when there is dumping of goods from foreign countries at a price lower than its market price.

A more severe impact of the FTA, though, would be on India's agricultural sector and on the livelihoods of some 600 million people who are dependent on it. Yet farmers have woken up only recently to the threats inherent in the proposed FTA. One sector alive to the near impossibility of breaking into the EU market is the cooperative dairy farms. Gujarat Co-operative Milk Marketing Federation (GCMMF), India's largest food products marketing organisation, has been writing repeatedly to the Prime Minister and Commerce Minister about the vulnerability of the dairy sector. Better known by its Amul brand, GCMMF is worried that the one-way trade through the FTA is likely to kill the cooperative dairies, which are among the top providers of livelihood. Rupinder Singh Sodhi, GCMMF Managing Director, told *Down To Earth*¹ in March 2014, that the EU is anticipating a huge market opportunity in India once the FTA is ratified and New Delhi needs to be cautious on this score. Dairy cooperatives generate employment for 15 million families in rural India across 1,40,000 villages.

A significant threat to the growth of the dairy sector is the EU's push on Geographical Indications (GIs). This is a tag given to products whose quality, reputation, or other characteristics are essentially attributable to its geographical origin, such as Champagne from the eponymous region of France, Scotch whiskey from Scotland, and Parma ham of Italy. The EU is strong on these Intellectual Property (IP) rights and has registered close to 3,000 GIs, primarily wines and agri-products, in the trade bloc.

Thus, one needs to assess the potential threat for agricultural products among others. Given the enormous importance of the sector in providing livelihoods to teeming millions, an objective assessment would bring forth the likely magnitude of impact. This can guide the negotiators to effectively

¹ *Down To Earth* | Latest news, opinion, analysis on environment & science issues | India, South Asia

bargain and steal good deals. The chapter proposes to quantify the likely impact of the FTA on imports of agricultural goods from the EU to India.

Methodology

To find the agricultural products which may potentially face threat from EU imports, two steps are followed. At the first step, the initial set of products that face threats from EU products if the FTA is signed is sought for. A natural choice would be products that are being exported to India in high volumes and tariffs are relatively higher on such products. The reason is that given the elasticities of import demand a reduction in tariff has the potential to significantly increase imports in such products. From the point of the EU to maximise the gains from the trade deal such products may be a natural choice among others. Further, the importance of such products in the EU's basket of agricultural commodities exported to India is considered. The growth of exports into India has been considered between 2013 and 2018. Only those products which have consistently been exported above US\$ 1 million have been considered. Finally, the third filter of gain in market share has been used by applying the Shift Share approach (SSA) (Chaudhuri, 2018). This method reveals the increase in market share of exports to India from the EU compared to the total shift in the market (between 2013 and 2018). The intersection set of all these lists obtained from the different filters applied gave us the initial set of products.

If India does not produce enough of these products to satisfy the domestic needs the increase in imports might not be harmful per se. It is difficult to estimate the domestic needs given the dearth of consumption data at the product level. The second-best alternative in our view is to look at exports of such products from India which at least shows that a significant domestic production is happening. Hence, the share of exports data for such products is used to determine the significant domestic production of the products. The share was calculated by dividing the 8-digit HS figure with the 6-digit HS export figure to which it belongs. This set of products was then matched with the products obtained from the earlier paragraph. Thus, we obtained the potential list of forty-five products which can face the threat of higher imports if the Agreement goes through (Table 5.2).

In the next stage, the likely import surge due to tariff reductions is estimated. Partial equilibrium simulations were applied to estimate the likely increase in imports. Five scenarios have been considered one of which is full liberalisation (0 per cent). The others are tariff reduction by 5 per cent, 10 per cent, 15 per cent, and 20 per cent. The SMART module developed and hosted by the World Bank has been used for this purpose. SMART is a

Table 5.2: Selection of Potential Threat Agricultural Products

<i>Product Code</i>	<i>Product Label</i>	<i>Growth Rate</i>	<i>Percentage Net Shift</i>	<i>Tariff (%)</i>	<i>Share of Exports from India to the World 2018</i>
07131000	Dried, shelled peas <i>Pisum sativum</i> , whether or not skinned or split	339.11	14.83	15	100.00
12099190	Vegetable seeds, for sowing: Other	479.62	7.75	5	67.60
23099090	Preparations of a kind used in animal feeding (excluding dog or cat food put up for retail sale)	93.56	5.74	15	57.97
08081000	Fresh apples	1516.42	5.42	15	95.16
15200000	Glycerol, crude; glycerol waters, and glycerol lyes	740.20	5.24	30	100.00
20098990	Juice of fruit or vegetables, unfermented, whether or not containing added sugar or other sweeteners.	1764.65	5.04	50	46.33
17021190	Lactose in solid form and lactose syrup, not containing added flavouring or colouring matter	126.31	4.31	25	85.27
15099010	Olive oil and fractions obtained from the fruit of the olive tree	81.20	2.93	35	59.46
19011090	Food preparations for infant use, put up for retail sale, of flour, groats, meal, starch.	369.89	2.87	50	99.34
17019990	Cane or beet sugar and chemically pure sucrose, in solid form (excluding cane and beet sugar)	625.33	2.53	100	98.69
04041020	Whey and modified whey, whether or not concentrated or containing added sugar or other sweetening matter	173.21	2.40	40	93.72
24022090	Cigarettes, containing tobacco: Other	7947.83	1.96	30	88.98
22030000	Beer made from malt	251.59	1.79	100	98.87
18031000	Cocoa paste (excluding defatted)	2993.52	1.72	30	100.00

<i>Product Code</i>	<i>Product Label</i>	<i>Growth Rate</i>	<i>Percentage Net Shift</i>	<i>Tariff (%)</i>	<i>Share of Exports from India to the World 2018</i>
08013100	Fresh or dried cashew nuts, in shell	2742.86	1.52	2.5	96.36
03061790	Frozen shrimps and prawns, even smoked, whether in shell or not, including shrimps and prawns.	907.12	1.29	30	96.02
21061000	Protein concentrates and textured protein substances	169.71	1.27	40	99.83
04090000	Natural honey	756.90	1.09	60	100.00
21021090	Active yeasts: Other	287.73	1.00	30	58.00
20057000	Olives, prepared or preserved otherwise than by vinegar or acetic acid (excluding frozen)	185.92	0.92	30	100.00
11071000	Malt (excluding roasted)	1051.92	0.84	30	99.36
12102000	Hop cones, ground, powdered or in the form of pellets; lupulin	126.50	0.83	30	100.00
15179090	Edible mixtures or preparations of animal or vegetable fats or oils and edible fractions	542.32	0.77	30	80.25
01012990	Live horses (excluding pure-bred for breeding)	240.97	0.71	30	100.00
11090000	Wheat gluten, whether or not dried	150.77	0.70	30	98.65
20091900	Orange juice, unfermented, whether or not containing added sugar or other sweetening matter	4196.67	0.67	35	100.00
24012010	Tobacco, partly or wholly stemmed/stripped, otherwise unmanufactured: Flue cured virginia tobacco	462.81	0.62	30	76.43
10039000	Barley (excluding seed for sowing)	550.44	0.61	0	100.00
09096139	Juniper berries and seeds of anise, badian, caraway or fennel, neither crushed nor ground.	346.23	0.60	0	92.39

<i>Product Code</i>	<i>Product Label</i>	<i>Growth Rate</i>	<i>Percentage Net Shift</i>	<i>Tariff (%)</i>	<i>Share of Exports from India to the World 2018</i>
22042190	Wine of fresh grapes, including fortified wines, and grape must whose fermentation has been arrested.	257.64	0.59	150	85.40
12093000	Seeds of herbaceous plants cultivated mainly for flowers, for sowing	337.17	0.57	15	98.40
18010000	Cocoa beans, whole or broken, raw or roasted	132.08	0.56	30	100.00
06029030	Live plants, including their roots, and mushroom spawn (excluding bulbs, tubers, tuberous roots, corms)	208.99	0.52	10	76.98
12074090	Sesamum seeds, whether or not broken: Other	845.45	0.47	30	95.54
22072000	Denatured ethyl alcohol and other spirits of any strength	353.95	0.46	30	100.00
11081200	Maize starch	124.37	0.44	30	98.62
18062000	Chocolate and other food preparations containing cocoa, in blocks, slabs or bars weighing >2kg	88.77	0.42	30	99.13
13022000	Pectic substances, pectinates, and pectates	78.09	0.25	15	99.68
11072000	Roasted malt	135.81	0.24	30	100.00
02032900	Frozen meat of swine (excluding carcasses and half-carcasses, and hams, shoulders and cuts thereof)	135.59	0.24	30	100.00
11081300	Potato starch	77.17	0.19	30	100.00
13023900	Mucilages and thickeners derived from vegetable products, whether or not modified	85.16	0.11	30	100.00
07112000	Olives, provisionally preserved, e.g. by sulphur dioxide gas, in brine, in sulphur water.	75.39	0.06	30	100.00
15050090	Wool grease and fatty substances derived therefrom, including lanolin: Other	70.89	0.04	15	73.29

simulation model which has been used to measure the total trade creation and trade diversion as a result of a preferential tariff reduction granted by India to its partner (EU in this case). In measuring trade creation, one will be requiring the elasticity of import demand to see how much more demand will be created as a direct effect of a reduction in price (due to the elimination of tariffs). On the other hand, the elasticity of substitution would help to calculate how much of trade will be diverted from other partners to the preferred partner (EU). Apart from import change due to tariff change, SMART also calculates the change in welfare and import tariff revenue change. The user-defined SMART module has been used to carry out the analysis at the 8-digit HS level (not possible in SMART in-built module). As far as our knowledge goes this has not been attempted in earlier studies.

Data for the analysis has been primarily obtained from Trade Map. The tariff data at the 8-digit HS level has been collected from Market Access Map.

Results

The top ten agricultural products which according to the outlined method face potential threat of import surge can be observed from Table 5.2. Dried, shelled peas *Pisum sativum*, whether or not skinned or split (07131000), vegetable seeds, for sowing: other (12099190), preparations of a kind used in animal feeding (excluding dog or cat food put up for retail sale) (23099090), fresh apples (08081000), glycerol, crude; glycerol waters and glycerol (15200000), juice of fruit or vegetables, unfermented, whether or not containing added sugar or other sweetening (20098990), lactose in solid form and lactose syrup, not containing added flavouring or colouring matter (17021190), olive oil and fractions obtained from the fruit of the olive tree solely by mechanical or other (15099010), and food preparations for infant use, put up for retail sale, of flour, groats, meal, and starch (19011090). These products appear to be potential threats from the point of view of significant domestic production reflected in high export share from India. Further, their tariffs are relatively high and hence can be targeted for reduction by EU authorities. A further reason for that is despite high tariffs the products are being imported by India at a high level. Again, growth and increasing share compared to other products make them possible threats for domestic producers. Hence, demand for such products may be high within the domestic economy causing problems for domestic substitutes. Agriculture being highly labour-intensive can cause considerable loss of employment. This can be damaging since in many cases these sector employs a vulnerable part of the labour force. Caution needs to be exercised by the Indian negotiators while agreeing upon the tariff reductions for such products. To look at

possible import surges, partial equilibrium simulations were applied. Tariffs were reduced and the impact was estimated on imports of such products.

Table 5.3 presents the results of partial equilibrium simulations. Beer made from malt (22030000), natural honey (40900000), wine of fresh grapes, including fortified wines, and grape must whose fermentation has been arrested (22042190), frozen meat of swine (excluding carcasses and half-carcasses, and hams, shoulders, and cuts thereof) (2032900) and maize starch (11081200) are the top five agricultural products showing the highest possibility of import surge. For beer, the range of import increase is 20.29 per cent to 405.88 per cent (for tariff reduction by 5 per cent to full tariff liberalisation). Similar changes for natural honey are estimated to be between 30.31 per cent and 363.72 per cent. On average for the first five products in terms of highest percentage import change the range is between 18.07 per cent and 239.46 per cent. Thus, the analysis at the ex-ante level shows that a substantial rise in imports in percentage terms for certain products is a possibility.

Table 5.3: Changes in Imports of Potentially Threat Agricultural Products for India Due to Tariff Concessions to EU

Product Code	Product Name	Full Liberalisation	Partial Liberalisation (Reduction in tariff %)			
		Tariff 0	Tariff 20	Tariff 15	Tariff 10	Tariff 5
22030000	Beer made from malt	405.88	81.18	60.88	40.59	20.29
04090000	Natural honey	363.72	121.24	90.93	60.62	30.31
22042190	Wine of fresh grapes, including fortified wines, and grape must whose fermentation has been arrested.	181.81	24.24	18.18	12.12	6.06
02032900	Frozen meat of swine (excluding carcasses and half-carcasses, and hams, shoulders and cuts thereof.	136.63	91.09	68.32	45.54	22.77
11081200	Maize starch	109.26	43.7	32.78	21.85	10.93
11081300	Potato starch	103.75	69.17	51.87	34.58	17.29
07112000	Olives, provisionally preserved, e.g. by sulphur dioxide gas, in brine, in sulphur water.	101.51	67.67	50.75	33.84	16.92
11072000	Roasted malt	92.96	61.98	46.48	30.99	15.49

Product Code	Product Name	Full Liberalisation	Partial Liberalisation (Reduction in tariff %)			
		Tariff 0	Tariff 20	Tariff 15	Tariff 10	Tariff 5
04041020	Whey and modified whey, whether or not concentrated or containing added sugar or other sweetening matter	86.88	57.92	43.44	28.96	14.48
19011090	Food preparations for infant use, put up for retail sale, of flour, groats, meal, starch.	63.84	25.54	19.15	12.77	6.38
15179090	Edible mixtures or preparations of animal or vegetable fats or oils and edible fractions.	58.7	39.13	29.35	19.57	9.78
17019990	Cane or beet sugar and chemically pure sucrose, in solid form (excluding cane and beet sugar)	38.61	7.72	5.79	3.86	1.93
23099090	Preparations of a kind used in animal feeding (excluding dog or cat food put up for retail sale)	31.11	20.74	15.56	10.37	5.19
11071000	Malt (excluding roasted)	28.79	19.19	14.39	9.6	4.8
20098990	Juice of fruit or vegetables, unfermented, whether or not containing added sugar or other sweetening matter	26.46	10.59	7.94	5.29	2.65
20091900	Orange juice, unfermented, whether or not containing added sugar or other sweetening matter	25.47	16.98	12.73	8.49	4.24
21021090	Active yeasts: Other	22.03	14.68	11.01	7.34	3.67
17021190	Lactose in solid form and lactose syrup, not containing added flavouring or colouring matter.	21.65	17.32	12.99	8.66	0
24022090	Cigarettes, containing tobacco: Other	16.23	10.82	5.41	2.7	2.7

Product Code	Product Name	Full Liberalisation	Partial Liberalisation (Reduction in tariff %)			
		Tariff 0	Tariff 20	Tariff 15	Tariff 10	Tariff 5
01012990	Live horses (excluding pure-bred for breeding) + detailed label not available	13.51	9.01	6.76	4.5	2.25
24012010	Tobacco, partly or wholly stemmed/ stripped, otherwise unmanufactured: Flue cured virginia tobacco	10.75	7.17	5.38	3.58	1.79
13022000	Pectic substances, pectinates, and pectates	9.61	6.4	4.8	3.2	1.6
06029030	Live plants, including their roots, and mushroom spawn (excluding bulbs, tubers, tuberous roots, corms)	9.21	9.21	9.21	9.21	9.21
18031000	Cocoa paste (excluding defatted)	5.35	3.57	2.67	1.78	0.89
18062000	Chocolate and other food preparations containing cocoa, in blocks, slabs or bars weighing > 2kg	4.87	3.25	2.43	1.62	0.81
07131000	Dried, shelled peas Pisum sativum, whether or not skinned or split	4.66	1.86	1.4	0.93	0.47
15200000	Glycerol, crude; glycerol waters and glycerol lyes	3.78	3.78	2.83	1.89	0.94
15050090	Wool grease and fatty substances derived therefrom, including lanolin: Other	2.4	2.4	2.4	1.6	0.8
11090000	Wheat gluten, whether or not dried	2.24	1.49	1.12	0.75	0.37
09096139	Juniper berries and seeds of anise, badian, caraway or fennel, neither crushed nor ground	2.06	1.38	1.03	0.69	0.34
13023900	Mucilages and thickeners derived from vegetable products, whether or not modified	1.94	1.29	0.97	0.65	0.32

Product Code	Product Name	Full Liberalisation	Partial Liberalisation (Reduction in tariff %)			
		Tariff 0	Tariff 20	Tariff 15	Tariff 10	Tariff 5
12102000	Hop cones, ground, powdered or in the form of pellets; lupulin	1.85	1.24	0.93	0.62	0.31
20057000	Olives, prepared or preserved otherwise than by vinegar or acetic acid (excluding frozen)	1.73	1.15	0.86	0.58	0.29
12093000	Seeds of herbaceous plants cultivated mainly for flowers, for sowing	1.5	1.5	1.5	1.01	0.5
18010000	Cocoa beans, whole or broken, raw or roasted	1.22	0.82	0.61	0.48	0.2
08081000	Fresh apples	1.13	0.45	0.34	0.23	0.11
21061000	Protein concentrates and textured protein substances	1.09	0.73	0.55	0.36	0.18
12099190	Vegetable seeds, for sowing; Other	0.94	0.94	0.94	0.99	0.94
12074090	Sesamum seeds, whether or not broken: Other	0.27	0.18	0.13	0.09	0.04
22072000	Denatured ethyl alcohol and other spirits of any strength	0.15	0.1	0.08	0.05	0.03
08013100	Fresh or dried cashew nuts, in shell	0.04	0.03	0.02	0.01	0.01

Source: Authors' own calculation

Implications

Making sense of the results outlined requires looking at the priorities and realities in the Indian agricultural sector. The Agricultural Policy (2020)² states that the import of products aiding in value-added exports (E.g. horticulture, dairy, poultry and inland aqua-culture) would be encouraged. Hence, further analysis of whether the identified products fall in such categories must be explored. However, at an 8-digit HS level that is less likely. A detailed analysis of employment and livelihood effects can throw light on the potential damage in each product category. Report by a major trading

² NTESCL636802085403925699_AGRI_EXPORT_POLICY.pdf (commerce.gov.in)

partner country (Australia) show that due to demographic and other reasons food demand in India may surpass supply by 2035. Again, a detailed product-level analysis on this aspect can help understand our stance in signing trade agreements. There are apprehensions that new Farm Laws³ may lead to high import of agricultural products. The country thus needs to be cautious while signing trade agreements given its potential to lead to import surges.

Results of the empirical analysis in this chapter show that even at an 8-digit level there is a substantial number of products where the country needs to be careful while negotiating with the EU. Further, for a number of products the import may increase amply following tariff reductions. These results may act as an initial reference point for starting discussions on this front. One aspect which could not be considered for data limitations is the price. Unit Value Index (UVI) could not be calculated at an 8-digit level for the dearth of volume data. This could further show the quality differences between Indian and EU varieties. If India is importing high-quality agricultural products from EU than is domestically available then the negotiating stance may be different depending on demand for such products. Comparing UVI values across importers could also reveal the price competitiveness of EU products, vis-à-vis, other countries. A unilateral concession to the EU may cause a lot of trade diversion which can attract commensurate retaliatory measures from affected countries.

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³ The Farmers' Produce Trade and Commerce (Promotion and Facilitation) Bill, 2020 (which allows farmers and traders to sell and purchase farmers' produce through alternate channels outside regulated APMC markets, without paying fees or levies to the state government); The Farmers (Empowerment and Protection) Agreement on Price Assurance and Farm Services Bill, 2020 (which draws up a national framework for contract farming agreements with agri-business firms, processors, wholesalers, exporters or large retailers for farm services and sale of future farming produce at a mutually agreed remunerative price)

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India-United Kingdom Trade in Agro-Foods: Challenges and Opportunities

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Introduction

In the last decade, agriculture and food markets globally, have witnessed a number of changes. An increase in incomes, urbanisation, changing consumer preferences, the growth of organised retail, etc., have led to higher integration of both national and global markets.¹ Trade in agro-food products has grown steadily with a reduction in tariffs.² Most prominently, there has been a significant rise in trade in agro-food products. From the US\$ 0.97 trillion in 2010 to the US\$ 1.37 trillion in 2020, exports of these products have increased by 41.24 per cent.³

Given India's endowment of arable land and favourable agro-climatic regions, raw materials, cost competitiveness and location advantages, India is amongst the world's largest producers and exporters of agriculture and food products. In the past, India exported mostly raw materials and intermediate products but over time, the Indian food processing industry has been making a significant contribution to the agro-food trade. The processed food sector in India is one of the largest in the world, estimated to be worth US\$ 535 billion by 2025-26.⁴ It accounts for 32 per cent of India's total food market and accounts for 6 per cent of total industrial investment in the country.

¹ Available at <https://www.fao.org/3/y4252e/y4252e12.htm>, accessed on 16 October 2021.

² Available at <https://www.ers.usda.gov/amber-waves/2021/june/how-the-removal-of-tariffs-would-impact-agricultural-trade/>, accessed on 16 October 2021.

³ Trade in agro-food exports have been calculated from UNComtrade Trade Statistics and ITC TradeMap. The HS codes used to refer to 'agro-food' products include 02, 03, 04, 07, 08, 09, 10, 11, 12, 15, 17, 18, 19, 20, 21, and 22.

⁴ Available at <https://www.investindia.gov.in/sector/food-processing>, accessed on 2 April 2022.

The sector contributes roughly 9 per cent of Gross Domestic Product (GDP) towards manufacturing and 11 per cent towards agriculture. In 2020-21, the food processing sector accounted for a share of 10.4 per cent of India's total exports.⁵

The key exported food products from India include pulses, processed fruits, vegetables and juices, groundnuts, guar gum, cereal preparations, milled products, alcoholic beverages, and oil meals. Indian agri-food products are exported to over 70 countries and the United Kingdom (UK) is one of the key markets (Mukherjee and Bharti, 2021). With the world's second-most populous country after China, India has a large market with growing demand for food products. The food and grocery market of India is the sixth-largest in the world, with 70 per cent of the sales attributed to the organised retail segment.⁶ Factors like the growing presence of the organised retail sector, rise in disposable incomes with increased preferences for diverse food products, expansion of food processing sector, the increasing role of the private sector in food processing, marketing, branding, etc., have made India an attractive market for global food exporters, including the UK companies.

The UK is a major importer of agro-food products from the world and imports more than 50 per cent of its total consumption (Lang and McKee, 2018). Prior to Brexit, the majority of its trade was with the European Union (EU). With Brexit, the UK is diversifying its trade markets away from the EU focusing more on emerging economies, including India. Fruits and vegetables are among the major agricultural produce imported by the UK; for example, mangoes and grapes from India. The UK is also a net importer of dairy products from the world, although it is a net exporter of some products such as fresh milk and cream. Major production of the country includes milk and milk products, meat (poultry, mutton, lamb, pig), vegetables (potatoes, carrots, turnips, etc.), mushrooms, and oilseeds.⁷ Among crops, wheat is the most widely grown. The UK produces a diverse range of products including meat, seafood, baked goods, dairy, ready-made meals, soft drinks/non-alcoholic beverages, and alcoholic beverages (such as malt, beer, and spirits) which are/can be exported to India.

In agro-foods and beverages, India had a positive trade balance with the UK in 2020 at US\$ 0.55 billion and exports from India to the UK have grown

⁵ Available at <https://www.investindia.gov.in/siru/indian-food-processing-sector-untapped-growth-opportunity>, accessed on 16 October 2021.

⁶ Available at <https://www.ibef.org/industry/indian-food-industry.aspx>, accessed on 16 October 2021.

⁷ Available at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/950618/AUK-2019-07jan21.pdf, accessed on 16 October 2021.

by 55.72 per cent during 2010-2020.⁸ While there is potential for enhancing trade, there are trade barriers such as high tariffs in India for UK's exports and limited market access for select products like dairy on both sides. This along with non-tariff measures like stringent food safety conditions or labelling requirements can be a trade barrier, especially for the Small and Medium Enterprises (SMEs) in the food and beverages sector. The Enhanced Trade Partnership (ETP) signed between India and the UK in February 2021 can leverage the untapped trade potential between the two economies. Both sides are exploring the priorities and challenges, and food and drinks have been identified as a key sector of interest under the ETP.

Objective, Methodology, and Data Sources

Given this background, the objective of this chapter is to present an overview of the food and drinks markets in both economies and identify the existing and emerging trade patterns in the agro-food sector between India and the UK, focusing on some key products which are currently exported or can be exported in the future, if trade barriers are removed. The chapter then presents the impact of tariff and non-tariff measures on exports and suggests policy recommendations on three key areas, namely, (a) tariff rationalisation, (b) removal of non-tariff barriers (NTB), and (c) sharing of knowledge and cooperation, to address the barriers and strengthen the bilateral trade through the ETP.

The chapter is based on secondary data and information analysis and 20 Key Informant Interviews (KIIs). The trade data has been taken from UNComtrade Trade Statistics and ITC Trade Map Database, while production data has been taken from websites of various government agencies/ministries such as the Ministry of Food Processing Industries (MoFPI), Ministry of Agriculture and Farmers' Welfare, Agricultural and Processed Food Products Export Development Authority (APEDA), etc. Tariff data have been accessed from World Tariff Profiles of the World Trade Organization (WTO).

Layout of This Chapter

The layout of the chapter is as follows: Section 2 presents some recent trends and developments in the agro-food sector of India and the UK. Section 3 presents an overview of India's and UK's trade with the world and their bilateral trade in the agro-food sector. Given that India and the UK have decided to launch a bilateral trade agreement and food and drinks have been identified as a key sector for trade discussions, Section 4 presents the

⁸ Computed from UNComtrade Trade Statistics.

engagement and discussions between the two countries on liberalising trade in food and drinks. It also lists the areas of potential bilateral collaborations and partnerships based on the KIIs. Section 5 presents the tariff and NTBs, which are impeding the two countries to reach their export potential and enhancing bilateral trade, investment, and collaboration.

Overview of India and the United Kingdom's Agro-Food Sector: Key Trends and Developments

This section gives a synopsis of the status of the agro-food sector in India and the UK, highlighting the production of key agriculture and food products, key exported and imported products, and development of the food processing sector in both countries.

India's Agro-Food Sector

India's total food production in 2019-20 was recorded at 296.65 Million Tonnes (MT), an increase of 4 per cent from the previous year.⁹ It is the world's largest producer of milk, pulses, and spices and the second-largest producer of rice, wheat, and sugarcane. India is the largest milk producer in the world, with production in 2020 amounting to around 146.31 MT, which is over 50 per cent more than the United States (US).¹⁰ Exports of dairy and dairy products from India in 2020-21 amounted to US\$ 201.37 million and 54,762.31 MT. India is the second-largest fish-producing country in the world, with exports in 2020-21 amounting to US\$ 5.96 billion and 11,49,341 MT.¹¹ Marine and seafood exports have seen significant growth in the past couple of years, specifically during the pandemic. India ranks second in the production of fruits and vegetables in the world, with major exported fruits being grapes, pomegranates, mangoes, bananas, and oranges; while major vegetables being onions, potatoes, tomatoes, and green chilli. While the share of fruits and vegetables exported from India accounts for only around 1 per cent of global exports, there has been growth owing to the development of cold-chain infrastructure. During 2020-21, fruits and vegetables worth US\$ 1.34 billion were exported from India.¹²

⁹ Available at <https://pib.gov.in/PressReleaseDetailm.aspx?PRID=1657225>, accessed on 16 October 2021.

¹⁰ Available at https://apeda.gov.in/apedawebsite/SubHead_Products/Dairy_Products.htm, accessed on 16 October 2021.

¹¹ Available at https://mpeda.gov.in/?page_id=5581, accessed on 16 October 2021.

¹² Available at https://apeda.gov.in/apedawebsite/six_head_product/FFV.htm, accessed on 16 October 2021.

In 2020-21, India produced a total of 121.46 MT of rice in volume terms,¹³ and total rice exports were recorded at 17.7 MT, of which over 70 per cent were non-Basmati rice. Out of the recorded 1,000 varieties of rice in the world, the maximum number is produced in India.¹⁴ Total non-Basmati rice exported by India in 2020-21 was worth US\$ 4.79 billion. India is the world's largest exporter of Basmati rice and in 2020-21, the total exports recorded US\$ 4.01 billion.¹⁵ India's overall cereal production and exports have expanded, with a sharp spike in 2020-21 for wheat exports at about 774.17 per cent from the previous year, and of other cereals (millets, maize, and other coarse grains) of about 238.28 per cent.¹⁶ In spices, India is the world's largest producer, consumer, as well exporter, producing around 75 of the total 109 varieties recorded.¹⁷ India accounts for over half of the world's trade in spices, with exports in 2020-21 amounting to US\$ 3.62 billion, despite the COVID-19.¹⁸ India's production has been growing in the organic food segment, with major products being cereals, millets, spices, tea, condiments, dry fruits, sugar, etc. Organic exports grew 51 per cent during 2020-21 over 2019-20, by an amount of US\$ 1.04 billion.¹⁹

Overall, agriculture and allied products are among the top exported commodities in India's export basket, and India has been among the top 15 leading agri-food exporters globally since the last decade. In 2020, India was among the top 10 agricultural produce exporters, with a global share of 2.2 per cent.²⁰ India exports a wide range of products to over 70 countries and the UK is among the top 15 markets. In 2020-21, commodities that recorded significant positive growth in exports were wheat, other cereals, non-Basmati

¹³ Available at <https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1721692>, accessed on 16 October 2021.

¹⁴ Available at https://apeda.gov.in/apedawebsite/SubHead_Products/Non_Basmati_Rice.htm, accessed on 16 October 2021.

¹⁵ Available at http://apeda.gov.in/apedawebsite/SubHead_Products/Basmati_Rice.htm, accessed on 16 October 2021.

¹⁶ Available at <https://pib.gov.in/PressReleasePage.aspx?PRID=1729115#:~:text=India's%20overall%20exports%20of%20cereals,238.28%25%20to%20USD%20694.14%20million>, accessed on 16 October 2021.

¹⁷ Available at <https://www.ibef.org/exports/spice-industry-indias.aspx>, accessed on 16 October 2021.

¹⁸ Available at <http://indianspices.com/export/major-itemwise-export.html#:~:text=Despite%20the%20COVID%2D19%20Pandemic,12%2C08%2C400%20tons%20valued%20Rs>, accessed on 16 October 2021.

¹⁹ Available at <https://apeda.gov.in/apedawebsite/organic/data.htm>, accessed on 16 October 2021.

²⁰ Table A-14, World Trade Statistical Review 2021, WTO.

rice, soya meal, spices, sugar, fresh and processed vegetables, and alcoholic beverages.

With respect to imports, the key imported commodities are vegetable oils, fresh fruits, spices, and pulses. Over the years, both exports and imports have increased, but India has consistently maintained a trade surplus in agro-food produce. While exports have increased, India has lagged in the share of foreign value-added content in its agriculture exports, which was recorded at 3.8 per cent in 2019, mainly due to high tariffs on imports of raw material and intermediate products to protect the domestic market (WTO, 2021b). In terms of domestic consumption, per capita consumption of cereals, pulses, and sugar is declining. Per capita consumption of other food products such as oils, animal products, and fruits and vegetables is increasing (Pandey et al., 2020).

United Kingdom's Agro-Food Sector

The food and drink sector of the UK is the largest manufacturing sector in the country, which employs over 4 million people, generates over US\$ 167.29 billion of value added each year to the economy and has a highly integrated supply chain (Food and Drink Federation [FDF], 2020). The sector accounts for almost 17 per cent of the total manufacturing value-added in the economy and comprises majorly of SMEs. The major food products include meat, seafood (such as Scottish salmon), ready-made meals, bakery products and confectionery items, dairy products, beverages (both alcoholic and non-alcoholic), etc. The UK has strengths in sub-sectors such as dairy, alcoholic beverages such as Scotch Whisky, confectionery and health food products (Mukherjee et al., 2019). Alcoholic beverages (mostly spirits) have a huge share in the imports of India from the UK. The market for health and well-being food products is on the rise among the consumers in the UK, with 'health and convenience foods' among the driving forces in the UK value-added food and drink sector (D'Angelo et al., 2020). Consumers are diversifying their food tastes, and the health and convenience food segment can be a potential sector for countries including India to export. However, the food import standards in the UK are very strict with requirements of high technical specifications, traceability, Minimum Residue Levels (MRL), etc., which at times many countries, including India, are unable to comply with.

Overview of India's Agro-Food Trade and Bilateral Trade Between India and the United Kingdom

In 2020, India was the 13th largest exporter of agro-food products with a share of 2.40 per cent in global trade.²¹ Its share has remained almost the same since 2015, when it was around 2.41 per cent, while it has improved a lot from 2010 when it was around 1.58 per cent. Overall, trade in food between India and the world has increased significantly between 2010 and 2020. Specifically, exports have surged since 2016 (Figure 6.1).

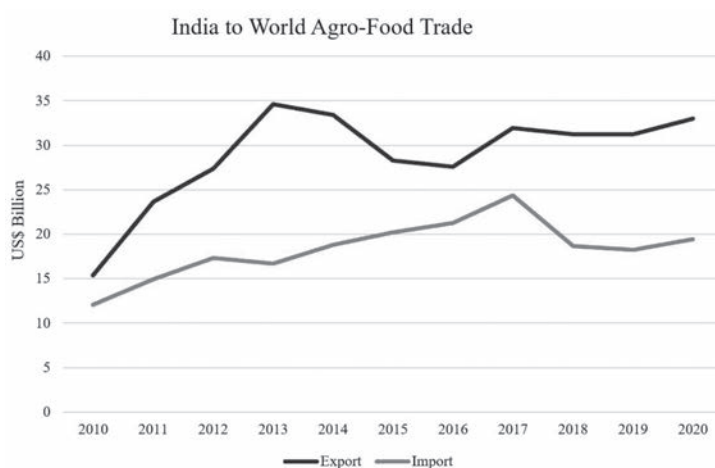


Figure 6.1: India's Trade in Agro-Food Trade (2010-20)

Source: UNComtrade Trade Statistics

In 2010, the total agro-food exports from India to the world were valued at US\$ 15.39 billion, which doubled to US\$ 33 billion in 2020. Imports have also increased over the decade with a growth of 61 per cent. In 2017, India became the 15th largest agro-food importer in the world with a share of 2.03 per cent globally. However, in spite of the growth in imports, India always has had a trade surplus in this sector, with the trade balance increasing from US\$ 3.32 billion in 2010 to US\$ 13 billion in 2019. Exports of agro-food from India remained stable even during 2020, unaffected by pandemic disruptions. The trade balance in 2020 in agro-food exports from India stood at US\$ 13.58 billion. Government interventions and expansion of products into new markets (such as many African countries) have been some of the favourable factors behind the positive trade balance in this sector in 2020.

²¹ While WTO's data shows that India is among the top 10 global exporters of agricultural products, it holds 13th rank when agro-foods exports (Footnote 3 for details on the HS codes used) are considered as per UNComtrade Trade statistics. The difference is based on the products considered for agro-foods in this study and agriculture products in general used in the WTO report.

India's agro-food produce is exported to over 100 countries of the world, with the major destinations being the Middle East countries, South-East Asian nations, the South Asian Association of Regional Cooperation (SAARC) nations, the EU, and the US. Of the total exports of agro-food products in 2020, the top ten markets had a share of 55 per cent. The top destinations were the US and the EU, with a share of 12.41 per cent and 7.91 per cent, respectively (Table 6.1). The other major export destinations include China, the United Arab Emirates (UAE), Saudi Arabia, and Iran.

Table 6.1: Top Export Destinations of India in Agro-Food Products (2020)

<i>Rank</i>	<i>Countries</i>	<i>Total Value (US\$ Billion)</i>	<i>Share (%)</i>
1	US	4.09	12.41
2	EU	2.61	7.91
3	China	2.40	7.29
4	UAE	1.70	5.16
5	Saudi Arabia	1.61	4.89
6	Iran	1.50	4.57
7	Bangladesh	1.12	3.42
8	Malaysia	1.11	3.38
9	Vietnam	0.99	3.00
10	Nepal	0.98	2.97
13	United Kingdom	0.70	2.13

Source: UNComtrade Trade Statistics

In imports, Indonesia, Argentina, and Malaysia were India's top agro-food import partners in 2020, accounting for a share of 18.65 per cent, 11.60 per cent and 8.25 per cent, respectively. The top ten import sources accounted for a total share of 69.44 per cent of India's total imports of agro-food produce from the world. Compared to exports, India's share of imports from the EU and the UK is very less, accounting for 3.20 per cent and 0.79 per cent, respectively (Table 6.2).

Table 6.2: Top Import Sources of India in Agro-Food Products (2020)

<i>Rank</i>	<i>Countries</i>	<i>Total Value (US\$ billion)</i>	<i>Share (%)</i>
1	Indonesia	3.62	18.65
2	Argentina	2.25	11.60
3	Malaysia	1.60	8.25
4	Ukraine	1.59	8.19
5	USA	1.35	6.97
6	Brazil	0.97	5.02
7	EU	0.62	3.20
8	Canada	0.53	2.74

Rank	Countries	Total Value (US\$ billion)	Share (%)
9	Myanmar	0.47	2.46
10	Russia	0.45	2.35
26	United Kingdom	0.15	0.79

Source: UNComtrade Trade Statistics

India-United Kingdom Bilateral Trade in Agro-Food Products

The UK is a major importer of agro-food products from the world. In 2020, the UK accounted for a share of 2.13 per cent (13th rank) in India's total exports of agro-food products to the world. This share has, however, decreased over the decade, from 2.93 per cent in 2010 to 2.57 per cent in 2015 to 2.13 per cent in 2020.

In case of the UK, it was the 13th largest export destination of India in agro-food products in 2020. Among India's import sources, the UK ranked 26th in 2020, a drop of eight positions from its rank of 18th in 2017.

Focusing on exports, the UK is among the top 15 global exporters of agro-food products with its total exports to the world increasing from US\$ 44 billion in 2010 to US\$ 48.18 billion in 2020. Over the years, India's share in UK's exports to the world has increased from 0.20 per cent in 2010 to 1.54 per cent in 2020, with a major increment noticeable from 2019 to 2020 (Figure 6.2). However, India's share in the UK's imports from the world has decreased 0.66 per cent in 2010 to 0.02 per cent in 2020 and as per the KIIs, this is a major concern for Indian exporters.

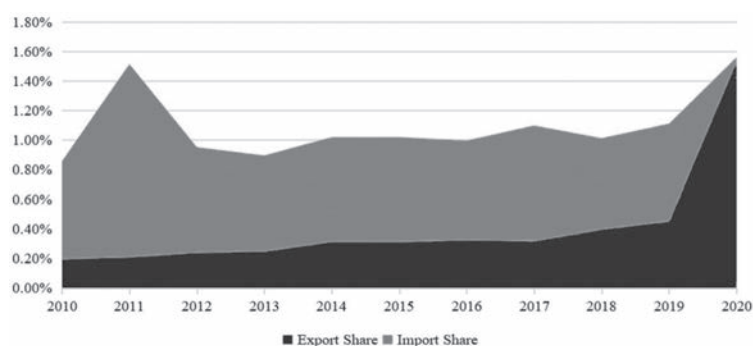


Figure 6.2: India's Share in UK's Agro-Food Trade

Source: UNComtrade Trade Statistics

Top Five Products: India's Export to the United Kingdom and the World

In terms of products exported, in 2020, the top five products exported by India to the UK include tea, crustaceans, rice, frozen fish, and pepper (Table

6.3). 'Tea' (HS 0902), 'Crustaceans' (HS 0306), and Rice (HS 1006) have been consistently the top three exported products of India to the UK.

Table 6.3: Top Five Agro-Food Products Exported from India to the UK
(2010, 2015, and 2020)

<i>HS Code (4-Digit)</i>	<i>Product Description</i>	<i>Exports (US\$ million)</i>	<i>Share (%)</i>
2020			
0902	Tea, whether or not flavoured	149.15	21.04
0306	Crustaceans, whether in a shell or not, live, fresh, chilled, frozen, dried, salted, or in brine, flours, meals and pellets, of crust	102.7	14.49
1006	Rice	40.3	5.69
0303	Frozen fish (excluding fish fillets and other fish meat of heading 0304)	26.96	3.80
0904	Pepper of the genus Piper; dried or crushed or ground fruits of the genus Capsicum or the of the genus Pimenta	25.84	3.65
	<i>Total of the Five Products</i>	344.95	48.67
	<i>Total of all the Food Products</i>	708.85	100.00
2015			
0902	Tea, whether or not flavoured	160.05	21.76
0306	Crustaceans, whether in a shell or not, live, fresh, chilled, frozen, dried, salted, or in brine, flours, meals and pellets, of crust	104.53	14.21
1006	Rice	64.13	8.72
0303	Frozen fish (excluding fish fillets and other fish meat of heading 0304)	37.58	5.11
0904	Pepper of the genus Piper; dried or crushed or ground fruits of the genus Capsicum or the of the genus Pimenta	31.08	4.22
	<i>Total of the Five Products</i>	397.37	54.01
	<i>Total of all the Food Products</i>	735.70	100.00
2010			
0902	Tea, whether or not flavoured	81.52	17.96
0306	Crustaceans, whether in a shell or not, live, fresh, chilled, frozen, dried, salted, or in brine, flours, meals and pellets, of crust	56.3	12.41
1006	Rice	46.36	5.55
1905	Bread, pastry, cakes, biscuits and other bakers' wares, whether or not containing cocoa; communion wafers, empty cachets of a kind suitable for pharmaceutical use, sealing wafers, rice paper and similar products	25.19	5.55

<i>HS Code (4-Digit)</i>	<i>Product Description</i>	<i>Exports (US\$ million)</i>	<i>Share (%)</i>
0910	Ginger, saffron, turmeric 'curcuma', thyme, bay leaves, curry, and other spices (excluding pepper)	24.19	5.33
	<i>Total of the Five Products</i>	233.56	46.80
	<i>Total of all the Food Products</i>	453.82	100.00

Source: UNComtrade Trade Statistics and ITC Trademap Statistics

If one compares the top items in India's export basket to the world with that to the UK, there are certain products like 'meat of bovine animals, frozen' (0202) which is among India's top exports to the world but the share of this product in India's exports to the UK was only 0.19 per cent in 2010 (Tables 6.3 and 6.4). It had increased from 0.58 per cent in 2015 to 1 per cent in 2020.

Table 6.4: Top Five Agro-Food Products Exported from India to the World (2010, 2015, and 2020)

<i>HS Code (4-Digit)</i>	<i>Product Description</i>	<i>Exports (US\$ million)</i>	<i>Share (%)</i>
2020			
1006	Rice	7,980.02	24.06
0306	Crustaceans, whether in a shell or not, live, fresh, chilled, frozen, dried, salted, or in brine, flours, meals and pellets, of crust	3,884.3	11.71
0202	Meat of bovine animals, frozen	2,762.44	8.33
1701	Cane or beet sugar and chemically pure sucrose, in solid form	2,494.64	7.52
0904	Pepper of the genus Piper; dried or crushed or ground fruits of the genus Capsicum or the of the genus Pimenta	1,167.24	3.52
	<i>Total of the Five Products</i>	18,288.64	55
	<i>Total of all the Food Products</i>	33,170.24	100.00
2015			
1006	Rice	6,354.68	21.79
202	Meat of bovine animals, frozen	4,029.65	13.82
0306	Crustaceans, whether in a shell or not, live, fresh, chilled, frozen, dried, salted, or in brine, flours, meals and pellets, of crust	3,194.18	10.95
1701	Cane or beet sugar and chemically pure sucrose, in solid form	1,185.97	4.07
1302	Vegetable saps and extracts; pectic substances, pectinates, and pectates; agar-agar and other other mucilages and thickeners, whether or not modified, derived from vegetable products Vegetable saps and extracts	1,030.52	3.53
	<i>Total of the Five Products</i>	15,795	54.17
	<i>Total of all the Food Products</i>	29,157.62	100.00

<i>HS Code (4-Digit)</i>	<i>Product Description</i>	<i>Exports (US\$ million)</i>	<i>Share (%)</i>
2010			
1006	Rice	2,295.81	14.50
202	Meat of bovine animals, frozen	1,676.47	10.59
0306	Crustaceans, whether in a shell or not, live, fresh, chilled, frozen, dried, salted, or in brine, flours, meals and pellets, of crust	1,058.55	6.69
1701	Cane or beet sugar and chemically pure sucrose, in solid form	857.78	5.42
0902	Tea, whether or not flavoured	694.85	4.39
	<i>Total of the Five Products</i>	6,583.46	41.59
	<i>Total of all the Food Products</i>	15,828.66	100.00

Source: UNComtrade Trade Statistics and ITC Trademap Statistics

Top Five Products: The United Kingdom's Export to India and the World

A humongous share of UK's exports to India includes alcoholic beverages 'Undenatured ethyl alcohol of an alcoholic strength of < 80%; spirits, liqueurs and other spirituous beverages' (2208) with a share of 84.43 per cent in 2020. It has increased over the decade from 73.52 per cent in 2010 to 84.16 per cent in 2015 to 84.43 per cent in 2020. Apart from alcoholic beverages, the top five products include mostly ready-made food preparations which in 2020, had a share of 92.79 per cent (Table 6.5). Except alcoholic beverages (HS 2208), the top five products in the UK's export basket to India have changed over time as shown in Table 6.5.

Table 6.5: Top Five Agro-Food Products Exported from the United Kingdom to India (2010, 2015, and 2020)

<i>HS Code (4-Digit)</i>	<i>Product Description</i>	<i>Exports (US\$ Million)</i>	<i>Share (%)</i>
2020			
2208	Undenatured ethyl alcohol of an alcoholic strength of < 80%; spirits, liqueurs, and other spirituous beverages (excluding compound alcoholic preparations of a kind used for the manufacture of beverages)	134.766	84.43
2106	Food preparations, n.e.s.	5.589	3.50
1904	Prepared foods obtained by the swelling or roasting of cereals or cereal products, e.g., corn of the genus Pimenta	3.819	2.39

<i>HS Code (4-Digit)</i>	<i>Product Description</i>	<i>Exports (US\$ Million)</i>	<i>Share (%)</i>
2005	Other vegetables prepared or preserved otherwise than by vinegar or acetic acid, not frozen, other than products of heading 2006	2.006	1.26
1104	Cereal grains otherwise worked, e.g., hulled, rolled, flaked, pearled, sliced or kibbled; germ of cereals, whole, rolled, flaked or ground Rolled or flaked grains	1.931	1.21
	<i>Total of the Five Products</i>	148.111	92.79
	<i>Total of all the Food Products</i>	159.626	100.00
2015			
2208	Undenatured ethyl alcohol of an alcoholic strength of < 80%; spirits, liqueurs, and other spirituous beverages (excluding compound alcoholic preparations of a kind used for the manufacture of beverages)	132.01	84.16
0306	Crustaceans, whether in a shell or not, live, fresh, chilled, frozen, dried, salted, or in brine, flours, meals and pellets, of crust	4.753	3.03
2207	Undenatured ethyl alcohol of an alcoholic strength of $\geq$ 80%; ethyl alcohol, and other spirits, denatured, of any strength	1.852	1.18
0404	Whey, whether or not concentrated or containing added sugar, or other sweetening matter; products consisting of natural milk constituents, whether or not containing added sugar or other sweetening matter, not elsewhere specified or included.	1.849	1.18
1104	Cereal grains otherwise worked, e.g., hulled, rolled, flaked, pearled, sliced, or kibbled; germ of cereals, whole, rolled, flaked or ground Rolled or flaked grains	1.729	1.10
	<i>Total of the Five Products</i>	142.193	90.65
	<i>Total of all the Food Products</i>	156.860	100.00
2010			
2208	Undenatured ethyl alcohol of an alcoholic strength of < 80%; spirits, liqueurs, and other spirituous beverages (excluding compound alcoholic preparations of a kind used for the manufacture of beverages)	64.392	73.52
1701	Cane or beet sugar and chemically pure sucrose, in solid form	3.847	4.39

<i>HS Code (4-Digit)</i>	<i>Product Description</i>	<i>Exports (US\$ Million)</i>	<i>Share (%)</i>
0404	Whey, whether or not concentrated or containing added sugar or other sweetening matter; products consisting of natural milk constituents, whether or not containing added sugar or other sweetening matter, not elsewhere specified or included	2.293	2.62
2005	Other vegetables prepared or preserved otherwise than by vinegar or acetic acid, not frozen other than products of heading 2006	2.131	2.43
2106	Food preparations, n.e.s.	1.810	2.07
	<i>Total of the Five Products</i>	74.473	85.03
	<i>Total of all the Food Products</i>	87.583	100.00

Source: UNComtrade Trade Statistics and ITC Trademap Statistics

Note: n.e.s. – not elsewhere specified

Comparing UK's exports to India with its export to the world, the top exported product remains the same throughout 2010 to 2020, i.e. 'Undenatured ethyl alcohol of an alcoholic strength of < 80%; spirits, liqueurs and other spirituous beverages' (2208). However, the share has fallen from 29.35 per cent in 2015 to 25.24 per cent in 2020. Other items in the top five products have remained more or less similar, with their shares slightly changing over the years. For example, the share of 'Food preparations, n.e.s.' (2106) have changed from 4.17 per cent in 2010 to 5.92 per cent in 2015 to 7.33 per cent in 2020 (Table 6.6). Overall, alcoholic beverages are a key item in the UK's export basket, both in the context of its global trade and its bilateral trade with India in the food and drink sector.

Table 6.6: Top Five Agro-Food Products Exported from the UK to World (2010, 2015, and 2020)

<i>HS Code (4-Digit)</i>	<i>Product Description</i>	<i>Exports (US\$ Million)</i>	<i>Share (%)</i>
2020			
2208	Undenatured ethyl alcohol of an alcoholic strength of < 80%; spirits, liqueurs and other spirituous beverages (excluding compound alcoholic preparations of a kind used for the manufacture of beverages)	6,235.394	25.24
2106	Food preparations, n.e.s.	1,810.96	7.33
1905	Bread, pastry, cakes, biscuits and other bakers' wares, whether or not containing cocoa; communion wafers, empty cachets of a kind suitable for pharmaceutical use, sealing wafers, rice paper and similar products	1,162.702	4.71

<i>HS Code (4-Digit)</i>	<i>Product Description</i>	<i>Exports (US\$ Million)</i>	<i>Share (%)</i>
406	Cheese and curd	839.614	3.40
302	Fish, fresh or chilled (excluding fish fillets and other fish meat of heading 0304)	824.347	3.34
	Total of the Five Products	10,873.017	24,700.507
	Total of all the Food Products	44.02%	100.00
2015			
2208	Undenatured ethyl alcohol of an alcoholic strength of < 80%; spirits, liqueurs, and other spirituous beverages (excluding compound alcoholic preparations of a kind used for the manufacture of beverages)	7,469.567	29.35
2106	Food preparations, n.e.s.	1,506.132	5.92
1905	Bread, pastry, cakes, biscuits and other bakers' wares, whether or not containing cocoa; communion wafers, empty cachets of a kind suitable for pharmaceutical use, sealing wafers, rice paper and similar products	1,266.977	4.98
302	Fish, fresh or chilled (excluding fish fillets and other fish meat of heading 0304)	781.619	3.07
2203	Beer made from malt	773.247	3.04
	Total of the Five Products	11,797.542	46.36
	Total of all the Food Products	25,448.57	100.00
2010			
2208	Undenatured ethyl alcohol of an alcoholic strength of < 80%; spirits, liqueurs, and other spirituous beverages (excluding compound alcoholic preparations of a kind used for the manufacture of beverages)	6,580.842	28.82
1905	Bread, pastry, cakes, biscuits and other bakers' wares, whether or not containing cocoa; communion wafers, empty cachets of a kind suitable for pharmaceutical use, sealing wafers, rice paper and similar products	1,004.086	4.40
2106	Food preparations, n.e.s.	953.196	4.17
2203	Beer made from malt	871.786	3.82
1001	Wheat and meslin	712.448	3.12
	Total of the Five Products	10,122.358	44.33
	Total of all the Food Products	22,834.801	100.00

Source: UNComtrade Trade Statistics and ITC Trademap Statistics

India-United Kingdom Bilateral Engagement/Discussions in Agro-Food Sector: Relevance for the Bilateral Trade Agreements

The agro-foods sector is one of the key areas of mutual interest for both India and the UK. With Brexit, there is a renewed interest of the UK in expanding its market share and investments in this sector in India. The ETP signed between India and the UK in February 2021 is in tandem with leveraging the untapped trade potential between the two economies, specifically in the food and drinks sector. In this sector, India has a positive trade balance with the UK, increasing from US\$ 0.36 billion in 2010 to US\$ 0.55 billion in 2020. The ETP is expected to create opportunities for UK businesses, including the food and drinks sector, where both parties are looking to address market access barriers. Under the ETP, both India and the UK have decided to set up three bilateral working groups, of which one is specifically for the food and drinks sector to tackle sector-specific trade barriers. The functioning of the working group would be led by the UK India Business Council (UKIBC), the Confederation of Indian Industry (CII), and the Federation of Indian Chambers of Commerce and Industry (FICCI). From the UK's end, earlier surveys by the UKIBC and others show that the businesses are looking for improvement in India's ease of doing business scenario, removal of trade barriers, joint research to improve agriculture practices, and collaboration in technology-related areas. The UK industry consultations have identified certain products of the UK's export interest to India such as apples and pears in fresh fruits; fishery products like Scottish Salmon, Mackerel, Herring, Langoustines (Norway lobster); animal products (poultry, the meat of lamb and turkey, for example); alcoholic beverages; confectionaries and dairy products like cream and cheese.

India's Food Safety and Standards Authority of India (FSSAI) has already partnered with the Foreign, Commonwealth & Development Office (FCDO), UK, where the FCDO has engaged with the FSSAI on several capacity building initiatives and facilitated collaboration with Food Standard Agency (FSA), UK, plant and animal quarantine agencies, and other such bodies. At the level of industry association and businesses, the KIIs have confirmed that India and the UK have already collaborated on diverse areas to enhance their partnership in the field of agriculture and food processing, including investing in agriculture technology (agri-tech), plant sciences, animal genetics and nutrition, aquaculture and precision agriculture, post-harvest management, sustainable technology usage, among others. The UK is one of the pioneers in the field of research and innovation in agri-tech and food processing technology, across the supply chain. There are possibilities for India to adopt tech-based agriculture and food processing practices, thereby enhancing bilateral partnership and exports. The UK's investment

in India's food processing sector can be an ideal area for bilateral partnership according to the KIIs. Such partnership will enable Indian businesses to manufacture high-quality products, innovate, scale-up, and globalise. It will also lead to an inflow of foreign direct investment in India, create jobs, and help to link Indian farmers and processors to the global value chains. UK businesses pointed out that India's evolving, and dynamic food market is one of the interest areas for the UK's businesses to expand in terms of exports and investment. They would also like to source more from India.

A number of large UK food businesses, for example, United Biscuits Limited, Holland & Barret, Borders Biscuits, Tesco, Walkers, etc., already have/had a presence in India. Companies such as United Biscuits Limited have been in India for a long time and have successfully captured the Indian market. The tea brand Typhoo have established its presence in India through an acquisition in 2005. Diageo India, which is a subsidiary of Diageo UK, established their presence in the Indian market by acquiring the Indian alcohol beverage company United Spirits Limited. They have over 45 per cent share of the total market for India Made Foreign Liquor (IMFL). Holland & Barret, India (a subsidiary of Holland & Barret International) is trying to establish its presence in India in the nutraceuticals/health foods segment. They currently import all products from the UK and depend on their partner, Apollo Pharmacy for retail sale in India.

Regarding the presence of Indian food businesses in the UK, companies such as Chamong Tee Export Private Limited supply tea to Wessanen UK, for brands such as Clippers Tea, which is sold through the retail outlets of Waitrose in the UK. VeeTee Rice Limited, UK, sources Basmati rice from India and sells it to retailers in the UK, including Waitrose.

While companies from India and the UK have established their presence in each other's countries in the food and drinks sector, the KIIs confirmed that there is still a lot of scope to expand and enhance exports on both sides, if barriers to trade are addressed.

Barriers to Trade in Agro-Food Products

The KIIs identified a number of challenges in the form of tariff and NTBs, which are impeding the two countries to reach their export potential and in enhancing bilateral trade, investment, and collaboration.

High Tariff Rates

Looking at tariffs imposed on agriculture and food products, the average tariff rates are high in India as compared to the UK. For example, in 2020, the Most Favoured Nation (MFN) applied average tariff rate on agriculture

products was 34 per cent in India, while it was 11.2 per cent in the UK (WTO, 2021). However, in the case of some products such as dairy, the UK imposes a higher average tariff rate (37.1 per cent) as compared to India (35.7 per cent). According to the Department for International Trade (DIT), the UK, the simple average tariff rate faced by Indian exports to the UK is around 4.2 per cent, while tariffs for the UK exports to India are higher at 14.6 per cent. At the product level, the peak tariffs are quite high for both India and the UK, especially for agriculture and food products. For example, in the UK, these tariffs are estimated at around 242 per cent for prepared foods, 124 per cent for vegetable products, and 103 per cent for animal and vegetable products. In India, peak tariffs are within a broad range, for example, between 100 to 150 per cent for agro-food products (Raju, 2021).

As seen in Section 3, alcoholic beverages comprise the majority of the agro-food exports of the UK to India (over 90 per cent), and high tariffs in this segment [estimated around 150 per cent to 50 per cent Basic Customs Duty (BCD) plus 100 per cent Agriculture Infrastructure Development Cess (AIDC)] has a huge impact for both for UK's exporters and India's importers (Box 6.1, for high tariffs case study for alcoholic beverages exports from the UK to India).

Box 6.1: Case of High Tariffs for the United Kingdom's Exports of Alcoholic Beverages to India

In 2020, over 80 per cent of the UK's exports of agro-food products to India consisted of 'Ethyl alcohol, undenatured; of an alcoholic strength by volume of less than 80 per cent volume; spirits, liqueurs and other spirituous beverages' (HS 2208), which mainly consists of the alcoholic beverage called Scotch Whisky. The customs tariff rate in 2020 for this product (bottled in 'country of origin') in India was 150 per cent. The same rate was applicable for bulk Scotch Whisky imported from the UK, for bottling in India. With major exporters such as the EU and the UK concerned with such high tariffs, the BCD on these products was brought down to 50 per cent in the Indian Union Budget of 2021-22. However, the Indian government introduced a new cess called the Agriculture Infrastructure Development Cess (AIDC) at 100 per cent, which eventually kept the applicable tariff rates for exporters at 150 per cent.

Source: Mukherjee et.al. (2021)

Non-Tariff Barriers

The exports from India to the UK, suffer from a high incidence of NTBs, mostly in the form of stringent technical standards; for example, high

Maximum Residue Limits (MRLs) in Basmati rice, spices, etc.), that Indian exporters, especially the SMEs, are unable to comply with. There are also issues related to product certifications (in the case of organic food exports), and inefficient testing processes as well as quality production (in the case of dairy products). UK's exports to India face NTBs in the form of changes in labelling requirements, tedious labelling requirements for products such as alcoholic beverages. Some examples of issues are listed as under:

Issue of Tedious Labelling Requirements

In the case of labelling requirements in India for products such as alcoholic beverages, exporters have to adhere to producing a tangible justification for the use of words such as 'premium', 'spirit', or 'rare' for different liquors/whisky on the label although this is a common global practice. Such conditions are difficult to be accommodated on the already limited space left on the labels. This acts as a major NTB, and many international players find it hard to comprehend the rationale behind such regulation. The exporters are also required to comply with labelling requirements of a number of regulatory bodies such as the FSSAI, Legal Metrology, etc., and of 25+ state excise departments (as alcohol is under the state subject), which disincentivises exports from countries such as the UK. Unlike other countries such as the UK, where the majority of agriculture and food products are rejected on grounds of food safety, in India, exports are rejected majorly on grounds of failure to comply with labelling requirements.

Stringent Food Safety Requirements

Indian exporters have been facing difficulties in exporting agriculture and food products to the UK, on the grounds of inability to meet food safety requirements. Data extracted from the Rapid Alert System for Food and Feed (RASFF) portal shows that between January 2020 and June 2021, a total of 29 notifications were made by the UK on food and food contact products originating from India.²² Out of these, 16 were marked under the 'serious category', 7 were marked under the 'not serious' category, 3 each under the 'no risk' and 'undecided' categories.

The issues affect various products and are multi-dimensional in nature. For example, rice exports (specifically Basmati rice) of India to the EU (including the UK) in 2018-19 fell by around 40 per cent over non-compliance with MRLs with respect to pesticides. Due to such failure to comply, additional mandatory checks (mandatory certification of inspection) have been put up by the EU and now the UK government (after Brexit).

India's exports of Basmati rice have faced rejections due to exceeding MRL limits of pesticides such as 'Thiamethoxam'. The UK has also banned

the use of Tricyclazole, which has impacted India's rice exports. Apart from non-adherence to MRL limits, India's exports were found to be contaminated with respect to aflatoxin in spices (majorly in the case of whole red dried chillies), ethylene oxide in nuts and seeds, and pesticides residues in fruits and vegetables. These products were rejected and labelled as 'serious risk' consignments. Under non-serious risk rejections, certain food products such as spices, fruits, vegetables, and nuts were found to be exported without health certificates.

Product Specific Bans

While India is the world's largest producer of milk in terms of absolute volume, the UK has imposed a ban on dairy product imports from India. India too has restricted exports from the UK. This is an area where both sides have export potential, but one Indian company is lobbying hard to keep the market closed as it is unable to implement a scientific milking process and product traceability across its cooperative members according to the KIIs.

The current processes of quality control, testing, and monitoring in India are not adequate to meet the global standard requirements. These issues deter India from getting market access for dairy products into the UK, which already has surplus production in dairy products utilising sophisticated high-end technology. In India, dairy and dairy products are handled by multiple small and mid-sized farmers and the lack of efficient supply chain/direct sourcing in some states impedes the creation of direct links between exporters, processors, and farmers. This hampers the establishment of product traceability and enhances high-quality exports. There is also high domestic consumption, which leaves limited stock available for exports. Some Indian companies, therefore, want the market to be closed and fear that opening up the sector to trade may lead to price reduction.

Issues with Organic Product Certification for Exports

India's exports of organic products are witnessing growth over the last couple of years, owing to increased demand from overseas, specifically developed countries such as the US, the EU, and the UK.

In India, organic producers are often not aware of certification requirements, especially for export. It acts as an obstacle towards enhancing exports in this area, where the UK is a prominent importer of organic foods. The UK regulation is similar to the EU regulation, and the APEDA's organic certification for exports is compliant with the EU/UK regulation. For organic trade to be competitive, there is a need for mutual recognition of standards, and India and the UK have not mutually recognised each other's standards for processed organic products.

The Way Forward

Apart from the barriers listed earlier, new trade challenges have evolved in the post-COVID-19 world, which includes supply chain disruptions, growing protectionism, and rising trade costs. Agro-food has perishable products and therefore, efficient logistics networks and fast track cargo clearances are important for trade to flourish. The pandemic has accentuated the need to replace the physical process of cargo clearance with robust technology driven risk management systems. According to the survey participants, there is scope for collaboration among the food safety agencies of the two countries on an efficient and technology driven risk management systems for food clearances.

The success of any trade agreement depends on its coverage and depth of commitments. Most modern trade agreements are comprehensive, while they focus on tariff reduction, they also try to address non-tariff measures through various means like mutual recognition agreements. There is scope for improvement of trade facilitation through commitments in trade agreements. Trade agreements are used to address issues like the removal of market access barriers for Geographical Indication (GI) products. In the case of India, 75 per cent of alcoholic beverages are procured through the government route at the centre and state levels. Accessing this government procurement market can be a key issue for discussion. Some key areas which can be discussed under the trade agreement are given next with some examples.

Tariff Rationalisation

High tariffs are more of a concern for the UK than for India, especially in key export items such as alcoholic beverages (specifically, Scotch Whisky and intermediate spirits). In this regard, bringing down tariff rates for the alcoholic beverage sector will be in the key ask a list of the UK. India has also expressed interest to phase out the tariff to zero. There can be a minimum threshold level imposed for tariff reduction to minimise competition with domestic producers and ensure that only high-quality products are imported. At the same time, India needs to reduce tariffs on intermediate products as that will lead to value addition within the country. India also needs to give market access to GI products.

While India is the largest producer of milk/milk products in the world, much of these are consumed domestically. But with increased demand for dairy products such as skimmed milk, curd, cheese, etc., a reduction in tariffs by the UK on these products would be beneficial for India. At the same time, this is more of an issue of standards and processes rather than high tariffs.

With the implementation of the UK Global Tariff (UKGT) from January 2021 (which replaced EU's Common External Tariff) post-Brexit, MFN rates on the number of products have been reduced.²² However, further reduction in tariffs in agro-food products through the MFN route or a preferential trade agreement of the UK with India will help in increasing India's exports to the UK in these product categories.

Removal of Non-tariff Barriers

To enhance trade discussions between India and the UK, while tariff reduction is important, a key concern from both sides with respect to the agro-foods sector would be the removal of NTBs. For India, for example, removal of NTBs in the form of less stringent Sanitary and Phytosanitary Requirements (SPS) with respect to limits of pesticide residues, while for the UK, removal of NTBs in the form of easier labelling and registration procedures, customs requirements, etc., would be beneficial.

Addressing Sanitary and Phytosanitary Requirements Barriers

To enhance greater market access from India to the UK, Indian exporters have to try to adopt better agriculture practices with respect to the usage of pesticides and fungicides. The main reason for the usage of select pesticides in India which are often banned in developed markets such as the UK and the EU is their relatively low cost and easy access. To circumvent this, the government should take proactive steps to aid the producers in adopting Good Agriculture Practices (GAP) and help in enhancing exports from India. These products (such as rice, spices, etc.), which often get rejected on the grounds of high pesticide residue, are key imported products of the UK and their rejection cost a lot to India's exporters. To prevent it, there is a need for scientific research in India to find out methods to address country-specific issues faced by such products in the UK. In this regard, government and stakeholders in India can work with importers in the UK through industry associations/business councils to have joint capacity-building programmes for Indian exporters, SMEs, and farmers. Once they are aware of the standards, all agents in the supply chain from farmers to exporters said during the KIIs that they would like to meet them. In case stringent requirements have to be met, certain relaxation in time may be given to the exporters for implementation.

²² Available at <https://www.gov.uk/guidance/tariffs-on-goods-imported-into-the-uk>, accessed on 20 October, 2021.

Improving Testing and Production Methods

To conform to standards of developed markets such as the UK and increase exports, there is a need for prompt action on the part of Indian exporters to adopt mechanised methods of production and product traceability across the value chain of food products. This is especially important for products such as rice and dairy, which have immense potential for expansion. While efforts have been taken in the right direction to ensure that products such as dairy have good quality checks and inspection processes before exporting, further improvement is required in overall testing and pre-inspection procedures. Exporters should be encouraged to adopt the General Principles of Food Hygiene (GPH) based on the Hazard Analysis and Critical Control Points (HACCP) system for production and processing across the supply chain. Further, to produce exportable quality products (for example, in the dairy sector), the supporting farm level infrastructure has to be strengthened through developing model dairy farms or specific dairy export zones. Government bodies such as the FSSAI and APEDA through these zones, have to identify/prioritise producers who are ready to export and provide them with the necessary training and capacity building. In this way, a number of small and mid-sized producers and co-operatives can be roped in to enhance exports, through better access to infrastructure facilities and training. To keep facilitating exports, there is a need for continuous research in developing efficient testing procedures and learning from global best practices.

Easing Labelling and Registration Processes

A significant NTB faced by the UK exporters in India is the cumbersome labelling, registration, and customs procedures. While India's consignments to the UK majorly get rejected on the basis of food safety concerns, the majority of consignments in India (including those from the UK) get rejected at the visual inspection stage due to labelling issues. The government agencies responsible for enforcing labelling specifications should come together and co-ordinate to simplify the requirements. This would help foreign businesses to adhere to labelling and other registration related requirements and promote overall ease of doing business in India. Most often, information on labels is for two main users, namely, consumers and the regulating bodies. In most countries, while consumer information is printed on the labels, others are bar-coded. A similar approach can be taken in India, where information relevant for consumers like the product category, manufacturing date, etc., can be displayed on the label, while the other information may be bar-coded. The state-excite-related varied requirements should be discussed at a Pan-India level to ease regulatory complexities for foreign exporters.

Expand Knowledge Sharing and Collaboration

India's consistent positive trade balance with the UK in the agro-foods sector exhibits potential for India to expand and diversify exports. Specifically, in products such as fruits and vegetables, organic products, etc., India has untapped potential to increase exports to the UK, where current export volumes are minimal owing to the lack of modern processing and low-value chain integration. However, to realise this potential, there is a need to adopt modern agriculture processing techniques and certification requirements, where both India and the UK can collaborate. The UK is known for its expertise in scientific research and innovation with respect to advanced agriculture and food processing technologies, where knowledge sharing through government bodies such as FSSAI, APEDA, or the MoFPI will be beneficial for India's producers/exporters to move up in the value chain. Initiatives can be taken for joint research between institutes of India and the UK to improve agriculture practices, adopt advanced mechanised methods of processing, and address country-specific SPS barriers. Such cooperation between institutes can help support the transfer of the UK's innovations in these areas to India.

The UK's investment in India's food processing sector can also be an ideal area for bilateral partnership, which can enable Indian businesses to produce high-quality products, innovate, scale-up, and globalise. India's evolving and dynamic food market is one of the interest areas for the UK's businesses to expand in terms of exports and investment. In areas such as conforming to global export certification requirements including that of the UK in areas such as organic products, Indian government agencies such as FSSAI, APEDA, Spices Board, etc., can collaborate with UK's agencies such as the FSA to ensure that Indian exporters can meet the export specifications. Additionally, to recognise both the countries' conformity assessment systems based on international standards, the governments can sign Mutual Recognition Agreements (MRAs), equivalence agreements, or sector-specific Memorandum of Understanding (MoU). Such MRA already exist between India and the UK in the dairy sub-sector, but it has not yielded any results for exporters of the two countries. This needs to be reviewed. Mutual recognition of qualifications/certifications can help to address trade barriers and reduce costs as these agreements help in preventing duplication of inspection and testing which can increase the cost of exports and help in ensuring health and safety concerns.

To conclude, agri-food is a core area in India-UK's bilateral trade talks and there is a need to have a comprehensive and multi-dimensional approach to remove tariff, non-tariff, and other barriers to India-UK bilateral trade in

agri-food products. The bilateral trade agreement should facilitate the same. Signing a low ambitious trade agreement will not benefit the exporters and manufacturers on either side.

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Behind the Border Measures: Examination of Sanitary and Phytosanitary Barriers Faced in the Case of Food Export from India

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Introduction

Globally, India is one of the largest producers of several agricultural commodities. According to the Food and Agriculture Organization (FAO), India is the top-most producer of pulses, milk, and jute and the second-largest producer of rice, wheat, groundnut, cotton, and fruits and vegetables in the world.¹ In 2018, around 60 per cent of India's total land was used for agricultural purposes, which is much higher than the global average (36.9 per cent in 2018).² Domestically, the agricultural sector in India is a significant employer, engaging more than 50 per cent of the workforce and accounting for 17.8 per cent of the gross value added.³

The large production base bestows the country with a sizeable base for the export of agricultural commodities. India is emerging as an important supplier of food to the world and in 2019, India made to the list of top ten exporters of agricultural products.⁴ It is worth mentioning that despite the Covid-19 situation in 2020-21, India's export of agricultural products

¹ Available at <http://www.fao.org/india/fao-in-india/india-at-a-glance/en/>, accessed on 21 September 2021.

² World Bank Statistics, available at <https://data.worldbank.org/indicator/AG.LND.AGRI.ZS>, accessed on 28 September 2021.

³ Economic Survey of India, 2020-21.

⁴ According to the World Trade Organization's (WTO's) international trade and tariff statistics, accessible at https://www.wto.org/english/res_e/statis_e/statis_e.htm accessed on 1 April 2022.

(excluding marine and plantation products) increased by 28.3 per cent as compared to 2019-20, to reach around US\$ 30 billion.⁵

Both domestic and international policies have contributed to the rise of India's trade in agricultural products. India's agriculture policy, for the longest time, was focused on addressing domestic food demand and shortages and ensuring food security. In December 2018, the Ministry of Commerce and Industry released the first Agriculture Export Policy (AEP), which aimed to double agricultural exports to reach over US\$ 60 billion by 2022 and US\$ 100 billion in the next few years thereafter. The Policy laid down several measures for export promotion. Since agriculture is a state subject, state-specific action plans, monitoring committees, and nodal agencies responsible for the implementation of the Policy have been identified. Apart from this, various cluster development measures have been undertaken by the central government in collaboration with the Agricultural and Processed Food Products Export Development Authority (APEDA), one of the nodal agencies for agri-food exports. Thus, at a country level, there is a strong Policy commitment to enhancing exports.

The commitments made by member countries of the World Trade Organization (WTO) to give tariff concessions on agricultural products and the proliferation of bilateral/regional agreements, which facilitates tariff reduction has gradually liberalised agriculture trade. The other factor that led to trade liberalisation which emerged in 2007-08 after the food crisis, is linked to the issue of food security—a narrative championed by global governance institutions such as the FAO—encouraging countries to facilitate well-functioning food supply chains. Despite the Coronavirus disease situation, India undertook measures to ensure uninterrupted exports of food products. Consequently, India's export of agriculture products registered a growth of 28.36 per cent during 2020-21.⁶ World exports of agricultural products increased by 0.9 per cent in 2020 as many countries across the world are dependent on food export.⁷ Focusing on India's exports, the European Union (EU) is among the top five export markets for India. It is also the largest importer of agriculture products, globally. In 2020, the EU's total agriculture importers were valued at US\$ 597 billion, and extra-EU imports were US\$ 178 billion.⁸ India is among the largest exporters of

⁵ As reported by Press Information Bureau (PIB), available at <https://pib.gov.in/PressReleasePage.aspx?PRID=1725891>, accessed on 28 September 2021.

⁶ Information released by the Ministry of Commerce and Industry and reported by the Press Information Bureau (PIB), available at <https://pib.gov.in/PressReleasePage.aspx?PRID=1725891>, accessed on 28 September 2021.

⁷ World Trade Statistical Review, 2021.

⁸ Extracted from World Trade Statistical Review, 2021, Table A14, p. 69.

agricultural products, globally. In 2020, with a share of 2.2 per cent in world total export (valued at US\$ 39 billion), India was ranked the ninth-largest exporter of agricultural products.⁹ India's exports of agricultural products to the EU were valued at US\$ 2.66 billion, growing at an annual average growth of 1.5 per cent.¹⁰ With a trade surplus in agricultural products, India is a net exporter of agricultural products to the EU. Despite the significant potential to export, India's exports are below the target laid down in the AEP 2018. Exports of agri-food products, continue to face barriers, which became glaring during the Covid-19 situation as countries are becoming more cautious on food safety and health-related standards. According to the WTO, while tariff barriers are gradually coming down, non-tariff barriers especially those related to food safety and health are on a rise. In 2020, the average Most-Favoured Nations (MFN) applied rates of the top ten importers of agricultural products were around or less than 15 per cent.¹¹ However, non-tariff barriers, applied in the form of Sanitary and Phytosanitary (SPS) restrictions and Technical Barriers to Trade (TBT) are on a rise. The range of the barriers varies from the specification of the minimum residue level to labelling and packaging requirements. To address the non-tariff barriers, export promotion councils in India like APEDA have become export control bodies laying out the requirements and food safety standards of the importing countries. During the Covid-19 pandemic, export promotion councils in India extended recognition certificates, accreditation facilities, and provided online services, among other things to facilitate trade. Most of these measures were adopted on a temporary basis, specifically to address the Covid-19 situation. It is widely acknowledged that these barriers exist, and they continue to restrict trade in agricultural products.

With this background, this chapter examines the non-tariff barriers to trade in agriculture products, specifically in the context of India's export to the EU. In doing so, the chapter analyses the information from Rapid Alert System for Food and Feed (RASFF) and European Union Notification System for Plant Health Interceptions (EUROPHYT) portals. It then examines the impact of the rejection. Given the importance of trade in agriculture

⁹ Extracted from World Trade Statistical Review, 2021, Table A14, p. 69.

¹⁰ Europa database. The original figure is reported in Euro. It is converted using XE Converter accessible rate available at <https://www.xe.com/currencyconverter/convert/?Amount=2.3&From=EUR&To=USD>. The rate as of 6 October 2020 was EUR 1 = USD 1.15.

¹¹ Except the Republic of Korea (henceforth, Korea) and India for which the simple average of MFN applied rate on agriculture products was 56.8 per cent and 34 per cent, respectively. For details see World Tariff Profiles, 2020 compiled by the WTO, available at https://www.wto.org/english/res_e/publications_e/world_tariff_profiles21_e.htm, accessed on 28 September 2021.

products to address the issue of food shortages and at the same time, the role of responsible production and consumption for ensuring sustainable development, the chapter makes recommendations on the following:

- (a) What needs to be done in the entire export value chain from farmers to producers and exporters to reduce rejections;
- (b) Improve the quality of output; and
- (c) Role of the government.

Before dwelling further, it is first important to investigate the scope of Sanitary and Phytosanitary (SPS) measures in a multilateral trading system. The layout of this Chapter is as follows: The next section, Section 2, presents the scope of SPS measures in international agreements, including the WTO. Section 3 presents and analyses the cases and reasons for export interceptions and rejections. The reasons and impact of the rejections on Indian farmers, processors, and exporters are presented in Section 4. Based on the analyses and previous surveys conducted by the authors, Section 5 makes policy recommendations and Section 6 draws broad conclusions.

Sanitary and Phytosanitary Measures and Technical Standards in the World Trade Organization and Other Trade Agreements

The Agreement on the Application of SPS (known as the ‘SPS Agreement’) was entered into force with the establishment of the WTO on 1 January 1995. The Agreement sets out the basic rules for food safety and animal and plant health standards. It allows countries to set their standards and also mentions that regulations must be based on scientific analysis. It states that the regulations should be applied only to the extent necessary to protect human, animal or plant life or health and they should not arbitrarily or unjustifiably discriminate between countries where identical or similar conditions prevail.

According to the WTO, domestic policies related to food quality, health, and food safety are among the most common non-tariff barriers. The SPS measures are imposed by most countries to ‘limit the damage caused by or to protect the health of individuals from risks arising from the entry, establishment or spread of pests, diseases, disease-carrying organisms or disease-causing organisms, additives, contaminants, toxins or disease-causing organisms in foods, beverages or feedstuffs; diseases carried by animals, plants or products.’¹²

¹² Annex A on Definitions of the WTO Agreement on the Application of Sanitary and Phytosanitary Measures (called the SPS Agreement) available at https://www.wto.org/english/tratop_e/sps_e/spsagr_e.htm, accessed on 2 October 2021.

Under the WTO's SPS Agreement, SPS measures are defined as any measure applied to protect animal or plant life or health from risks arising from the following:

- The entry, establishment, or spread of pests, diseases, disease-carrying organisms, or disease-causing organisms;
- Additives, contaminants, toxins, or disease-causing organisms in food, beverages, or feedstuff;
- Diseases carried by animals, plants, or products thereof, or from the entry, establishment, or spread of pests.

Sanitary and Phytosanitary Measures include all relevant laws, decrees, regulations, requirements, and procedures including, *inter alia*, end product criteria; processes and production methods; testing, inspection, certification, and approval procedures; quarantine treatments including relevant requirements associated with the transport of animals or plants, or with the materials necessary for their survival during transport; provisions on relevant statistical methods, sampling procedures and methods of risk assessment; and packaging and labelling requirements directly related to food safety. The SPS Agreement also encompasses measures to prevent or limit other damage within the territory of a country from the entry, establishment or spread of pests.

Further, the WTO member countries are encouraged to use international standards, guidelines, and recommendations, where they exist. Specifically, the Agreement encourages harmonisation on the basis of standards, guidelines, and recommendations set by three international organisations, including the Codex Alimentarius Commission, the International Office of Epizootics (OIE), and the relevant international and regional organisations operating within the framework of the International Plant Protection Convention (see the text of the WTO SPS Agreement). Article 12 of the SPS Agreement established the Committee on SPS Measures to provide a regular forum for consultation, implement the provisions of the Agreement, and further the objective of harmonisation of standards across countries.

It is important to note that globally acceptable standards such as the Codex Alimentarius can be higher than the national requirements of many countries, especially developing countries, but the SPS Agreement explicitly permits governments to choose not to use international standards. However, if countries align themselves to globally acceptable standards such as the Codex Alimentarius standards, then it is likely that a majority of the SPS issues in international trade could be resolved. The bigger concern is that, time and again, many countries, especially developed countries, impose more stringent standards than international standards with a view to protecting

their nations against potential health threats arising from the consumption of certain types of food products originating in developing countries (Nielsen and Anderson, 2001), which can act as a major non-tariff barrier to exports from developing countries (Henson and Loader, 2000). Many developing countries, including India, have small farm sizes, and poor farmers. While these farmers are keen to export, they may not have the right technology and training or access to the right inputs, including seeds and fertilisers, which could enable them to meet the conditions imposed by importing countries. In such cases, there is a need for collaboration, sharing of information, and sometimes support for upgrading food safety standards. Some countries have, therefore, entered into capacity-building initiatives with developed countries, like the one between Cambodia and the EU on rice production.

While the WTO acknowledges that some trade restrictions may be necessary to ensure food safety and animal and plant health protection, SPS restrictions can be used by member countries to protect their domestic producers from economic competition. To reduce possible arbitrariness in decisions and encourage consistent decision-making, the Agreement clarifies which factors should be taken into account in the assessment of the risk involved. It points out that measures to ensure food safety and protect the health of animals and plants should be based as far as possible on the analysis and assessment of objective and accurate scientific data. Therefore, there is a need to collect and collate the data for challenging an SPS measure.

One key issue that needs consideration here is that due to differences in climate, existing pests or diseases, or food safety conditions, it is not always appropriate to impose the same SPS requirements on food, animal or plant products coming from different countries. Therefore, SPS measures sometimes vary, depending on the country of origin of the food, animal or plant product concerned. This is taken into account in the SPS Agreement and thus, using this provision, an importing country/region such as the EU, can consider an exporting country like India more risky than other trading partners such as the United States (US). For example, India has been identified as one of the third countries with the risk of Foot and Mouth Disease (FMD). This implies that the dairy products from India have to undergo various heat treatments before being exported to the EU.¹³

The WTO member countries are required to notify other countries of any new or changed SPS requirements that can affect trade. They have to set up offices (called Enquiry Points) to respond to requests for more information on new or existing measures. They also have to share information on how

¹³ For details see Commission Regulation (EU) No 605/2010, available at <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:175:0001:0024:EN:PDF>, accessed on 6 October 2021.

they apply their food safety and animal and plant health regulations. This enables member countries to understand the national standards of their trading partners. The information about SPS measures undertaken by the EU is available to Indian policymakers and industry through this route.

Apart from SPS issues, there are also technical barriers to trade, which are imposed in the form of technical regulations, standards, and conformity assessment procedures that may be discriminatory and impose unnecessary obstacles to trade. These are covered under the TBT Agreement of the WTO. Often countries also impose labelling and packaging requirements that need to be met by exporters, which can act as barriers to trade.

In the case of food products, standards for organic products are considered as a technical standard rather than a food safety standard, as conventional food is also safe for human consumption. There are mutual recognition agreements for organic standards, which can be part of trade agreements (for example, the EU and the Republic of Korea) or these can be signed outside the trade agreements, like the EU has unilaterally approved the organic standards laid down by APEDA for exports of fresh products from India.

Most of the trade agreements have provisions for chapters on SPS and TBT. Some trade agreements merely reflect the WTO requirements while others, especially the agreements of developed countries like the US and the EU, are WTO plus and have provision for mutual recognition of standards and other regulatory cooperation.

Analysis of Rejections

The issue of food safety became prominent in the EU in the late 1990s after a series of food incidents took place in the member countries. The European Commission released a White Paper on Food Safety,¹⁴ which recommended the establishment of the European Food Authority and bringing about a Food Safety Legislation and Food Safety Controls. The larger objective was to have a more coordinated and integrated approach towards food safety. Following this, the General Food Law Regulation¹⁵ was adopted by the European Parliament and Council in 2002, which lays down general principles, requirements, and procedures that underpin decision-making in matters of food and feed safety, covering all stages of food and feed production and distribution.¹⁶ It created a European food safety system

¹⁴ Available at <https://op.europa.eu/en/publication-detail/-/publication/6d4b523b-dad8-4449-b2b4-9fa9b0d6e2be>, accessed on 30 September 2021.

¹⁵ Available at https://ec.europa.eu/food/horizontal-topics/general-food-law_en, accessed on 1 October 2021.

in which responsibility for risk assessment (science) and risk management (policy) are kept separate. The Food Law is based on three inter-related components of risk analysis as presented in Figure 7.1.

For risk communication with its trading partners, the EU has created two portals, namely, RASFF and EUROPHYT, to immediately notify the member countries and partner countries like Norway, Liechtenstein, Iceland, and Switzerland of risk arising from food safety issues or pest infestations. First, an alert is raised and once it is confirmed it is notified to the exporting country.

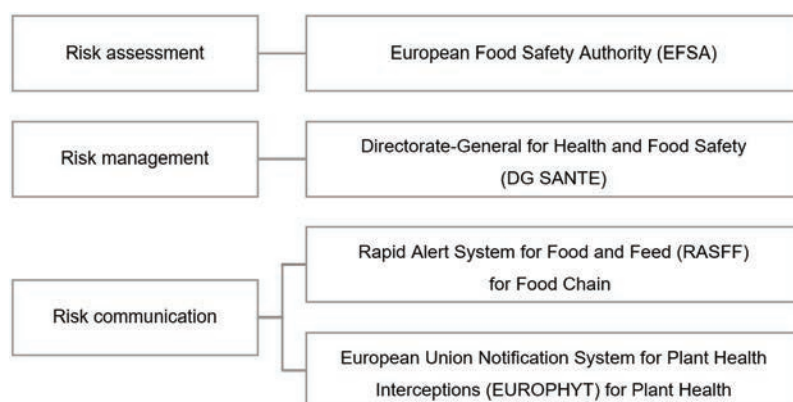


Figure 7.1: Components of Risk Analysis

Source: Compiled by the authors.

The RASFF notifies when risks are detected in the food supply chain and the EUROPHYT is a notification and alert system for risks related to plant health. The European Food Safety Authority (EFSA) deals with risk assessment and communicates its scientific findings to the public. It is funded by the EU and operates independently of the European legislative and executive institutions (Commission, Council, and Parliament) and EU member states.¹⁶ As the risk manager, the Directorate-General for Health and Food Safety (DG SANTE), is responsible for the implementation of EU laws on the safety of food and other products, consumers' rights, and the protection of people's health.¹⁷ The counterpart of RASFF will be the rejection by the Food Safety and Standards Authority of India (FSSAI) and that of EUROPHYT is the Plant Quarantine in the case of India.

Given this institutional background, this Section analyses the notifications pertaining to food exports from India to the EU member states as reported by the RASFF and the EUROPHYT portals of the EU.

¹⁶ Available at <https://www.efsa.europa.eu/en/aboutefsa>, accessed on 2 October 2021.

¹⁷ Available at https://ec.europa.eu/info/departments/health-and-food-safety_en, accessed on 2 October 2021).

The RASFF portal¹⁸ gives public access to summary information about the most recently transmitted RASFF notifications. Data is available from 2020 through 2021 and the information for products originating from India is extracted from the database. The risk is classified as: (a) serious, (b) not serious, (c) undecided, and (d) no risk. Additionally, the data presents the type of notification made, namely, border rejection, alert, information for attention, or information for follow-up.

Notifications Against Food and Feed from India

Between January 2020 and June 2021, 563 notifications were made on food and food contact material and 15 notifications were made for feed for products originating from India. Out of the total notifications made, around 86 per cent of the notification made with respect to food and food contact material were marked under the serious category while about 73 per cent of the notifications with respect to feeding were marked as serious (Table 7.1).

Table 7.1: Distribution of Notification by Risk Decision
(From January 2020 to June 2021)

<i>Type</i>	<i>Serious</i>	<i>Not Serious</i>	<i>No Risk</i>	<i>Undecided</i>	<i>Total</i>
Food	489	18	3	53	563
Feed	11	2	0	2	15

Source: Rapid Alert System for Food and Feed (RASFF) portal

Note: Food includes Food Contact Material

The notifications are classified into four categories, namely, alert, rejection, information for follow-up and information for attention.

Alert notifications are sent when food or feed presenting a serious health risk is on the market and rapid action is required. However, this does not necessarily mean that for all serious notifications 'serious' risk decisions are taken. The RASFF member/the EU member state that identifies the problem and takes the relevant actions (e.g., withdrawal of the product) triggers the alert. A few risks may remain undecided or may be considered not serious after a thorough check.

Border rejections concern food and feed consignments that have been tested and rejected at the external borders of the EU [and the European Economic Area (EEA)] when a health risk has been found. The notifications are sent to all EEA border posts to reinforce controls and ensure that the rejected product does not re-enter the EU through another border post.

Information notifications are used when a risk has been identified about food or feed placed on the market, but the other members do not have to

¹⁸ The portal is accessible at <https://webgate.ec.europa.eu/rasff-window/screen/search> (accessed on 2 October 2021).

take rapid action. This is because the product has not reached its market or is no longer present on its market or because the nature of the risk does not require rapid action. Any information related to the safety of food and feed products that has not been communicated as an alert or an information notification, but which is judged interesting for the control authorities, is transmitted to the members under the heading 'News'.

Between January 2020 and June 2021, around 333 alert notifications were sent for food and food contact material originating from India while one alert notification pertained to feed. In total 115 border rejections were made for food and food contact material originating from India while 9 border rejections were made for feed (Table 7.2).

Table 7.2: Distribution of Notification by Classification
(From January 2020 to June 2021)

<i>Type</i>	<i>Alert</i>	<i>Rejection</i>	<i>For Follow Up</i>	<i>For Attention</i>	<i>Total</i>
Food	333	115	13	102	563
Feed	1	9	0	5	15

Source: Rapid Alert System for Food and Feed (RASFF) portal

Note: Food includes Food Contact Material

A majority of the rejections in food-related notifications were made by the Netherlands (40 per cent), primarily because of the high volume of export traffic directed towards the Rotterdam and Antwerp ports in the Netherlands (Table 7.3). This is followed by Germany (13 per cent). Post-Brexit, a majority of the food products enter the EU market through the Netherlands' Rotterdam port, and thus the number of interceptions is higher for the Netherlands.

Table 7.3: Distribution of Food-related Notifications by Notifying Country in the EU, Switzerland, and the UK (From January 2020 to June 2021)

<i>Country</i>	<i>Serious</i>	<i>Not Serious</i>	<i>No Risk</i>	<i>Undecided</i>	<i>Total</i>
Austria	7			2	9
Belgium	19			5	24
Bulgaria	1				1
Croatia	3	1		2	6
Cyprus	3			1	4
Czech Republic	9			1	10
Denmark	6			3	9
European Commission				1	1
Finland	7			3	10
France	13	1		4	18
Germany	63			10	73

<i>Country</i>	<i>Serious</i>	<i>Not Serious</i>	<i>No Risk</i>	<i>Undecided</i>	<i>Total</i>
Greece	18				18
Ireland	1				1
Italy	25	3		3	31
Latvia	1	1			2
Luxembourg	3			2	5
Malta	1				1
The Netherlands	225			2	227
Norway	6			3	9
Poland	10	1		2	13
Portugal	5			2	7
Romania	5				5
Slovenia	7	3			10
Spain	17	1		3	21
Sweden	8			1	9
Switzerland	10				10
United Kingdom	16	7	3	3	29
Total	489	18	3	53	563

Source: Rapid Alert System for Food and Feed (RASFF) portal

Note: Food includes Food Contact Material

As regards feed-related notifications, a majority of the notifications are made by Germany (4), followed by the Netherlands (3), the UK (3), Finland (2), and Belgium, Spain, and Sweden (1 each).¹⁹

In terms of the category-wise notifications, Table 7.4 shows that a majority of the notifications were made with respect to nuts, nut products, and seeds (66.7 per cent). These largely pertained to the export of sesame seeds from India to the EU members states, Switzerland, and the UK.

Table 7.4: Category-wise Distribution of Notifications Made for Food and Food Contact Material (From January 2020 to June 2021)

<i>Category</i>	<i>Serious</i>	<i>Undecided</i>	<i>Not Serious</i>	<i>No Risk</i>	<i>Total</i>
Cephalopods and products thereof	9				9
Cereals and bakery products	18	10	2	2	32
Cocoa and cocoa preparations, coffee and tea	2	1			3
Crustaceans and products thereof	6	2	1		9

¹⁹ Rapid Alert System for Food and Feed (RASFF) portal

<i>Category</i>	<i>Serious</i>	<i>Undecided</i>	<i>Not Serious</i>	<i>No Risk</i>	<i>Total</i>
Dietetic foods, food supplements, and fortified foods	12	2	1		15
Fats and oils	1				1
Fish and products thereof	4	1	2		7
Food additives and flavourings	5		1		6
Food contact materials	1	1			2
Fruits and vegetables	18	7	3	1	29
Herbs and spices	37	12	5		54
Ices and desserts	1				1
Nuts, nut products, and seeds	361	12	3		376
Other food products/mixed	14	3			17
Prepared dishes and snacks		2			2
Total	489	53	18	3	563

Source: Rapid Alert System for Food and Feed (RASFF) portal

The analysis reflects that over an 18 month-period starting January 2020, nearly 600 notifications are made with respect to food and feed originating from India and most of these are alert notifications of serious risk category.

While the RASFF provides risk data on food and feed, the risks related to plant health are reported by EUROPHYT. The tables are presented in the following paragraphs.

Interceptions Made by the European Union and Switzerland for Products From India for Risks Related to Plant Health

The data on annual interceptions made by the EU and Switzerland of harmful organisms in imported plants and other objects from India is collected from the EUROPHYT portal.²⁰ The import of most plants and plant products from non-EU countries is allowed, subject to certain conditions. Some plants are prohibited or subject to very strict requirements if a risk assessment indicates that this is necessary due to the pests they may host. An implementing regulation sets out the precise rules with the lists of regulated pests, regulated commodities, import prohibitions, and requirements for import and internal movement, reinforcing the Union's phytosanitary protection. All living plant material (entire plants, fruits, vegetables, cut flowers, seeds, tubers, etc.) and some plant products (wood of certain tree species, etc.) can only be imported

²⁰ Available at https://ec.europa.eu/food/plants/plant-health-and-biosecurity/europhyt/interceptions_en, accessed on 2 October 2021.

into the EU if accompanied by a phytosanitary certificate confirming their compliance with the EU legislation. The only exceptions relate to five fruit species, namely, bananas, coconuts, dates, pineapples, and durians do not need a phytosanitary certificate for import into the Union.²¹

Between 2015 and 2020, around 866 interceptions were made with respect to the import of plants and produce and 893 interceptions were made with respect to objects. The annual break-up of these interceptions is presented in Table 7.5.

Table 7.5: Annual Interceptions of Harmful Organisms in Commodities (Objects, Plants, and Produce) Imported from India into the EU Member States, Switzerland, and the UK (2015–20)

<i>Year</i>	<i>Total Number of Interceptions: Plants and Produce</i>	<i>Total Number of Interceptions – Objects</i>	<i>Total Number of Interceptions</i>
2015	103	261	364
2016	91	161	252
2017	228	162	390
2018	214	136	350
2019	94	128	222
2020	136	45	181

Source: EUROPHYT database, available at https://ec.europa.eu/food/plants/plant-health-and-biosecurity/europhyt/interceptions_en#annual_interceptions, accessed 13 September 2021.

The interceptions on plants and products pertain to the threats found on products intended for planting, other living plants, fruits or vegetables, seeds, etc. The object-related interceptions are made due to harmful organisms found on packing materials, wooden crates, pallets, and other materials.

Reasons for Rejections and its Impact

The data provided by the RASFF is further analysed to investigate the reasons for rejections. Between January 2020 to June 2021, broadly, the issues listed in Table 7.6 were found in food imported from India.

Table 7.6: Issues Detected in Food Products Originating From India

<i>Issue</i>	<i>Explanation</i>
Aflatoxin	These are a family of toxins produced by certain fungi that are found on crops such as maize (corn), peanuts, cottonseed, and tree nuts.
Aluminium Residue	In food additives, aluminium compounds are used as preservatives, for colour or leavening bread.

²¹ Available at https://ec.europa.eu/food/system/files/2020-07/ph_biosec_qandas.pdf, accessed on 12 October 2021.

<i>Issue</i>	<i>Explanation</i>
Azo Dye	These are used as food colouring ingredients.
Cadmium	It is a heavy metal found as an environmental contaminant, both through natural occurrence and from industrial and agricultural sources.
Chlorpyrifos	It is an organophosphate insecticide, acaricide, and miticide used to control foliage and soil-borne insect pests on a variety of food and feed.
Ciguatoxins	This is a group of poisons that can accumulate in certain fish.
Dinitrophenol	It is an anti-obesity therapy/supplement however studies show that DNP causes toxicity by the uncoupling of oxidative phosphorylation in the mitochondria of cells throughout the body.
Ethylene Oxide	It is used in or as fumigants/insecticides to combat fungi and bacteria.
Excessive Lead and/or Mercury	Contamination beyond the level of tolerance.
Glycidyl Esters	These are processing-induced contaminants primarily found in refined fats and oils, and foods containing fats and oils.
Histamine	It is a biogenic amine which is a naturally occurring substance in the human body. Histamine is derived from the breakdown (decarboxylation) of the amino acid histidine.
Irradiation	Food irradiation (the application of ionising radiation to food) is a technology that improves the safety and extends the shelf life of foods by reducing or eliminating microorganisms and insects. Unauthorised irradiation is considered harmful.
Mycotoxins	There are toxic compounds that are naturally produced by certain types of moulds (fungi). Moulds that can produce mycotoxins grow on numerous foodstuffs such as cereals, dried fruits, nuts, and spices.
Nitrofuran	These are antimicrobial agents and are rapidly metabolised, occurring in animal tissues as protein-bound metabolites.
Ochratoxins	This is a naturally occurring foodborne mycotoxin found in a wide variety of agricultural commodities worldwide.
Pesticide Residue	Any substance or mixture of substances in food for man or animals resulting from the use of a pesticide and includes any specified derivatives, such as degradation and conversion products, metabolites, reaction products, and impurities that are considered to be of toxicological significance.

<i>Issue</i>	<i>Explanation</i>
Salmonella	It is a bacteria that can result in food poisoning.
Tricyclazole	It is a specialty systemic fungicide. The product is rapidly absorbed by rice plants and translocated towards leaf tips.
Undeclared Ingredient/ Incorrect Labelling	Could include allergens or materials not disclosed on labels.
VTEC: E. Coli	It is a germ (bacterium).
Other Issues	Absence of certification, use of unauthorised substance, poor temperature control, and undefined hazard, among others.

Source: Compiled by authors from information available on the RASFF portal.

Table 7.6 highlights that most of the issues arise due to the poor quality of soil and water, excessive use of certain pesticides or fumigants or banned ingredients, and cross-contamination of food. These result in contamination or food toxification. Some persistent issues are summarised next.

Ethylene Oxide in Sesame Seeds

Almost 70 per cent of the RASFF notification for food and food contact material imported from India pertained to excessive ethylene oxide in some food products. One of the most recurring issues during the period was related to high levels of ethylene oxide being found in sesame seeds imported from India. According to the EU regulations, sesame seeds may only be placed on the market in the EU when they comply with the Maximum Residual Limits (MRL) of 0.05 mg/kg, set at the limit of quantification. In October 2020, the EU Member States called for short-term measures on sesame seeds imported from India, including prior testing by India of sesame seeds intended for exports to the EU for compliance with the MRL for ethylene oxide, confirmed by an official certificate that would accompany the consignments, and imposing increased controls on sesame seeds coming from India at border control posts checking 50 per cent of consignments presented at the EU border.

Aflatoxin in Peanuts and Spices

Around 7 per cent of the notification during the period²² were issued due to the presence of aflatoxins, mostly in peanuts. According to the EU regulations, the level of aflatoxin B1 in groundnuts intended for direct human consumption must not exceed 2 µg/kg and the total aflatoxin content (B1, B2, G1, and G2) must not exceed 4 µg/kg. However, a higher aflatoxin

²² January 2020 to June 2021

content for groundnuts is allowed if the products are not intended for direct human consumption. In such cases, the groundnuts must be sorted or treated before they are placed on the market.²³ In April 2021, the EU tightened the checks on peanut imports from India, due to the presence of Aflatoxins. The frequency of identity and physical checks on peanuts from India was increased from 10 per cent to 50 per cent.²⁴

Pesticide Residue in Rice

Around 4.6 per cent of the notifications were made due to the presence of pesticide residues, most of which were found in rice exported from India to the EU. It is worth mentioning since 2017, to ensure compliance with EU MRLs for Basmati rice exported to the EU is based almost exclusively on mandatory pre-shipment residue analysis conducted by exporters. According to an Audit Report of the European Commission, evaluating control of pesticides in food exported to the EU from India, it is found that the issue persists due to the poor practices in the use of plant protection products are widespread, with 50 per cent of all residue findings in rice being for active substances not approved on the crop.²⁵

Salmonella in Sesame Seeds and Spices, etc.

Problems with salmonella in sesame seeds are not just limited to India. Due to the high volume of imports from India, in February 2017, a new EU-Regulation was implemented requiring that a health certificate, as well as a laboratory report verifying the absence of salmonella, shall accompany each consignment of sesame seeds. Since salmonella cases have occurred repeatedly, the EU has stipulated that every fifth delivery of sesame from India must be tested for the pathogen. In India, ethylene oxide is essentially used to stop the growth of salmonella in sesame seeds and other spices, like ginger or previously, fruit flies in mangoes. This may have led to Indian exporters increasingly disinfecting their goods with ethylene oxide, resulting in a high incidence of ethylene oxide residues in sesame seeds.²⁶

²³ Available at <https://www.cbi.eu/market-information/processed-fruit-vegetables-edible-nuts/groundnuts/market-entry>, accessed on 14 October 2021.

²⁴ Available at <https://www.foodsafetynews.com/2021/04/eu-gets-stricter-on-black-pepper-from-brazil-and-peanuts-from-india/>, accessed on 15 October 2021.

²⁵ Available at https://ec.europa.eu/food/audits-analysis/act_getPDF.cfm?PDF_ID=14220, accessed on 12 October 2021.

²⁶ Available at <https://organic-market.info/news-in-brief-and-reports-article/pesticide-findings-in-organic-sesame-from-india.html>, accessed on 13 October 2021.

While these are some of the recurring issues, there are other issues such as the presence of tricyclazole in rice, ciguatoxins and nitrofurans in seafood, the presence of azo dye in food products, etc., that have resulted in notifications by the EU member states.

Most of the notifications result in mandatory testing and certification requirements, from Indian authorities, followed by testing at the landing port in the EU. With increased sampling sizes, these testing and certification requirements turn out to be costly and time-consuming. For some product categories such as peanuts, for instance, the EU has higher food safety standards than not only those set by international organisations such as Codex Alimentarius Commission, but the standards are higher than those set by other developed countries such as the US.

Moreover, as pointed out during the Key Informant Interviews (KIIs), often products can get contaminated in the supply chain due to poor storage conditions or incorrect processing technologies, among others. The RASFF data reflects that in a few cases, notifications were issued due to poor temperature control in the case of certain products. The case of sesame is unique by itself. The use of ethylene oxide to control bacterial growth, itself led to a high incidence of notifications and another round of mandatory checks on Indian food products. One core issue that came up during the industry interaction was that there are information gaps and information sharing with the exporters and farmers. This is a major issue leading to export rejections. Often the exporters are not aware of frequent changes in standards and requirements, despite being members of export promotion councils and bodies.

It is worth mentioning that in times of emergencies, like the recent Pandemic, some of the mandatory certification requirements were relaxed by the EU. For instance, as a measure to facilitate trade, due to the Covid-19 situation, mandatory pre-shipment residue analysis for rice was relaxed for export to select EU member states.

Focusing on the issue and its impact, KIIs confirmed that a core issue for India is that despite there being export control agencies, we are unable to meet the importing countries' requirements. There seem to be gaps in information sharing, knowledge, and the export control process in general. Multiple overlapping bodies often depend on each other to do the due diligence, while the entire process can be more efficient through a technology-based risk management system. There are structural issues in the Indian agricultural sector, which is dominated by smallholders, like the lack of knowledge, the lack of quality inputs, subsidies given to fertilisers that are banned in the EU, the use of wrong pesticides, the lack of traceability due to limited use of digital technology, etc.

The impact of the rejection has been diverse. Often there are periodic product bans like for mangoes due to the fruit flies and so on. This led to a drastic fall in prices of mangoes and the loss to the farmers. Dairy products imports are banned by the EU and the UK, leading to a huge loss of revenue for many of our manufacturers. Second, if the product is destroyed then the exporters face a total loss. The product may be allowed to be shipped to a third country or back to India. In this case, too, the exporters face a huge cost. Perishable products have a short shelf-life, and they get spoiled in the process. In case of issues like the presence of tricyclazole in rice, almost 60 per cent of the consignment in the year of implementation of the ban on tricyclazole by the EU, were rejected by the EU companies and Indian companies lost their market share to Vietnam and Cambodia. In the case of vegetables and fresh fruits, many African countries are taking away India's market share, and exports are now reducing in key markets like the US and the EU.

Recommendations

India wants to become a key exporter of agricultural products and therefore it is in the interest of the country to address the export rejection and ensure its export competitiveness. Based on the KIIs, five key areas of interventions have been recommended in this section, which will help to reduce the chances of export rejection and enhance our export competitiveness.

- **Implement and Strengthen Traceability Using Digital Technologies:** One of the most successful ways of resolving the SPS issues in recent years has been the establishment of technology-based traceability to the farms in products. Export promotion agencies including APEDA have established traceability procedures for export-oriented products such as grapes. There is an urgent need to implement product traceability for all exported products. However, due to the fragmented nature of India's agriculture sector, large-scale adoption is often difficult and costly. There is evidence on the use of block-chain technology for building supply chain traceability and improving transparency for products that have high chances of rejection. Technological solutions can be explored at an institutional level and through a public-private partnership. Innovative start-ups can be roped in for such technology solutions. Technology will not only help to manage the risk better but it will also help to identify where the product is getting contaminated in the supply chain.
- **Implement Good Agricultural Practices and Global Best Practices:** Most developing countries address the SPS issues faced in developed country markets by implementing Good Agricultural Practices (GAP)

and reducing the use of chemicals and pesticides. As a first step, chemicals and fertilisers that are banned in other countries, especially key markets of developed countries like the US and the EU, should also be banned in India. Moreover, realising the importance of export markets, farmers in India are willing to switch to the use of bio-fertilisers and green inputs, but most of them do not have the knowledge and financial means to make the switch. There is a significant push from the Indian Central and state governments to promote organic farming and nutritious food but there is a severe shortage of organic inputs, technology, knowledge, and most importantly, funding. Chemical fertilisers are highly subsidised and available in plenty; in contrast, the availability of bio-chemicals and green inputs is limited and organic inputs for exports have little (or no) subsidies. Therefore, it is important to re-examine the subsidy regime and subsidise the right type of inputs and farm practices.

- **Review the Export Control Process:** If a product goes through the export control process domestically and is then rejected in key markets, it is important to review and undertake a third-party audit to examine the efficiency of the control process that has been carried out in India. Further, there should be a single agency for export control, traceability, and laboratory testing. Different nodal agencies for export control (such as APEDA for organic spices and Spices Board India for spices) create confusion as it leads to the incidence of multiple laboratory test requirements. Registration with multiple agencies also adds to the cost while, on their part, agencies lack accountability. A single nodal agency for export will reduce the cost for exporters and increase accountability. It will also reduce the cost of governance related to running multiple organisations with overlapping responsibilities.
- **Implement Food Safety Regulations in the Domestic Market:** While India may have adopted international standards for the domestic market, there are gaps in the adoption and implementation of standards, especially for fresh produce sold through unorganised markets in India. In the case of products such as milk, the quality of processing plants varies widely and, in many cases, they are below international standards. It is, therefore, important to focus on quality and standards in the domestic market so that products are produced and processed adhering to international food safety requirements. Poor quality food can be equally harmful to consumers in India and hence, the Department of Consumer Affairs under the Ministry of Consumer Affairs, Food & Public Distribution, and FSSAI should work together on this issue.
- **Establish World-Class Export Infrastructure:** India has been increasingly implementing food safety assurance and management

systems such as Hazard Analysis and Critical Control Points (HACCP) and the FSSAI has mandated its implementation for all food business operators. For the treatment and processing of certain products, different importing countries prescribe different treatments that require the installation of specific infrastructure, for example, mechanised methods of milking for dairy exports are a requirement of the EU, which may be possible for private dairies to abide by but may be difficult for milk co-operatives to implement, given a large number of small farms. In this context, it is important to identify and prioritise companies that are ready to export and those that need further training and capacity building prior to the export. Similarly, some countries require hot water treatment or vapour heat treatment for mangoes before export while others require gamma irradiation. At present, the infrastructure available is limited to a few states and it is not evenly spread across the country. For export products such as mangoes, Basmati rice, and grapes, investments should be made in setting-up relevant infrastructure for export.

Conclusions

It is important to note that while food standard is a public policy issue when products cross borders, it becomes a trade policy issue. Consumers across the world have become more health-conscious and are aware of food safety standards. Food demand patterns are changing in both the domestic and export markets. As India is moving towards the exports of semi-processed, processed, and specialised food products (such as halal meat or organic spices), more value addition will happen in the country leading to more employment creation and the growth of the food processing sector. Such products also earn a premium price, but they will require the implementation of proper certification and standards. Further, wide differences in domestic and export standards will make it difficult for India to become a food processing hub as a processor in India will need to source local ingredients to process for exports and the domestic market. If domestic standards are aligned to international standards, there is less likelihood of product rejections, and it is easier to earn a premium price for certified products such as organic food products. Rejection and bans of products can tarnish the image of India as an exporting country. There is an urgent need to first implement strict quality standard and focus on brand building based on that quality standards. Overall, it is recommended that all government departments may work together to design a comprehensive policy on safe agriculture practices. There is a need to use technology for food safety compliance and risk management. To counter rejection by a partner country

in forums like the WTO's SPS committee or TBT committee, there is a need for data collection and scientific evidence-based reports. At the same time, it is important to build the capacity of our small and medium farmers and processors and inform them about the export market requirements.

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Promoting Agricultural Exports: Need for National Level Policy on Food Loss Management

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Introduction

India is home to 1.38 billion people. Agriculture continues to be at the country's centre stage as it provides direct livelihood avenues to almost half of the country's population and supports significant industries in the agro sector by providing raw materials. It will not be out of context if it is stated that agriculture, including horticulture and vegetable cultivation, and related activities such as animal husbandry, poultry, and fish-culture are the backbone of the Indian economy. Besides providing economic resilience, the sector is also essential for political and social stability and is directly responsible for providing food security to the country.

Food Security

It has been illustrated and defined from time to time by various agencies and authors. The Food and Agriculture Organization (FAO) has defined food security as 'ensuring that all people at all times have both physical and economic access to the basic food that they need.' (FAO, 1983). A more comprehensive definition can be 'Food security exists when all people, at all times, have physical, social and economic access to sufficient, safe, and nutritious food which meets their dietary needs and food preferences for active and healthy life (FAO, 2016). Household food security applies this concept to the family level, with individuals within households as the focus of concern. Food security, in its broader term, may have been achieved by India, but the country continues to lag behind most of the other countries on the FAO's Hunger Index, which measures the index of hunger on the indices of under-nourishment, child wasting, child stunting, and child mortality.

The FAO has placed India at 101 rank among 116 countries on the Global Hunger Index, 2021 (FAO, 2021).

The Status

Despite the overall importance of the sector, the fact remains that agriculture and the Indian farmer continue to struggle with the ever-growing problem of long-term sustainability and viability of its economics. The levels of farm efficiency index reflected in farm production levels continue to be a cause of concern. The major reasons, as attributed by many a report, which can be cited for this anomaly are as follows (Dalwai, 2017):

- Fragmented and small size of per capita land holdings
 - Issues related to soil and water management
 - Unavailability of quality and cost-effective farm inputs such as seeds and fertilisers
 - Low level of public and private investments
 - Lower levels of technology infusion
 - Weak Research and Development (R&D) back-up
 - Weak extension and training services
 - Pre-harvest, harvest, and post-harvest gaps
 - Weak value chains and market linkages
 - Food loss and food wastage
- Low levels of farm income generation lead to inequitable wealth distribution in rural areas compared to urban India.

India's Food Growth Trajectory

Nevertheless, the sector has not belied the nation's hopes, and it has made India from a self-deficient nation to a self-sufficient nation in so far as foodgrain production is concerned and has provided food self-sufficiency to the nation despite its ever-increasing population. Where foodgrain production is concerned, various policy measures along with the thrust provided by the 'Green Revolution' and increased availability of irrigation and fertiliser, the country has seen remarkable strides in foodgrain production. Table 8.1 depicts the decadal average foodgrain production since 1951.

It is estimated that in the FY 2021-22, the nation will be producing foodgrains in the vicinity of 300 Million Metric Tonnes (MMT) and an equal quantity of fruits and vegetables. Deaths on account of food starvation have become far and remote, and the availability of free and subsidised foodgrains to resource-less people has been ensured on account of augmented food production and increased efficiency of public distribution systems. Over the years, India has made rapid progress in food production. The annual growth rate of food production, including non-cereal food, increased from

Table 8.1: Average Food Grain Production

<i>Decadal Period</i>	<i>Average Production Per Year in Million Metric Tonnes</i>
1950-51 to 1959-60	65.47
1960-61 to 1969-70	85.00
1970-71 to 1979-80	111.53
1980-81 to 1989-90	146.55
1990-91 to 1999-2000	188.44
2000-01 to 2009-10	210.52
2010-11 to 2019-20	267.24

Source: Directorate of Economics and Statistics, Department of Agriculture, Cooperation and Farmers Welfare, Ministry of Agriculture, Government of India.

2.1 per cent during the 1960s to 3.0 per cent in the subsequent decade and further to 3.8 per cent during the 1980s. Between 1960 and 1980, food production barely kept pace with the population, but in the 1980s, per capita food production increased at a satisfactory rate of 1.6 per cent per annum (Radhakrishna and Reddy, 2004). Table 8.2 depicts the annualised growth rates of foodgrain production and growth in population.

Table 8.2: Annualised Compound Growth Rates of Food Production and Population Growth

<i>Year</i>	<i>Food Production</i>		<i>Population Growth Rate</i>
	<i>Aggregate</i>	<i>Per capita</i>	
1961-63 to 1971-73	2.11	(-) 0.10	2.24
1971-73 to 1981-83	3.00	0.84	2.23
1981-83 to 1991-93	3.77	1.62	2.02
1991-93 to 1997-99	2.72	0.90	1.84

(Per cent per annum)

Sources: FAO, State of Food and Agriculture

Though there has been a steady growth in foodgrain production, the per capita foodgrain availability almost remains static. It was only in 2020 that

Table 8.3: Foodgrain Availability in India

<i>Decadal Period</i>	<i>Net Availability of Foodgrains in Grams per day per Capita</i>
1950-51 to 1959-60	429.8
1960-61 to 1969-70	447.5
1970-71 to 1979-80	442.2
1980-81 to 1989-90	464.2
1990-91 to 1999-2000	475.5
2000-01 to 2009-10	443.5
2010-11 to 2019-20	485.5

Source: Agricultural Statistics at a Glance (2020)

India was able to break the barrier of 500 grams of foodgrain per person per day, with the availability of foodgrain touching 513 grams per person per day. Table 8.3 indicates the foodgrain availability in India.

Food Loss and Food Waste

It is of paramount importance and is a globally recognised fact that reducing food loss and waste is a solution to reduce food and nutrition insecurity and reduce Greenhouse Gas (GHG) emissions without impinging on activities related to core economic development. The EAT-Lancet Commissions' report, indicates that reductions in food loss and food waste can play a pivotal role in evolving sustainable food systems to provide healthy diets for 10 billion people by 2050 (EAT-Lancet Commission, 2019). The role of reducing food loss and waste in improving social, economic, and environmental outcomes is also underlined in Target 12.3 of the Sustainable Development Goals (SDGs), which calls for reducing food loss and halving food waste by 2030. Thus, effective strategies have been developed to minimise food loss and waste globally. It is estimated that half of the world's population now lives in countries that have set an explicit public target aligned with the Sustainable Development Goal (SDG) 12.3 (Flanagan et al., 2019). However, as per NITI Aayog (2019), India has not set such a target despite having national-level surveys on post-harvest losses. Therefore, a policy vacuum remains in the country in so far as reducing food loss is concerned.

Differentiating Food Loss From Food Wastage

In contemporary times, the two terms are often being used interchangeably, and a little differentiation is made between the two. However, there is a vast difference between 'Food Loss' and 'Food Waste' on account of their occurrence and cause (see Box 8.1).

Food Loss is defined as a 'Decrease in quality and quantity of the food as a result of decisions or actions in the food supply chain.' (World Health Organization, 2019). Thus, food loss occurs due to on-farm activities encompassing harvesting, threshing, winnowing, storage, packaging, and transportation. On the contrary, Food Waste is defined as a 'Decrease in quality and quantity of the food as a result of decisions or actions by retailers, food service providers, and consumers.' (Ibid.) PM

According to the UN Environment Program (UNEP) Report, the world, annually, wastes an average of 121 kilogram (kg) of food per person (UNEP, 2021). The share of food wasted in domestic households is 74 kg. India, where about 14 per cent of the population (about 169.4 million people as per the 2011 Census) is malnourished, has also been annually wasting 50 kg of

cooked food per person. Table 8.4 depicts the country-wise position on food wastage in Southern Asia.

Box 8.1: Food Loss from Food Wastage

Food refers to any substance, whether processed, semi-processed or raw, intended for human consumption.

The food supply chain consists of the following segments: agricultural production and harvest, slaughter, or catch; post-harvest, slaughter, and catch operations; storage; transportation; processing; wholesale and retail; and consumption by households and food services.

Food loss is the decrease in the quantity or quality of food resulting from decisions and actions by food suppliers in the segments of the chain excluding retail, food service providers, and consumers. It is also known as post-harvest losses.

Food waste is the decrease in the quantity or quality of food resulting from decisions and actions by retailers, food services, and consumers. Quantitative food loss and waste is the amount or the mass of food destined for human consumption removed from the food supply chain.

Qualitative food loss and waste is the decrease in food attributes that reduces its value in terms of intended use. It can result in reduced nutritional value (e.g., smaller amounts of vitamin C in bruised fruits) and/or the economic value of food because of noncompliance with quality standards.

Source: Adapted from FAO (2019)

Box 8.2: Food Loss vs. Food Waste



Source: Adapted from <http://onethird.io> > food-Loss-Food-Waste-difference, accessed on 31 January 2022

Table 8.4: Household Food Waste in Southern Asia

<i>Country</i>	<i>Household Food Waste Estimate (Kg/Capita/Year)</i>	<i>Household Food Waste Estimate (Tonnes/Year)</i>
Afghanistan	82	31,09,153
Bangladesh	65	1,06,18,233
Bhutan	79	60,000
India	50	6,87,60,163
Islamic Republic of Iran	71	58,84,242
Maldives	71	37,688
Nepal	79	22,49,412
Pakistan	74	1,59,47,645
Sri Lanka	76	16,17,738

Source: UNEP (2021)

The Government of India, to check this alarming trend, has introduced ‘The Compulsory Food Waste Reduction Bill 2018’ in the Parliament which underlined a legislative system “to constitute a Committee for Food Waste Reduction which shall publish a Food Waste Reduction Strategy to reduce food wastage and make it mandatory for supermarkets and food manufacturers to donate food and beverage products and for matters connected in addition to that or incidental to that”. However, any such specific legislation on food loss is still awaited.

Magnitude of Food Loss

A study conducted in 2021 indicates that India is one of the world’s leading food producers. The land, water, and carbon footprint of food loss and waste are very high for the country (Agarwal et al., 2021). The Indian Council of Agricultural Research (ICAR), 2006, devised a formula and methodology to comprehensively establish how much is lost by India of what it produces. Accordingly, ICAR’s Central Institute of Post-Harvest Engineering and Technology (CIPHET) mounted and completed two studies—the first one in 2013-14 devolving around the pre- and post-harvest food loss and the other one in 2015-16, involving a survey of storage and supply chains (Srivastava, 2021 Vishwakarma et al., 2019). The study calculated the economic value of harvest and post-harvest losses of primary agricultural and livestock produce (using production data of 2012-13 and wholesale prices of 2014 and results of the 2016 study). The estimated annual value of the losses was pegged approximately at INR 9,26,510 million, while the total food security expenditure of the nation per annum is INR 15,00,000 million. The study findings were presented in the Parliament, and the Government

Table 8.5: Food Production and Food Loss of Major Crops

<i>Food Produce</i>	<i>Estimated Production (2021-22) in MMT</i>	<i>Share %age of Food Loss of Total Produce</i>	<i>Food Loss in MMT (2021-22)</i>	<i>Approximate Loss Value in (Rs Million)*</i>
Cereals	240	4.65 to 5.99	12	2,40,000
Pulses	30	6.36 to 8.41	02	1,40,000
Oilseeds	30	3.08 to 9.96	02	1,40,000
Fruits and Vegetables	300	4.58 to 15.88	30	2,90,000
Milk	150	0.92	1.5	50,000
Meat	5	2.71	0.14	40,000
Poultry	7	6.74	0.46	50,000

Source: PIB, ICAR/CIPHET

Note: *Valuation on the basis of MSP/Farm gate price available to a farmer.

Table 8.6: Magnitude of Food loss and Export Potential (Rs in Million)

<i>Commodity</i>	<i>Quantum of Export in MMT in 2019-20* (a)</i>	<i>Value of Export* (b)</i>	<i>Per Unit Export Value (b)/(a)</i>	<i>Quantum of Loss in MMT</i>	<i>Realisable Value of Export if Loss is Reduced by 10%</i>	<i>Realisable Value of Export if Loss is Reduced by 25%</i>	<i>Realisable Value of Export if Loss is Reduced by 50%</i>
Cereals	10.23	4,73,250	46,261	12	55,513	1,38,783	2,77,566
Pulses	0.23	15,120	65,739	02	13,148	32,870	65,739
Oilseeds	1.05	93,630	89,171	02	17,834	44,586	89,171
Fruits and Vegetables (Fresh)	2.77	1,01,140	36,513	30	1,09,539	2,73,848	5,47,695
Meat	1.30	2,33,000	1,79,231	0.14	2,509	6,273	12,546
Total							9,92,717

Source: Directorate General of Commercial Intelligence & Statistics, D/o Commerce, Kolkata.

* Provisional figures

of India (GoI) acknowledged that 'Food wastage in India is driven by the lag in many stages of the supply chain in the country.' Cold chain and storage facilities, exports, transportation, processing facilities, and marketing need to be upgraded (GoI, 2016). The United Nations Food and Agriculture Organization (FAO) estimates that more than 40 per cent of food produced is wasted in India, and its costs could be as high as US\$ 14 billion (12.42 billion euros) every year (FAO, 2018). Table 8.5 illustrates the quantum share of food loss of major crops and food production.

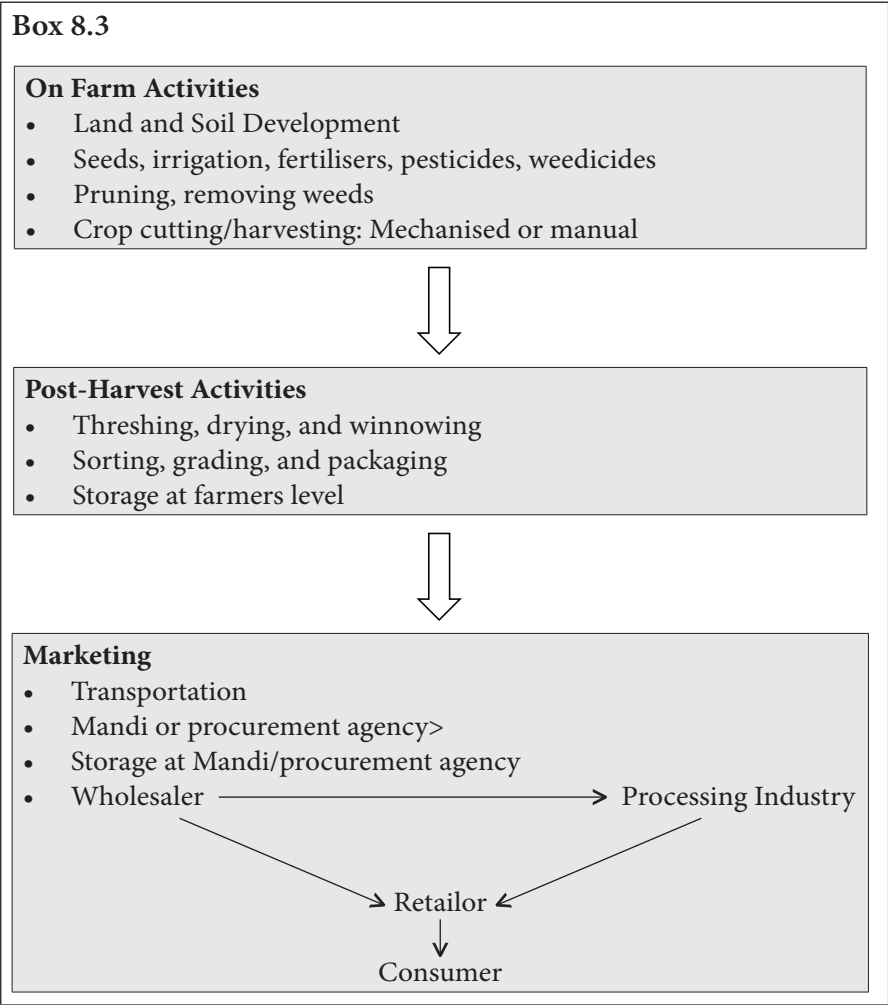
The comparison of the estimated value for food loss with respect to major commodities with that of their export value indicates the absolute

magnitude of loss and the export potential which can be generated on account of reducing the food loss is depicted in Table 8.6 (GoI, 2020).

The Critical Loss Points and Low Loss Points

Food loss can be broadly categorised into two types of losses, namely, the loss in quantity and the loss in quality. Various studies have tried to map the stages where these losses take place. Accordingly, based on the magnitude of the loss at which the loss may be occurring, the Critical Loss Points (CLP) and Low Loss Points (LLP) are identified in the value chain.

Quantitative food loss and waste which is also referred to as physical food loss and waste results in the decrease in the mass of food that could have been used for human consumption, and this loss results in the removal

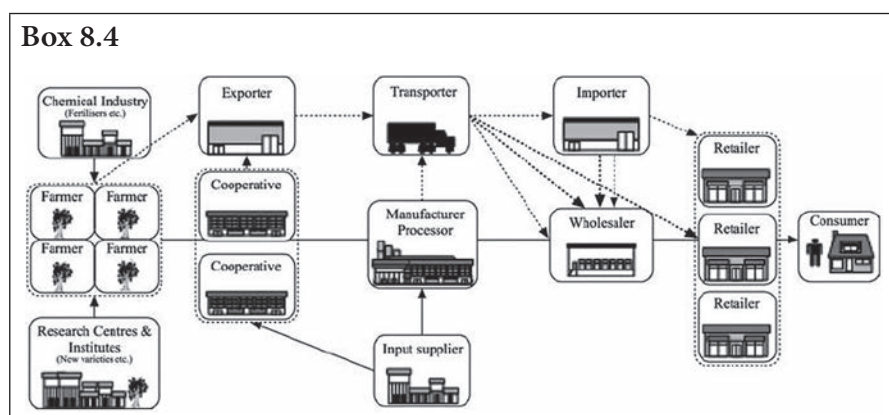


of food from the value chain itself. As such, quantitative food loss refers to the decrease in the mass of food destined for human consumption from decisions and actions by food suppliers in the chain (Agarwal, 2021).

In comparison to quantitative loss, qualitative food loss and waste lead to a reduction in food ingredients, resulting in a decrease in nutritional value and non-compliance with quality standards. A below-par quality food item may result in unsafe food, presenting risks to consumer health. Thus, qualitative food loss refers to the decrease in food attributes that reduces the value of food in terms of its intended use, and it also results from decisions and actions by food suppliers in the chain (Agarwal et al, 2021).

A typical value chain for an agro-commodity will have the following value broad contents (Box 8.3).

Based on this flow chart, a detailed activity-wise and component wise value chain for an agriculture commodity is diagrammatically represented in Box 8.4 (Matopoulos, 2007).



Various studies have identified broad categories of CLPs and LLPs in the value chains of an agro commodity (Agarwal et al., 2021).

Table 8.7: Quantitative and Qualitative Loss in Foodgrain

Stage	Quantity (%)	Quality (%)	Reasons
Harvesting and Threshing, Winnowing	CLP 6	LLP <1	Gaps in technical know-how on the use of machines and lack of timely availability of machines leading to early or delayed harvesting
Drying	LLP < 1		Open and manual drying exposes the grains to feeding birds and admixture of dust or stones contributes to grain breakage during milling.

Transportation	LLP < 1		Losses occur as a result of pilferage during loading or unloading
Storage	LLP < 1	CLP 3 S	Unscientific and inadequate storage infrastructure
Distribution.	LLP < 1		Pilferage at the time of distribution has been observed

Source: Agarwal et al., 2021

It is evident from Table 8.7 that the CLP regarding quantitative loss in a foodgrain is at the level of harvesting, threshing, and winnowing. It happens because of a lack of awareness among farmers, machine operators, and the low level of R&D on this front. Similarly, the CLP regarding the loss in quality of the foodgrain is at the level of storage. The low level of public and private investment creates the state-of-the-art storage infrastructure, especially at the farm gate level, so that the grains produced by small and marginal farmers get access to proper storage before the market procures it.

According to ICAR/CIPHET study, the loss at CLP in respect of some of the major agro commodities is provided in Table 8.8.

Table 8.8: Critical Loss in Agro-Commodities

Commodity	Critical Loss During Farm Operations* (%)	Critical Loss During Storage (%)	Total Loss (%)
Paddy	3.9	1.3	5.2
Wheat	4.7	1.3	6.0
Maize	2.8	1.3	4.1
Cabbage	4.6	2.3	6.9
Cauliflower	4.8	2.0	6.8
Green Pea	8.6	1.7	10.3
Mushroom	11.0	1.5	12.5
Onion	5.2	2.3	7.5
Potato	6.7	2.3	9.0
Tomato	9.9	2.5	12.4
Tapioca	7.5	2.3	9.8
*Harvesting, threshing, winnowing, etc.			

Source: ICAR-CIPHET

Conclusion and Suggestions

It is high time that the GoI puts in place a comprehensive national policy on 'Achieving SDG 12.3 Targets by Minimising Food Loss'. The Policy has to focus not only on minimising food loss but also on leveraging the potential to increase agro-based exports, resulting in augmented farm level income. The suggestions are based on the identified CLPs and the available infrastructure,

vis-à-vis, the required infrastructure. The major components of the Policy should encompass the following:

Addressing Farm Level Operations to Reduce the Food Loss

India needs to strengthen its farm-related extension services. The Indian farmer needs to be made aware of the economic implications of food loss, and topical training may be imparted on this aspect. The task is enormous, keeping in view the number of farmers in India. NABARD All India Rural Financial Inclusion Survey, 2016-17 estimated the country's 'agricultural households' at 100.7 million. The Pradhan Mantri Kisan Samman Nidhi (PM-KISAN) has around 111.5 million enrolled beneficiaries, with an average of 102 million-plus getting payments for 2020-21. The primary extension work in the agriculture sector is carried out by government-owned and managed 724 Krishi Vigyan Kendras (KVKs), which are under the jurisdiction of 11 Agricultural Technology Application Research Institutes (ATARIs), which, in turn, are governed by ICAR.¹ The country has 748 districts with 0.25 million gram panchayats which cover 0.6 million villages having almost 100 million farmers. Thus, the Policy should entail enlisting public-private partnerships to create awareness and provide concurrent training inputs to farmers. Deployment of extension workers on the lines of health workers (Asha workers) will provide a fillip to the extension work. The unavailability of farm labourers, increased minimum labour wages, and aspects related to farm-level efficiency have seen an increasing trend towards farm machinery in harvesting, threshing, and winnowing of farm produce. The combined harvesters were introduced at the advent of the Green Revolution in India and their numbers grew from 800 in 1971-72 to over 40,000 in 2016 (Damodaran, 2016). In most cases, the harvesters performed shallow cutting, resulting in residual grains being wasted. The system's introduction of advanced combined harvesters would enable deep cutting and help minimise losses during harvesting and threshing. More so, most of the combined harvesters are operated by untrained persons. Although National Skill Development Corporation (NSDC) has introduced a qualification pack (code AGR/Q1102), the skill course requires to include good practices in harvesting to minimise food loss. Moreover, it should be made mandatory for the manufacturing units and dealers to provide NSDC approved training to the operator when selling the unit itself. As a result of untimely harvesting at high moisture content, the grains need excessive drying before processing, leading to higher storage losses. Thus, skill up-

¹ 'ICAR KVK Info' and 'KVK Dashboard', Agricultural Extension Division, available at Icar.org.in, accessed on 31 January 2022.

gradation and capacity-development programmes will ensure sensitising machine operators and farmers about harvesting at the appropriate maturity period, specific moisture content required for harvesting, and strict monitoring of mechanical harvesting.

Addressing Storage Level Operations to Reduce Food Loss

The storage capacity for foodgrain has not grown commensurately to the foodgrain production, and it puts the central procurement agency, the Food Corporation of India (FCI), under stress. Though wheat can be stored safely under good storage practices for 4-5 years, the FCI decided to lower the bar for storage to 3 years for wheat and 2 years for rice due to lack of storage capacity. As of 2020, the total covered storage capacity of FCI stood at 38.31 Million Tonnes (MT), and that of state-level agencies was pegged at 23.80 MT. In addition to this, 62.04 MT capacity, FCI and states have an additional 13.20 MT Cover and Plinth (CAP) storage for wheat only as rice can be stored in covered storage. Thus, the Policy has to look to provide workable solutions for creating storage capacities at the farmers' level, procurement agencies' level, and wholesalers' level. The Policy should entail increased coverage byways of schemes like the Private Entrepreneurs Guarantee (PEG) and Pradhan Mantri Kisan Sampada Yojana (PMKSY). In addition, the Policy intervention is required to provide hermetic storage (Superbugs: 50 kg), steel silos, and commercial cocoons with a capacity of 5 to 1,000 tonnes at farmer and warehouse levels. It is a viable solution as either can provide air-tight conditions for stored grains. A policy decision to inbuilt a one-time component on the Kisan Credit Cards (KCCs) for providing bank credit to build storage infrastructure by each farmer will go a long way in reducing food loss at farm gates. Further, creating scientific storage systems at the Primary Agricultural Credit Society (PACS) level can also mitigate the difficulty at ground level. The newly formed (2021) GoI Ministry for cooperatives can devise and formulate a national-level plan. Further, the Policy intervention is required to:

- Shifting to an end-to-end cold chain and not just storage
- Modernisation of existing stores
- Better and more sophisticated machinery and equipment
- Setting up of multipurpose cold storage rather than conventional single commodity storage
- Modern pack houses
- Ripening facilities
- Farm-gate or source point cold storage
- Energy-efficient technology and new storage technology

- Integrated cargo complexes at major airports and sea ports to handle all kinds of goods, including perishables.

Promoting Farmer Producer Organisations (FPOs)

It is suggested that economically viable, democratic, and self-governing Farmer Producer Organisations (FPOs) be created and promoted. The FPOs would provide end-to-end links between farmers and their markets and will allow them to improve their productivity through efficient, cost-effective, and sustainable use of resources. Farmers will also be able to obtain higher returns for their produce through improved access to markets. This can be achieved through fruitful collaboration with academia, research agencies, government, civil society, and the private sector. These FPO can function on a five-point agenda:

- **Capacity-building:** To strengthen farmers' abilities through the communication of agricultural best practices to enhance productivity.
- **Quality inputs:** To ensure access to and use of quality inputs, credit, and other services at affordable prices for enhanced production.
- **Storage:** To invest in and operate community storage and drying facilities.
- **Value addition:** To facilitate links to processors for value-addition of the produce.
- **Market linkage:** To facilitate access to fair and remunerative markets including linking farmers to marketing opportunities through market aggregators.

Though GoI has launched the Centrally Sponsored Scheme (CSS) to promote 10,000 FPOs in the country over the next 3 to 5 years, a separate department should be created in the Ministry of Agriculture for formulating, implementing, and monitoring FPO related policy interventions in the country.

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Financing India's Agricultural Exports: Current Scenario and Way Ahead

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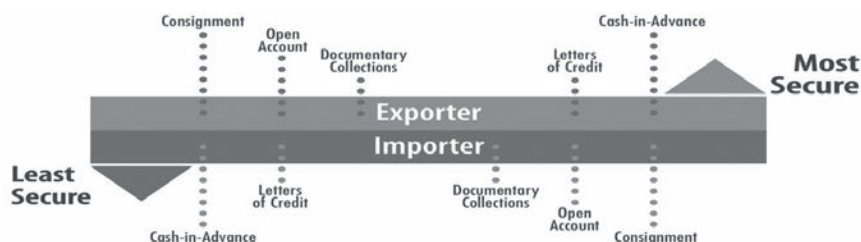
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Introduction

International trade entails considerable risk, necessitating an enabling environment for producers and firms to manage the risks to engage in trade. One of the chief concerns in international trade is the uncertainty over the timing of payments made by the importer to the exporter. There are five key methods of payment for international transactions. These are cash-in-advance, consignment, Letter of Credit (LC), Documentary Collections (D/C), and open account—each with a different associated risks for the buyer and the seller (Box 9.1).

Box 9.1: *Payment Terms in International Transactions*

There are five major methods of payment for international transactions. Depending on the bargaining power, nature of the commodity, transaction size, among other factors, the exporters and importers decide on a mutually desirable payment term.



Source: United States, International Trade Administration, Trade Finance Guide: A Quick Reference for U.S. Exporters, U.S. Department of Commerce, International Trade Administration, 2008.

1. **Cash in Advance:** Under this, payment is received by the exporters before the transfer in ownership of the goods. This is the most secure payment option for exporters, where they can avoid any credit risk. However, this is the least attractive option for the importer, as it creates unfavourable cash flow, along with concerns that the goods may not be sent if payment is made in advance.
2. **Letters of Credit (LC):** An LC is one of the most secure instruments. It is a contractual agreement whereby the issuing bank (importer's bank), acting on behalf of the importer, promises to make payment to the beneficiary or exporter against the receipt of stipulated documents. The issuing bank typically uses intermediary banks to facilitate the transaction and make payment to the exporter.
3. **Documentary Collections:** In a D/C, the exporter entrusts the collection of the payment to its bank (remitting bank), which sends the documents that its buyer needs to the importer's bank (collecting bank), with instructions to release the documents to the buyer for payment. Funds are received from the importer and remitted to the exporter through the banks involved in the collection in exchange for the documents.
4. **Open Account:** An open account transaction is a sale where the goods are shipped and delivered before the payment is due, which in international sales is typically in 30, 60, or 90 days. This is advantageous to the importer in terms of cash flow and cost, but it is consequently one of the highest risk options for an exporter.
5. **Consignment:** Consignment in international trade is a variation of an open account in which payment is sent to the exporter only after the goods have been sold by the foreign distributor to the end customer.

According to Niepmann and Schmidt-Eisenlohr (2015), of the major payment terms, cash-in-advance or open accounts are preferred for very small transactions, as is the case for agricultural exports. Buyers often prefer open account payments over cash-in-advance due to lesser risk for buyers in case of open account transactions. As a result, the ability of the exporters to offer their goods on open account terms greatly enhances their export competitiveness. However, these payment terms also increase the requirement for working capital finance for the exporters. Exporters need access to finance for completing production for exports, as also for business continuity while awaiting payment from the buyers. An efficient system for extending financing to enterprises at the pre-shipment and post-shipment stages of exports is, therefore, important for improving the competitiveness of exports.

Export Finance for Agricultural Exports in India

Traditionally, the Indian economy has been a bank-dominated system and banks are the primary source of export finance. Financing is available to exporters before the shipment of goods (pre-shipment), as also after the shipment (post-shipment). Pre-shipment financing is needed to support pre-export activities prior to the shipment of goods and is used for meeting wages and other overhead costs during this period. Post-shipment financing provides adequate liquidity to the exporter till the time purchaser receives the product and initiates payment. Commercial banks also provide other financing products such as working capital loans, LCs, bills of exchange, etc., which helps the firms in fulfilling their export orders.

Given the significance of banks in financing agricultural exports, it is a matter of concern that the outstanding export credit to the agriculture and allied sector has witnessed a decline in recent times. As of end-March 2021, outstanding export credit extended by Scheduled Commercial Banks (SCBs) to the agriculture and allied sector stood at (INR) ₹27,331 crore, registering a Year-on-Year (y-o-y) increase of 3.4 per cent. Prior to this increase, there was a nearly consistent decline in outstanding export credit to the agriculture and allied sector over the past few years, registering a negative Compound Annual Growth Rate (CAGR) of (–) 1.7 per cent from end-March 2016 to end-March 2021. However, it may be noted that the decline in outstanding export credit to the agriculture and allied sectors have been relatively less than the decline in outstanding overall export credit extended by the banks. Overall outstanding export credit by the SCBs witnessed a much steeper CAGR of (–) 3.3 per cent from end-March 2016 to end-March 2021. The agriculture and allied sectors have, therefore, been less affected by the dip in outstanding export credit extended by the SCBs.

One of the major reasons for a steady flow of export credit to the agriculture sector has been the policy-level push on the sector. The significance of policy-level changes on export credit flows is evinced by the strong growth in export credit to the agriculture sector during periods of policy intervention or announcement. A case in point is the record y-o-y growth in outstanding export credit to the agricultural sector during 2010–11. The Reserve Bank of India (RBI), vide its circular dated 15 June 2010 had clarified that all export credit granted to agriculture and allied activities would be eligible to be classified as priority sector loans, and advised the banks to report such loans under a separate heading. Following the circular, there was a significant increase in the level of export credit to the agriculture and allied sectors, and the outstanding export credit to the sector recorded a y-o-y growth of 73.0 per cent as of end-March 2011 (Figure 9.1). The

Government of India (GoI) and the regulator have played an important role in creating a robust environment for financing agricultural exports from the country. In particular, priority sector lending to the agriculture sector has ensured the healthy flow of credit to the sector.

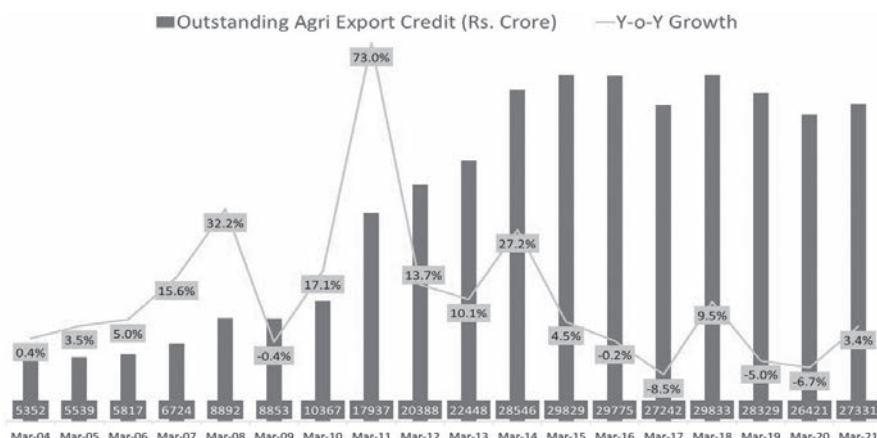


Figure 9.1: Trends in Outstanding Export Credit to Agriculture and Allied Sector by SCBs

Note: Data pertains to the end-March figure of the respective financial year.

Source: Compiled from Basic Statistical Returns of SCBs, RBI,
India Exim Bank Research

In spite of the significant flow of export credit to the agricultural sector, not more than 40-57 per cent of agricultural exports each year are supported by the export credit from the SCBs (Figure 9.2). This is broadly in line with the level of overall merchandise exports (including agriculture) supported by the export credit extended by the SCBs. In the recent period, however, the export credit extended to the agriculture and allied sector is estimated to have marginally greater coverage of the agricultural exports from the country, as compared to the coverage in the case of overall merchandise exports from the country. The maximum estimated share of agricultural exports supported by export credit from the SCBs was higher than the maximum estimated share of overall merchandise exports (including agriculture) supported by these institutions from 2017-18 to 2019-20. In 2019-20, SCBs are estimated to have supported at most 42.5 per cent of agricultural exports from India, as compared to 35.7 per cent of the overall merchandise exports (including agriculture) from the country (Figure 9.2). In 2020-21, however, the trend was reversed with maximum estimated share of overall merchandise exports (including agriculture) supported by SCBs being 38.2 percent, and the maximum estimated share of agricultural exports supported by these institutions dipping to 35.8 percent.

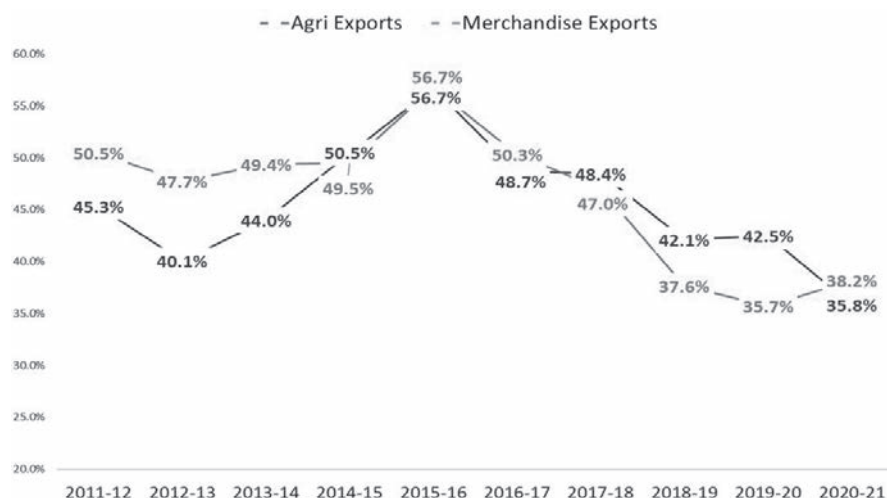


Figure 9.2: Maximum Estimated Share of Exports supported by Export Credit Extended by SCBs (Agriculture, vis-à-vis, Overall)

Notes: *Export credit estimates are based on data sourced from RBI and the business cycle under short-term exports is around 90 days. Accordingly, the outstanding export credit is multiplied by a factor of four.

**Overall merchandise exports include agriculture. It also includes project exports (~ 1.4-3.0 per cent of merchandise exports), which require medium- to long-term export credit.

Source: Compiled from Basic Statistical Returns of SCBs, RBI, India Exim Bank Research

While processed food accounts for nearly 16 per cent of India's agricultural exports, it has a much higher share in the export credit extended by the banking sector to the agricultural sector (High Level Expert Group on Agriculture, 2020). As of end-March 2021, nearly 81 per cent of the outstanding export credit extended by SCBs to the agriculture and allied sector was directed towards the food manufacturing and processing segment, while agriculture (primary or with low processing) accounted for 18 per cent, and beverages and tobacco the remaining 1 per cent. Within food manufacturing and processing, rice and dal mills as well as flour received the largest share of export credit from SCBs, accounting for nearly 22 per cent of the outstanding export credit as of end-March 2021 (Figure 9.3).

The low share of unprocessed segments in the outstanding export credit by the SCBs could partly be due to errors in the classification of such export credit. Moreover, with the inclusion of loans to food and agro-processing units under the priority-sector lending, the focus on financing these activities has increased as these units are also considered relatively more creditworthy.

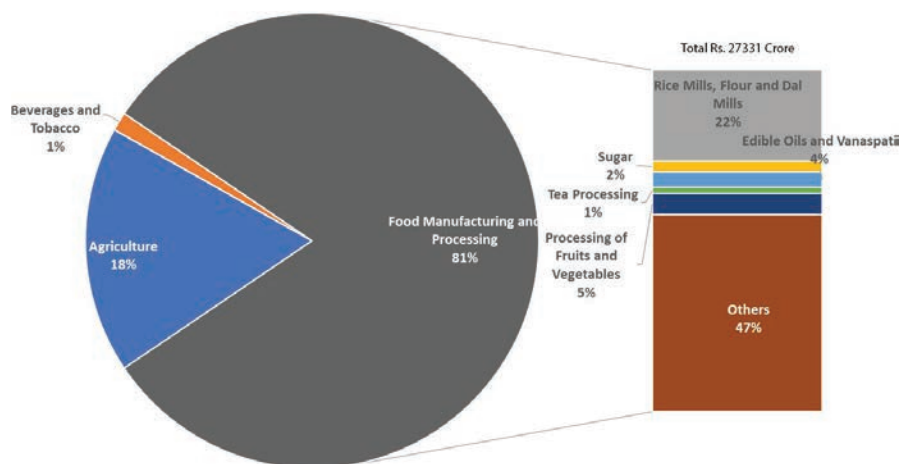


Figure 9.3: Category-wise Outstanding Export Credit extended by SCBs to the Agriculture Sector (As of end-March 2021)

Source: Compiled from Basic Statistical Returns of SCBs, RBI, India Exim Bank Research

According to a National Sample Survey Office (NSSO) survey, more than 46 per cent of farm households in India sell approximately 58 per cent of what they produce, but the bulk of it to the wholesalers and retailers (80 per cent) (Government of India, 2014). The farm households, on their own, have limited linkages with the international markets. Further, farm households also have limited access to institutional finance for exports, due to a variety of reasons including weak linkages with international buyers, lack of collateral, and high-risk perception by banks, among others.

Impact of Export Financing on Agricultural Exports

An attempt has been made in this section to analyse the impact of export finance on agricultural exports. This analysis is important to understand the significance of financing in placing the agricultural exports on a high growth trajectory and achievement of the ambitious target of US\$ 100 billion of agricultural exports set by the GoI.

In this section, the impact of export financing, agricultural production, and global import demand on agricultural exports from India is investigated through an Autoregressive Distributed Lag (ARDL) model. The ARDL model has advantages over other co-integration tests in non-stationary variables, such as the one developed by Engle and Granger (1987), Phillips and Hansen (1990) and Johansen (1991), as also over the traditional vector autoregressive (VAR) models. According to Pesaran (1999), the ARDL model applied to co-integration is more efficient in capturing long-term relationship data in

small samples, and they perform well irrespective of whether the variables are stationary, i.e. $I(0)$, non-stationary $I(1)$, or even mutually co-integrated. Since our sample size is relatively small, and we expect some of the variables in our analysis to be non-stationary, the ARDL model is preferred.

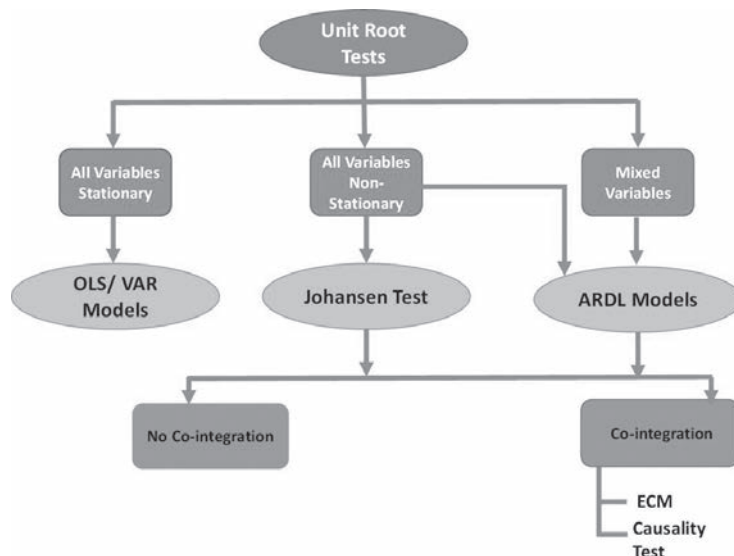


Figure 9.4: Model Selection Criteria in Time Series Models

Source: Adaptation based on literature survey.

Data Sources

The data set consists of yearly observations on the volume of agricultural exports from India, export finance to the Indian agriculture sector, the volume of agricultural production in India, and volume of global import demand. Data on volume of agricultural exports from India, volume of agricultural production in India, and volume of global import demand have been sourced from the Food and Agriculture Organization. Data on export finance is sourced from the RBI. The time taken into consideration is from 1990 to 2019.

Equations for the Autoregressive Distributed Lag Model

The ARDL model of the following form has been taken for analysing the impact of export finance on exports from the agricultural sector:

$$\Delta \log X = \sum_{i=1}^q a_1 \Delta \log X + \sum_{i=1}^m a_2 \Delta \log C + \sum_{i=1}^n a_3 \Delta \log \text{Prod} + \sum_{i=1}^p a_4 \Delta \log I + a_5 \log X + a_6 \log C + a_7 \log \text{Prod} + a_8 \log I + \epsilon \dots \text{Equation 9.1}$$

Where X represents the volume of India's agricultural exports; C is the export finance to the agricultural sector; Prod is the volume of agricultural

production in India; I is the volume of global import demand of agricultural products; i is the number of lag terms and q , m , n , and p are the lag lengths; Δ denotes a first difference operation; a_1 , a_2 , a_3 and a_4 show the short-run dynamic structure; a_5 , a_6 , a_7 and a_8 are the long-run coefficients; and ε denotes the white noise error term.

The first step in the ARDL bounds testing approach is the estimation of the aforementioned equation to test for the existence of a long-run relationship among the variables by conducting an F-test for the joint significance of coefficients of lagged level variables. Two sets of critical bounds for F-statistics are generated by Pesaran et al. (2001). If the computed F-statistic is above the higher bound level, the null hypothesis of no co-integration cannot be rejected, implying the presence of a long-run co-integration relationship among the variables taken into consideration.

Once co-integration is established, the long-run model function can be written as follows:

$$\log X_t = \beta_0 + \sum_{i=1}^q \beta_{1i} \log X_{t-i} + \sum_{i=1}^m \beta_{2i} \log C_{t-i} + \sum_{i=1}^n \beta_{3i} \log \text{Prod}_{t-i} + \sum_{i=1}^p \beta_{4i} \log I_{t-i} + \varepsilon_t$$

...Equation 9.2

The orders of the ARDL model would be selected using the Akaike Information Criteria (AIC). Finally, the short-run dynamic parameters would be selected by estimating an error correction model associated with the long-run estimates. This is specified as follows:

$$\Delta \log X_t = \delta_0 + \sum_{i=1}^q \delta_{1i} \Delta \log X_{t-i} + \sum_{i=1}^m \delta_{2i} \Delta \log C_{t-i} + \sum_{i=1}^n \delta_{3i} \Delta \log \text{Prod}_{t-i} + \sum_{i=1}^p \delta_{4i} \Delta \log I_{t-i} + \phi \text{ECM}_{t-1} + \varepsilon_t$$

...Equation 9.3

where δ_1 , δ_2 , δ_3 , and δ_4 are the short-run dynamic coefficients of the Model's convergence to equilibrium and ϕ is the error correction coefficient and measures the speed of adjustment parameter. ECM is the error correction term that is derived from the estimated equilibrium relationship of Equation 9.1. A negative and significant coefficient of ECM will be an indication of cointegration.

Unit Root Test

Both the Augmented Dickey Fuller (ADF) and Phillips Perron (PP) tests are used to check the presence of unit roots and determine the order of integration of the variables. The unit root test results indicate that the variables under consideration are $I(1)$ (Table 9.1). The ARDL process can be used for estimation as the variables meet the requirement of the Model.

Table 9.1: Results of Unit Root Test

	Augmented Dickey Fuller (ADF)		Phillips Perron (PP)	
At Levels				
	<i>Intercept</i>	<i>Intercept and Trend</i>	<i>Intercept</i>	<i>Intercept and Trend</i>
LogX	−1.802578 (0)	−3.203551 (1)	−2.099917 [25]	−2.075986 [9]
LogC	−2.609343 (0)	−3.605309* (5)	−2.333988 [3]	−1.918127 [3]
LogProd	0.052720 (0)	−2.481295 (0)	0.723132 [13]	−2.481295 [0]
LogI	0.077119 (0)	−2.421459 (0)	0.370648 [11]	−2.192865 [5]
At First Difference				
	<i>Intercept</i>	<i>Intercept and Trend</i>	<i>Intercept</i>	<i>Intercept and Trend</i>
LogX	−3.416026** (7)	−3.660384** (7)	−6.584194*** [27]	−8.358434*** [27]
LogC	−3.928850*** (0)	−4.263749** (0)	−3.881772*** [3]	−4.249860** [3]
LogProd	−7.163188*** (0)	−7.083114*** (0)	−7.361223*** [4]	−7.552295*** [5]
LogI	−6.162346*** (1)	−6.867107*** (1)	−5.888228*** [1]	−6.059300*** [1]

Notes: ***, ** and * denote significant at 1 per cent, 5 per cent and 10 per cent significance levels, respectively. The figure in parenthesis (...) represents the optimum lag length selected based on Akaike Info Criterion. The figure in bracket [...] represents the Bandwidth used in the KPSS test selected based on the Newey-West Bandwidth criterion.

Source: RBI, FAOstat, Computed using Eviews 9.5, India Exim Bank Research

Autoregressive Distributed Lag Bounds Test: Establishment of Co-integration Relationship

For implementing the bound test for co-integration, a conditional ARDL error correction model as specified in Equation 9.1 is estimated in the statistical package, Eviews with log of agricultural exports from India as the dependent variable, and log of export finance for the agricultural sector in India, log of the volume of agricultural production in India, and log of the volume of global import demand for agricultural products as the dynamic regressors. The appropriate lag has been automatically selected based on AIC, with the maximum lag set at 4. As seen in Figure 9.5, the AIC was lowest for ARDL (4, 0, 3, 2).

Table 9.2 presents the results of the ARDL Bounds F-test for co-integration based on Equation 9.1. As per the results, the computed F-statistics

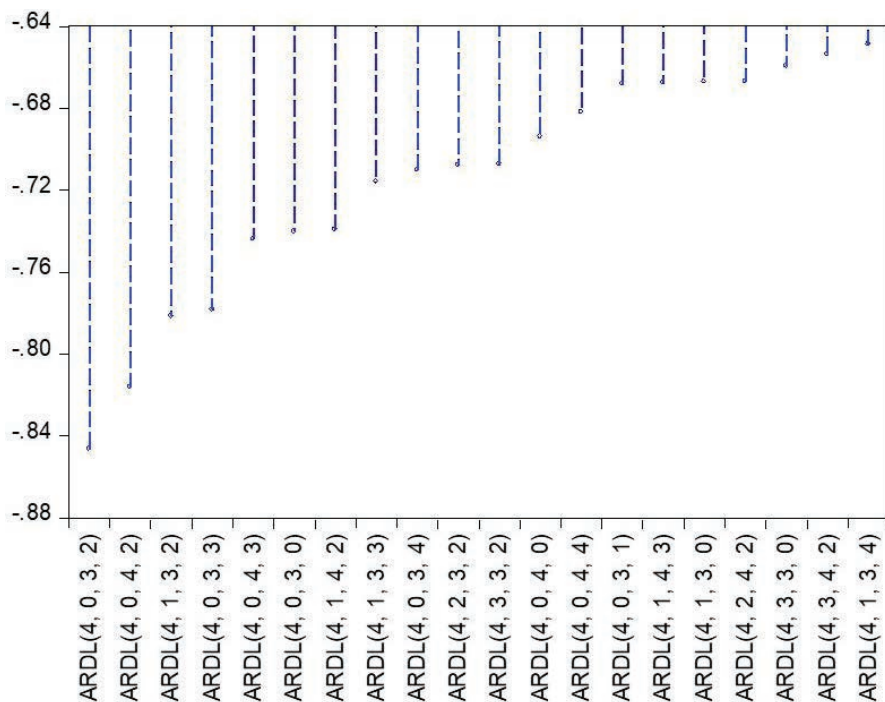


Figure 9.5: ARDL Lag Length Selection

Source: Computed using Eviews 9.5, India Exim Bank Research

of 4.586351 is greater than the upper bound critical value at a 5 per cent level of significance. Therefore, the null hypothesis of no co-integration is rejected, indicative of a stable long-run co-integration relationship among the variables taken into consideration.

Table 9.2: Results of Bounds Test Approach to Co-Integration

Null Hypothesis: No long-run relationships exist		
Test Statistic	Value	k
F-statistic	4.586351	3
Critical Value Bounds		
Significance (%)	I0 Bound	I1 Bound
10	2.01	3.1
5	2.45	3.63
2.5	2.87	4.16
1	3.42	4.84

Source: Computed using Eviews 9.5, India Exim Bank Research

Analysis indicates that the variables are co-integrated among themselves and the series cannot move too far away from each other or cannot move independently of each other. Moreover, the co-integration of variables also

implies that there is some adjustment in the short run which prevents the errors in the long-run relationship from becoming larger.

Estimation of Long-Run and Short-Run Coefficients

Upon establishment of the existence of a co-integration relationship among variables, Equation 9.2 is estimated for long-run coefficients of the selected ARDL (4, 0, 3, 2) based on AIC. The results of estimation presented in Table 9.3, indicate that the impact of all the three variables—export finance, the volume of agricultural production, and the volume of global import demand of agricultural products, on agricultural exports from India is significant at a 5 per cent level of significance (Table 9.3).

The results indicate that a 1 per cent increase in the financing for agricultural exports leads to a 0.5 per cent increase in the agricultural exports from India. Import demand elasticity of India's agricultural exports is also estimated and is significant at a 5 per cent level of significance. A 1 per cent increase in global demand, leads to a nearly 1.7 per cent increase in agricultural exports. As far as agricultural production is concerned, although the relationship with agricultural exports from India is significant at a 5 per cent level of significance, the coefficient is negative. This finding could intuitively indicate that any fluctuations in agricultural production in India are in response to domestic consumption rather than exports. An increase in agricultural production in India is in response to favourable domestic demand conditions, and better domestic demand conditions could, in fact, lead to a diversion of production away from exports towards the domestic market. Greater investigation on this aspect could be a possible area of future research.

Table 9.3: Long-Run Coefficients

<i>Variable</i>	<i>Coefficient</i>	<i>Std. Error</i>	<i>t-Statistic</i>	<i>Prob.</i>
LOGC	0.479578	0.081581	5.878575	0.0000
LOGPROD	−2.032835	0.234485	−8.669362	0.0000
LOGI	1.683746	0.380610	4.423805	0.0006

Source: Computed using Eviews 9.5, India Exim Bank Research

The results of short-run dynamic coefficients associated with the long-run relationships obtained from Equation 9.3 are presented in Table 9.4. The negative and highly significant error correction term further confirms the presence of a stable long-run relationship. The Model indicates a moderately quick adjustment back towards equilibrium following a disturbance. Following a shock, nearly 63.5 per cent of the adjustment back to the long-run equilibrium is completed after a year. In the short run, growth in agricultural production, growth in global import demand, and growth

in export financing for the agricultural sector have a positive impact on agricultural exports.

Table 9.4: Error Correction Representation for the Selected ARDL (4, 0, 3, 2)

<i>Cointegrating Form</i>				
<i>Variable</i>	<i>Coefficient</i>	<i>Std. Error</i>	<i>t-Statistic</i>	<i>Prob.</i>
D(LOGX(-1))	0.800180	0.155567	5.143639	0.0001
D(LOGX(-2))	0.609817	0.159866	3.814540	0.0019
D(LOGX(-3))	0.391057	0.156191	2.503708	0.0253
D(LOGC)	0.872113	0.207946	4.193933	0.0009
D(LOGPROD)	0.018619	0.809354	0.023005	0.9820
D(LOGPROD(-1))	3.904919	1.011261	3.861434	0.0017
D(LOGPROD(-2))	2.826949	0.852596	3.315696	0.0051
D(LOGI)	3.332843	1.249752	2.666804	0.0184
D(LOGI(-1))	2.443260	0.993647	2.458883	0.0276
CointEq(-1)	-0.635067	0.244993	-6.673919	0.0000
Cointeq = $\log X - (0.4796 * \log C - 2.0328 * \log \text{Prod} + 1.6837 * \log I)$				

Source: Computed using Eviews 9.5, India Exim Bank Research

To further determine the direction of causality, pair-wise Granger causality tests are conducted for the variables taken into consideration. Results indicate that export credit to the agricultural sector has a significant impact on agricultural exports, as the one-way causality is significant at the 5 per cent level of significance (Table 9.5). There is also a one-way causality between the global import demand for agricultural products and agricultural exports from India (Table 9.5), with an increase in global import demand leading to an increase in agricultural exports.

Table 9.5: Pair-wise Granger Causality Tests

<i>Pairwise Granger Causality Tests</i>			
<i>Null Hypothesis:</i>	<i>Obs</i>	<i>F-Statistic</i>	<i>Prob.</i>
Log C does not Granger Cause Log X	27	3.65511	0.0300
Log X does not Granger Cause Log C		0.20224	0.8936
Log Prod does not Granger Cause Log X	27	0.96649	0.4279
Log X does not Granger Cause Log Prod		1.36661	0.2816
Log I does not Granger Cause Log X	27	3.88381	0.0245
Log X does not Granger Cause Log I		1.19372	0.3375

Source: Computed using Eviews 9.5, India Exim Bank Research

Performance on Diagnostic Tests

The Model passes all diagnostic tests for usual econometric problems. The Breush-Godfrey Serial Correlation LM test was used to verify that the

residuals from the Model are serially uncorrelated. The residuals were also found to be homoscedastic. The Ramsey RESET test also indicates that the Model is correctly specified.

The stability of long-run coefficients together with the short-run dynamics is also examined by applying the Cumulative Sum of Recursive Residuals (CUSUM) and Cumulative Sum of Squares of Recursive Residuals (CUSUMSQ) plots. As evident from Figure 9.6, the plots of CUSUM and CUSUMSQ are within the critical bounds of the 5 per cent significance level, and therefore the null hypothesis of all coefficients in the given regression being stable cannot be rejected. The short-run and long-run coefficients of the estimated model are stable.

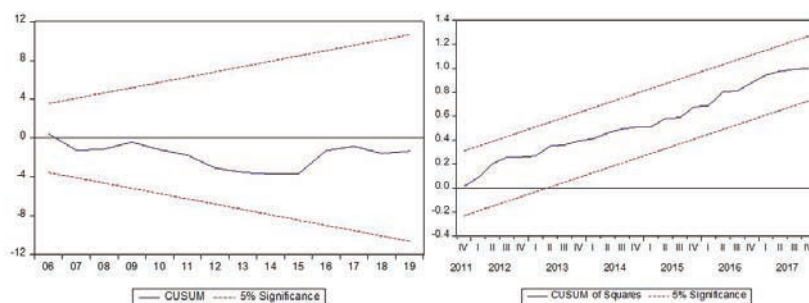


Figure 9.6: Plot of Cumulative Sum of Recursive Residuals and Cumulative Sum of Squares of Recursive Residuals

Source: Computed using Eviews 9.5, India Exim Bank Research

Strategies for Strengthening Financing for Agricultural Exports

Analysis in the previous section highlights the significance of export financing for agricultural exports from the country. The results emphasize the need to enhance the availability of financing to boost agricultural exports from the country. Agriculture in India is often considered a high-risk and low-profit activity for bank lending, and in spite of the priority sector lending norms, the sector continues to remain locked into a cycle of low investment and low returns. Exports present an opportunity for agricultural producers to gain greater value for their produce, and exit the cycle of subdued investments. For achieving a greater export-orientation, there is a need for a more integrated approach to financing agricultural exports. Strengthening the financing framework for agricultural exports would be a sine qua non for boosting agricultural exports from the country.

Farmer Collectives/Cooperatives for Value Chain Financing

Indian agriculture is characterised by small landholding, with 63 per cent of landholdings being less than 1 hectares (NSSO, 2014). On their own, these

small farmers would be unable to get export orders, avail financing to fulfil the export orders, and meet the transaction costs involved with exports. It is in this context that cooperatives or farmer organisations gain significance. Collective action by cooperatives or farmer organisations upstream of the value chain is essential to overcome scale limitations for accessing export markets and availing export finance. Setting up of these collectives usually requires intermediation or facilitation from Non-governmental Organisations (NGOs), governments, or lead firms.

Recognising the importance of such collectives in the Indian context, the GoI is actively promoting Farmers Producer Organisation (FPO). FPOs provide end-to-end support and services to small farmers, including supply of seed, machinery, market linkages and fertiliser, training, networking, and financial and technical advice. According to estimates by NABARD, there are nearly 10,000 FPOs in the country. These FPOs benefit from several schemes of the GoI, such as the Equity Grant Fund Scheme under which equity grant support is provided to eligible Farmer Producer Companies (FPCs) on a matching basis, the Credit Guarantee Fund Scheme under which credit guarantee cover is provided to eligible lending institutions to enable them to provide collateral-free credit to FPCs, and the scheme for 'Formation and Promotion of FPOs' to set up 10,000 new FPOs, among others. NABARD has also launched several initiatives to promote FPOs.

In spite of the initiatives to bolster FPOs, their success remains limited on account of several challenges, such as a small number of shareholders, low procurement volumes, sub-scale operations, limited value addition capabilities, poor marketing linkages, inability to attract talent, and lack of strategic thinking and planning, among others (NABARD, 2019). These are factors that also impact the foray of FPOs into the international market. Even if the FPOs can secure export orders, affordable financing is difficult to obtain. According to a recent report, only a few banks have ventured into lending to FPOs (Murray et. al., 2019). Unlike co-operatives which benefit from joint ownership of the institution along with the Government, FPOs only depend on members/shareholders for access to equity, which impacts their creditworthiness. Access to debt is also constrained as banks consider the business models of FPOs unviable and not bankable. According to estimates in several studies, close to 90 per cent of the lending to FPOs is by Non-Banking Financial Companies (NBFCs). Banks have not ventured into lending to FPOs due to a lack of clear policy directives from RBI, small and scattered markets, and information asymmetry on FPOs' operations and business potential (Murray, 2019). Institutional lending from banks could substantially enhance access and reduce the cost of borrowing by FPOs.

There is a need for a concerted effort from APEDA and the missions abroad to create market linkages for FPOs by financial institutions, banks, and the RBI to help meet the financing requirements for fulfilling the export orders. The financing requirements in the case of FPOs may not only be limited to a typical pre-shipment/post-shipment credit type facility, but structured financing, often referred to as 'value chain financing', which caters to various levels of the value chain including crop loans, term loans, warehousing finance, financing for processing, and export financing.

Value chain financing can be defined as 'a flow of funds to different links of the value chain, or among these links, in order to improve efficiency and competitiveness, to reduce risk within the chain, and also to promote and develop the chain' (Shwedel, 2010). The value chain approach allows greater access to finance without much emphasis on collateral, and also reduces the costs and risks associated with the lending. Value chain instruments can be tailored to help increase the competitiveness of smallholders and allow them to compete in the international markets.

One important instrument used in value chain financing is warehouse financing. There are, however, issues with the successful implementation of warehouse financing in India. FPOs in India face challenges in availing of warehouse financing as bank guidelines typically state that the warehouse used by the FPO must be near the bank branch, which limits the options available to FPOs operating in relatively remote locations (Shwedel, 2010). There is a need for an assessment of the challenges to the development of value chain financing in the country and the adoption of a cohesive, all-encompassing approach to address the issues.

The role of the Government in strengthening the value chain framework would be crucial. In this context, not only is it important to formulate new tools, guidelines, and policies for strengthening the financial framework for value chain financing, but also to regularly review the performance of various initiatives undertaken by the GoI and take corrective actions to improve the efficacy of these measures. For example, the GoI has been extending Kisan Credit Card (KCC) to livestock and dairy farmers from 2018 onwards. However, the KCC for dairy farmers has not been able to gain much traction as banks are hesitant to provide the KCC loans in the absence of collateral. Undertaking by the milk cooperatives that the farmers supply milk to them is insufficient collateral for the banks. Lack of collateral is therefore hindering access to finance for dairy farmers in spite of their inclusion in the KCC scheme. In some developing countries such as China, some provincial governments facilitate the financing of smallholder farmers associated with value chains through a tripartite agreement among lead firms, commercial banks, and farmers using 'contracts as collateral' (Chen, 2015). As the banks

are not comfortable extending KCC loans to dairy farmers on the back of undertaking by the milk cooperatives that the farmers supply milk to them, the state governments could consider providing the necessary guarantee as in the case of the Chinese model.

Factoring for Agricultural Exports

Agriculture is considered a high-risk area, that can be effectively served by factoring solutions. Factoring is based on a company/individual selling its account receivables to a factoring company at a discount. It differs from the value chain approach explained earlier as the financing is only available once the goods have been delivered but payment for exports is not yet received. The company/individual selling the account receivables can utilise the cash received for its working capital needs.

The Factoring Regulation (Amendment) Act 2021 would help enhance the scope, reach, and affordability of factoring services for agricultural exports. Currently, several NBFCs are engaged in factoring services on the back of the strength of their balance sheets. However, the cost for such factoring services is prohibitive. With the change in regulations, instead of lending against the risk of sellers, NBFCs/banks would now be able to lend against the risk of the buyer/or the banks issuing LCs, which are typically larger and more creditworthy. This change, along with the reduction in entry barriers in factoring, is likely to lower the cost of factoring services.

The Government provides interest subsidies for pre and post-shipment Rupee export credit which helps exporters avail financing at competitive rates. The subsidy may also be crucial for export factoring to decrease the cost of such financing. This would be essential till the time the factoring market is sufficiently mature and able to service the requirement of exporters at a lower cost.

Exchange Facilitated Financing in India

Commodity exchanges are important trade facilitating institutions, which allow price discovery, price-risk management, facilitate commodity trade, facilitate financing to the agricultural sector, and also play a role in market development. In India, commodity exchange has exhibited proven results in the case of exports of cardamom and Mentha oil. Exporters have reported easier availability of premium quality cardamom at the exchange, and better discovery of prices for negotiating export contracts. The commodity exchanges have also led to ancillary benefits, such as the development of testing infrastructure, which are critical for exports. Mentha arvensis, the exchange-approved variety of Mentha oil required testing in a Gas-Liquid

Chromatography (GLC) machine, which was a more advanced method of Mentha oil testing, as compared to the previously prevalent capillary column method. Since the launch of the Mentha oil futures contract, the number of GLC machines used for testing increased substantially, as farmers were keen on getting more volumes of oil tested due to higher prices for oil that met the GLC standards (UNCTAD, 2009). There is scope for further strengthening of the commodity exchanges. One particular way, which is being considered by the Securities and Exchange Board of India, is to let foreign portfolio investors trade commodity futures listed on local exchanges. This would help Indian commodity exchanges become a true world reference exchange in the way that Bursa Malaysia has become for the palm oil industry.

In the context of financing as well, the commodity exchange can play a crucial role in India. International evidence indicates that services of commodity exchanges can help reduce risks of financiers, and thereby lead to lower costs of financing for the agricultural sector. There are several models for such commodity financing as explained in UNCTAD (2009). These are as follows:

- The most straightforward model for this is inventory financing, using warehousing receipts as collateral. Exchanges provide the financier with a mechanism for valuation of the collateral, hedging against change in the value, and also for liquidating collateral in case of default.
- Another mechanism is where the exchange itself can facilitate producers' access to finance directly from capital market investors. The instrument is exchange-traded repurchase agreements, or 'repos'. These could be structured on inventories, as well as on future receivables. Under this, the warehouse receipt could be transferred to an exchange broker, and the owner of the commodities signs an agreement to buy it back at a given price after a certain period. The broker posts this 'package' on the exchange network, and investors can bid on it. Investors know that after the defined period, they will receive the price as defined in the agreement. The higher the bid, the lower the effective interest rate they will receive. In cases where repos are structured around future receivables, a higher degree of structuring is required to mitigate financial and physical risk. In either case, the exchange disintermediates banks, increasing access and reducing the cost of finance for the borrower.
- There are several other possibilities for creating linkages between finance and price-risk management in financing agreements and also in the contract for a physical transaction. One option is the linking of a producer's loan repayment conditionality to the price of the underlying commodity using derivatives instruments—if prices fall, the producer

pays less interest, and vice versa. The second variety is where an exporter and a buyer agree on a fixed price for a certain volume of a commodity. The buyer then provides a line of credit to the exporter, which is drawn down as exports are made. In turn, the buyer sells the commodity for future delivery or hedges the price risk on the options market.

Exchange supported-commodity financing arrangements have been beneficial for smallholders in countries such as Brazil and South Africa. In Brazil and South Africa, the models have differed, to suit the different market conditions in the countries, but have led to the achievement of the same goalpost of enhancing credit flow to the sector.

In South Africa, the South African Futures Exchange (SAFEX) was established as a financial future exchange in 1988. In August 2001, it was acquired by the JSE Securities Exchanges, but the brand name of SAFEX was continued as it was recognised as an efficient and transparent price-discovery mechanism for South Africa and the region. The delivery mechanism of JSE/SAFEX was explicitly developed to integrate the commodity and the finance. The larger banks played a role in designing the JSE/SAFEX silo receipt system, in collaboration with the exchange, collateral managers, silo operators, and other interested parties. This lowered the risk of lending to producers as silo receipts became widely accepted as collateral by the banks.

In Brazil, the development of the exchange facilitated financing system was led by the Banco do Brasil in 1994, which launched the Cédula de Produto Rural (CPR) rural financing instrument. The CPR is a bond issued by rural producers, farmers' associations, and cooperatives to obtain financing for production. Over time, the Bolsa de Mercadorias e Futuros (the Brazilian Mercantile and Futures Exchange) has established mechanisms to enhance the functionality and liquidity of CPRs through exchange trading mechanisms, particularly through its Brazilian Commodity Exchange subsidiary (UNCTAD, 2009).

Financialisation is nearly absent in the Indian commodities markets. The aforementioned models can be explored for adoption in India given their possible effect on exports and farmers' income. Engagement of the commercial banking sector, improvement in the processes, and institutional strengthening as well as support from the legal and regulatory framework would be prerequisites for the development of the model. For instance, banks are currently prohibited from taking proprietary positions in commodity derivatives, and are unable to hedge their exposure to price risks arising from their loan portfolio (George, 2021). Another issue is that several warehouses are unwilling to register with the Warehousing Development and Regulatory Authority (WRDA) as this would make them liable to regular audits and inspection. Private warehouses feel that such inspections may hamper their

operations and affect their income from collateral management fees paid by the banks. These challenges, if suitably alleviated, could pave the way for exchange facilitated financing for agriculture in India.

Conclusions

The analysis in this Chapter finds a strong impact of export financing on agricultural exports. While the Government has taken several initiatives to improve credit flow to the agriculture sector, there remains further scope for strengthening the financial framework for supporting exports from the sector. Availability and affordability of export credit through lesser-explored mechanisms such as factoring, commodity exchange-facilitated financing, and value chain financing, would be critical for the achievement of the ambitious targets of the GoI for agricultural exports.

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Modelling Agriculture Exports in Emerging Economy Through Cluster Based Approach

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Introduction

India has a diverse agriculture sector which includes the prior production of fruits and vegetables. Consistent improvements in innovation have resulted in good productivity and a better export system. India is currently second in the production of fruits and vegetables in the world after China. According to the report on second advanced estimates by the National Horticulture Board published in 2019-20, India produced 99.07 million Metric Tonnes (MT) of fruits and 191.77 million MT of vegetables (National Horticulture Database) (National Horticulture Board, 2020). The total production of vegetables in the world is 1,130.2 million MT for 2019-20¹ while the total production of fruits worldwide is 883.42 million MT for 2019.² The contribution of India towards the production of fruits and vegetables is significant according to the statistics record. However, the lack of scientific storage, cold chain, and processing facilities results in the spoilage and wastage of fruits and vegetables. Therefore, agricultural exports and processing have been receiving high priority in India. This opens the scope for generating foreign revenues for the country. The Government of India (GoI) has been making consistent efforts for boosting agriculture exports. Indian agricultural exports registered an increase of 17.34 per cent (US\$ 41.25 billion) between

¹ Available at <https://www.statista.com/statistics/264059/production-volume-of-vegetables-and-melons-worldwide-since-1990/>, accessed on 23rd February 2022

² Available at <https://www.statista.com/statistics/262266/global-production-of-fresh-fruit/>, accessed on 23rd February 2022

2020 and 2021.³ The Agriculture Export Policy (AEP) was announced in 2018 to boost export-oriented production, market, and the promotion of agricultural produce. The Policy emphasises a farmer-centric approach. Progress has been made in providing support to export the produce to the Farmer Producer Organisations (FPOs). The direct linkages of FPO with the export markets have led to an increase in the farmers' income (Bikkina et al., 2018). The Policy advocates a cluster-based approach for promoting agriculture exports. Forty-seven unique district clusters have been notified for export promotion. The clusters form FPOs and connect them to the exporters. This helps in sorting out the problems of transportation, logistics, packing, etc. Varanasi cluster of farmers in different districts and Fresh Vegetables and Fruits Exporters Association (VAFA), Mumbai have set an example for increasing agricultural exports from the country.

Literature Review

This section elaborates on the overview of agriculture and food exports through cluster development, agriculture exports during COVID -19, drivers for agriculture exports, the impact of agro-processing and cluster-based approach for boosting agriculture export. Clusters have been a part of the industrial framework for time (Nuur, 2005). Clusters are interconnections of companies in geographies to support economic growth (Monni et al., 2017). The cluster approach includes the capabilities, information, knowledge, organisational process, and all assets controlled by a firm for improving efficiency and effectiveness. The cluster approach helps in collaboration, managing resources, relational resources, managing capabilities, innovative capabilities, and export-oriented capable markets (Haddoud et al., 2017). The cluster can be based on the Italian model consisting of small- medium-sized firms and a hub and spoke model where the lead firm can manage the activities of the small firms (Humphrey and Schmitz, 2000). Cluster approach results in better performance, competitiveness, and productivity by having a pool of skills, innovative ideas, and resources (Kumari et al., 2021b; Sultan, 2014).

Overview of Agriculture and Food Exports Through Cluster Development

The AEP has focussed on doubling agriculture exports. The Policy aims to diversify the export basket and boost high-value horticulture crops and

³ Available at https://www.business-standard.com/article/economy-policy/india-s-agriculture-exports-increase-17-34-at-41-25-bn-in-2020-21-121061000744_1.html, accessed on 3rd February 2022.

value-added agriculture exports. The Policy enables farmers to benefit from the export opportunities and provides an institutional mechanism for pursuing market access. The clusters have helped in promoting agri-exports. The Lucknow Cluster for Mangoes had dispatched 26.25 MT of mangoes to Oman during the lockdown in June 2020. Fresh mangoes were also exported to Dubai. Nagpur clusters have exported 15 MT of oranges to Dubai. Nagpur has exported more than 100 MT of oranges to the United Arab Emirates (UAE). Anantapur cluster has exported 9,790 MT of bananas to the Middle East. Theni clusters have exported bananas to Dubai, Saudi Arabia, and the Maldives. Kolhapur, Solapur, and Jalgaon clusters have exported 32,78,275 and 77 containers, respectively, of bananas to date. Surat, Narmada, and Bharuch cluster exported 8,735 MT of fresh bananas to the Middle East countries, viz., Bahrain, Dubai, Georgia, Iran, Oman, Saudi Arabia, Turkey, the UAE, Iraq, etc., to date. Sangli, Nasik, and Pune clusters have exported grapes in large quantities. Bangalore Rural and Chikkaballapura clusters have exported 7,167.62 MT of rose onions to Malaysia, Singapore, Indonesia, Bangladesh, and Sri Lanka from October 2020 to December 2020 (Reforms to Promote Agri Export, 2021).⁴

In addition to the clusters identified under AEP, 54 districts are covered under the One District One Product (ODOP) scheme for the export promotion of spices. Saffron—Kharewa, Pulwama, Budgam, Kishtwar, and Srinagar districts of Jammu and Kashmir exported saffron to the UAE and increased by 101.37 per cent during April–December 2020 as compared to the previous period. Ginger—Bidar (Karnataka), South District (Sikkim), Dima Hasao, West Karbi Anglong and Karbi Anglong (Assam), Sirmaur (Himachal Pradesh), Koraput (Odisha), and Pherzawl (Manipur) export has increased by 81.98 per cent during April 2020 and December 2020 as compared to the previous period. Turmeric—Chamraajnar (Karnataka), Erode (Tamil Nadu), Bilaspur (Himachal Pradesh) Guntur and Prakasam (Andhra Pradesh), Bongaigaon (Assam), Kandhamal (Odisha), Lalitpur (Uttar Pradesh), Kangpokpi (Manipur)—Dry Turmeric export increased by 33.95 per cent. Other Turmeric export increased by 58.14 per cent and Turmeric Oleoresins export increased by 78.7 per cent between April 2020 and December 2020 as compared to the previous period. Coriander—Kota (Rajasthan) increased its export by 18.34 per cent between April and December 2020. Cumin—Patan and Surendranagar (Gujarat) and Jodhpur (Rajasthan) export increased by 14.90 per cent between April 2020 and December 2020 as compared to the previous period.

⁴ Available at Reforms to Agri Export (2021). <https://commerce.gov.in/wp-content/uploads/2021/06/Reforms-to-promote-Agri-Export.pdf>, accessed on 4th April 2022.

Agriculture Exports during COVID-19

The COVID-19 outbreak has disrupted the world's trade and supply chain since 2019. The global agriculture supply chain suffered from behavioural uncertainties. Amid the uncertainties, India's agriculture exports (including marine and plantation products) have beaten the Pandemic registering a growth of 17.34 per cent to US\$ 41.25 billion in 2020-21.⁵ Farmer Producer Companies (FPCs) have actively pursued growth in commodity sales by enabling the farming community, including the small and marginal farmers, in addressing their production and marketing issues. The research was undertaken to understand the role of FPCs in addressing the challenges in supply chain and agriculture exports and exploring the antecedents for sustaining agricultural export in India. The sustainable approaches by the selected FPCs who were key players in agriculture exports were explored. The findings suggest a resilient aggregate model for sustaining agriculture exports. The drivers for the same and their linkages are discussed in the model. The results of this study can provide useful guidance and implications for agricultural exports to cooperatives and policymakers for mitigation efforts to navigate this global pandemic.

The agriculture exports slowed down during 2019 with the arrival of COVID-19 and resulted in the disruption of the supply chain. With time the agricultural export managed to rise to their peak. The data show that agriculture exports were recovered from 2020. Over the last 6 months, Indian agricultural exports have been boosted. Arrangement of online issuance of certificates for exports was made available. The Agricultural & Processed Food Products Export Development Authority (APEDA) created an emergency response cell to help exporters in addressing movement issues.

Drivers of Agriculture Exports

Agriculture exports from India have remained stagnant since 2011-12, besides being the largest producer of agricultural commodities. Agriculture exports are supported by strategic and operational drivers. The strategic elements include policy measures, infrastructure, and government support. The operational elements include cluster formation, research and development, private investments, and quality production. The farmers need to be trained for the processing of agricultural produce. The farmers need to be made aware of the tastes and preferences of the global consumers as exporters. Having diversified agro-climatic zones the country has untapped

⁵ Available at <https://economictimes.indiatimes.com/news/economy/agriculture/indias-agriculture-exports-jump-to-41-billion-despite-pandemic-disruptions/articleshow/83400113.cms?from=mdr>, accessed on 14th January 2022.

potential for exporting processed fruits and vegetables. The challenges which are commonly faced by the farmers are the lack of agriculture logistics and post-harvest infrastructure.

Agro-Processing and its Impact

Self-Help Groups (SHGs) have been contributing towards agro-processing and have set successful stories on the same. SHGs like Kruthika Group have set examples of successful enterprises in processing fruits and vegetables and producing value-added products like pickles, jaggery powder, and vermicelli. Sumitra Food has streamlined the makhana processing in the Darbhanga district of Bihar under the capacity building component of the PM Formalisation of Micro Food Processing Enterprise. Anuradha Home Produce, through an entrepreneurial mindset, has set up tomato papad and amla pickle. Shriram Home Products initiated by Kalleshwara SHG led to the production of jackfruit jam and lemon pickle. Jamuna SHG at Betul, Madhya Pradesh also set an example for pickle production and sale.

There have been success stories documented on SHGs, but there are very few studies that need to be documented on a cluster-based approach, with special reference to FPCs. This has driven us to present a case on the cluster approach of FPCs. The case will be a model for the other FPCs that can sustain agro-processing and exports.

Cluster-Based Approach for Boosting Agri Exports

The cluster-based approach is essential for boosting agricultural exports. The present need of the hour is to boost agro-processing and exports through a cluster-based approach. The farmers' cluster of produce can result in the bulk of the produce with proper management of the quality and better marketing. Farmers producing in silos may not be able to tap the export market due to the small quantity and lack of facilities for the same. Therefore, farmers producing the same agricultural produce can come together to tap the export market with better economies of scale. The concept of the cluster approach in the form of collectives, Farmer Producer Companies (FPOs), SHGs, FPOs, and cooperatives has been helpful in boosting agriculture export (Kumari et al., 2021a).

Research Methodology

The selection of cases is done based on the secondary data. Successful cases from secondary data were identified and analysed using SWOT Analysis, Root Cause Analysis, and Situation Analysis. Several other analyses of their strategies like Service Mix Portfolio, Segmentation-Targeting—Positioning,

Marketing Strategy Situation, Objectives, Strategy, Tactics, Action and Control (SOSTAC) Strategic alternatives—Worst to Best Case, Ansoff Matrix and GE McKinsey Matrix, etc., will also be undertaken for a better understanding of the processes in this industry.

Results and Discussion

Aggregation of farmers, especially small and marginal farmers, is a solution for the promotion of agro-processed product exports. The cluster approach makes it easy to access technology, finance, input, marketing, and knowledge. The different models of SHGs, Farmers' Interest Group (FIGs), collectives, and FPOs have been introduced to professionalise the agriculture processing sector. The FPOs are concentrated on marketing and value addition of agricultural produce increasing agri export. The primary objective in the formation of FPOs and FPCs is to build a strong infrastructure and adequate production and processing facilities to increase the reach of agricultural produce. This section elaborates on the collectives selected for the study. The results are tabulated for comparing different parameters for the agro-processed exports.

Bombay Fruits and Vegetables Export

Bombay Exports (BFVE)⁶ was established on 23 November 1989 by Anand K. Shejwal. BFVE started as a small proprietorship export firm and has established the brand name 'Daisy' in the export market. The Company has been exporting fresh fruits and vegetables to Doha, Muscat, Dubai, Bahrain, the Netherlands, the United Kingdom, the Kingdom of Saudi Arabia, Sultanate of Oman, Sri Lanka, and Abu Dhabi. The Firm is also trying to expand its export business to Singapore, Mauritius, and Malaysia. BFVE has been among the highest foreign exchange earners in the country, providing the best Made in India produce to the world. It participated in a mango promotion campaign held in the UAE and Doha to maintain high-quality fresh fruits and vegetables in the international market. The Firm won the Bronze APEDA export award for outstanding contribution to the promotion of agri produce and the silver APEDA export award for excellence in export in 2002-2003 and 2003-2004.

India is the world's largest producer of mango, growing 1,000 varieties of mango. BFVE has exported different varieties of mango like Alphonso, Banganpalli, PIU, Totapuri, Neelam, Kesar, Lalbaug, Rajapuri, and Rumali. The mango varieties are exported in corrugated boxes of 2 kilogram (kg),

⁶ Bombay Fruits and Vegetables Export, available at <https://www.bombayexports.net/frameset1.htm>, accessed on 29 September 2021.

5 kg, and 7 kg. Mangoes are majorly exported to the UAE, Oman, Saudi Arabia, the UK, and Bahrain. The Firm exports varieties of grapes like Flame, Red Globe, Black and White/Green Thomson. The grapes are procured from regions of Maharashtra like Narayangaon, Junnar, Sangli, and Solapur. The grapes are packed in 4.5 to 1 kg corrugated boxes. Fruits like pomegranate, custard apple, orange, and sapota are available throughout the year. The fruits are procured from districts of Maharashtra and Gujarat and packed in 5 kg corrugated boxes for export to the UAE, Oman, Bahrain, Saudi Arabia, and the UK.

Watermelon, papaya, pineapple, and lime are also exported to the UAE, Oman, and Bahrain. The fruits are procured from nearby states like Madhya Pradesh, Andhra Pradesh, Karnataka, and Kerala. The same is packed in 8 kg, 9 kg, and 10 kg corrugated boxes. Guava, banana, and bore fruits are available throughout the year for export. The produce is procured from the districts of Maharashtra and Andhra Pradesh.

Apart from fruits, the Firm also exports vegetables. Vegetables like arbi, beans, carrot, cauliflower, drumstick, green bananas, green chilli, ladyfinger, tomato, ginger, onion, and pumpkin. The vegetables are procured from nearby states like Gujarat, Andhra Pradesh, Maharashtra (Nashik and Pune), and Tamil Nadu (Chennai). The vegetables are packed in corrugated boxes. BFVE has two sister concerns, namely, Daisy Exports established on 2 December 1996 and Crown Traders established on 10 April 2000.

Jay Agro Exports

The Jay Agro Exports (JAE) is located in Nashik and contributes to 80 per cent of the grapes, onion, and vegetable export. The Firm is known for exporting grape, pomegranate, onion, mango, and fresh vegetables. The Firm was started in 2003 and exported grapes to the Netherlands. In 2011, the Firm started supplying quality fruits and vegetables in the domestic market and became a leading supermarket chain. The modern packhouse and cold storage facilities for grapes, pomegranate, and fresh vegetables were given prime importance. All the products are monitored and tested in APEDA, and therefore meet the customer's requirements. JAE provides technical and managerial support for cultivation. The professional team helps in crop management, food safety, and quality assurance. The products are mainly exported to the Netherlands, Germany, France, Italy, Canada, Malaysia, Thailand, Singapore, Gulf countries, and the UK. The Firm has created a set of standards for good agriculture practices. The professional team has controlled the usage of agrochemicals by partnering with Food Chain Partnership. Modern packing methods and cold chain management have helped in building hygiene and safe production.

Om Gayatri Farmer Producer Company

Om Gayatri Farmer Producer Company (OGFPC)⁷ started its work by providing quality seedlings to the farmers and guiding them to produce good crop yield till the stage of harvesting. It started venturing into exports in 2016. Based in the agriculture capital of Maharashtra, the FPC can manage agriculture production by increasing the nutrition, sweetness, freshness, colour, odour, and size of the crops. The FPC has the vision to educate the farmers by applying scientific technology and supporting the growth of quality products to meet international standards, thereby increasing the agriculture export. The farmers get a fair price in the international market. The process helps in smoothing the import-export cycles based on a transparent business. The FPC is consistently engaged in agriculture research and technology. The FPC has an aim to build a network of 1 lakh farmers pan India to enhance quality export. It also provides strong assistance for the farmers from planting to selling the produce.

Sahyadri Farmer Producer Company

Sahyadri Farmer Producer Company (SFPC),⁸ located in Nashik district, has exported different value-added produce of a variety of fruits and vegetables across the country. Sahyadri Farm was declared the leading exporter of grapes in 2014 shipping 625 containers amounting to 9,000 MT of grapes valued at US\$ 17 million.⁹ The Company also processes the farm produce into pulp, juices, jam, squash, and ketchup. Sahyadri has excellent produce as aseptic fruit pulp and concentrates, frozen pulp, dry fruits, fruit drinks, Individual Quick Freezing (IQF) vegetables, and jams. The processed produce is exported to countries like the United States (US), Europe, and Canada. Sahyadri has also exported instant quick-freezing grapes to Australia. For agro-processed export produce, Sahyadri has excellent facilities in the cold chain and was awarded Confederation of Indian Industry (CII) cold chain awards for outstanding performance of packhouses. The Company adheres to the standards set for all the packhouses handling and processing the horticulture produce meets the standards in terms of international quality and safety.

⁷ Om Gayatri Farmers Producers Company, available at <https://www.ogfpc.com/>, accessed on 9 September 2021.

⁸ Sahyadri Farmer Producer Company, available at <https://www.sahyadrifarms.com/>, accessed on 29 September 2021.

⁹ Available at <https://www.sahyadrifarms.com/milestones.html>, accessed on 23rd February 2022

Shree Agro Krushi Farmer Producer Company

Shree Agro Krushi FPC (SKFPC)¹⁰ is an FPC with a team of 2,000 farmers working for the world market for agricultural produce. SKFPC exports primary produce and diversified products like pickles, jams, jelly, cashew, etc., to the rural population. The priority of the FPC is to strive for the production of quality products with good agriculture practices and scientific post-harvest methods. They focus on diversified produce having a range of fruits like pomegranate, mangoes, grapes, custard apple, fig, strawberry, etc. The FPC has performed very well in Maharashtra, Gujarat, Karnataka, Andhra Pradesh, and Tamil Nadu. A comparative analysis of selected five FPCs involved in agro-processed export produce is presented in Table 10.1. It has been observed that though Bombay Fruits and Vegetables focuses only on fruits and vegetables undergoing primary processing, it has got a good brand value in agriculture exports. JAE and Om Gayatri FPC also have big clusters and focus on the export of primary processed quality fruits and vegetables. The Sahyadri FPC and Shri Agro Krushi FPC focus on processed fruits and vegetables with a diversification of the produce. If we compare the approaches, then it can be observed that a cluster like Sahyadri has expanded in the export market as it focuses on processed fruits and vegetables. The three other clusters that are doing well in primary processed produce can expand their market by focusing on diversified processed produces.

Table 10.1 presents the situation analysis of the collectives. BFVE, JAE, and OFPC follow legal standards. They do not have advanced technology, and so their main focus is on the export of primary processed products only. SFPC and SKFPC have advanced technology and good support from social, economic, and political indicators.

Table 10.2 presents the internal environment analysis of the collectives. It has been observed that the success of processed agro exports depends to a large extent on leadership. SFPC and SKFPC have strong leadership. The primary focus of JAE, BFVE, and OGFPC is the delivery of quality products and is less prone to innovative technology.

Service Mix Portfolio

Figure 10.1 focuses on quality agriculture produce exports concerning the service mix portfolio. The clusters selected for the study have focused on quality products to meet international standards. SAFPC and SKFPC are providing services through advanced technology and building a strong networking system.

¹⁰ Shree Agro Farmer Producer Company, available at <https://www.shreeagro.fpc.com/>, accessed on 20 September 2021.

Table 10.1: Situation Analysis of the Collectives: External Environment Analysis

<i>Collectives</i>	<i>Political</i>	<i>Economic</i>	<i>Social</i>	<i>Technology</i>	<i>Environment</i>	<i>Legal</i>
Bombay Fruits and Vegetables Export (BFVE)	The Company follows the EXIM Policy	The Company has a wide reach in terms of buyers and sellers	They are the leading exporter of high-quality horticulture produce, building a strong network of buyers and consumers.	The Company does not have advanced technology as it does not focus on the processing of fruits and vegetables	The fresh fruits and vegetables meet the quality standards with good agriculture practices	The Company follows legal standards for the export of the produce
Jay Agro Exports (JAE)	The Company follows its policy of excelling in export	The cluster approach again helps in having a high economy of scale	The Company not only has a strong network of growers but also has been successful in having good buyers satisfying them with excellent produce	It provides advanced techno-managerial support	It has the most advanced agricultural practices focusing on food safety measures and quality standards	The quality is monitored and tested in APEDA recognised laboratories as per the customer's needs
Om Gayatri Farmer Producer Company (OGFPC)	The FPC follows the export policy and guidelines for exporting agriculture fresh and processed produce.	Strong export infrastructure helps in smoothening the process flow for exports and quality maintenance.	The FPC has a network of farmers and a strong system for the export business.	OGFPC has a strong infrastructure and focuses on technology like packhouse, pre-cooling chamber, cold storage, refrigerated container, and quality control equipment.	The FPC is particular in maintaining the quality standards for agriculture export.	To create awareness on grafting and residue-free farming amongst farmers.
Sahyadri Farmer Producer Company (SFPC)	The FPC have a strong command on following policy	Sahyadri came to be known as a brand across the world.	Sahyadri has a strong network system.	Sahyadri has strong traceability and technology adoption.		
Shree Agro Krushi Farmer Producer Company (SKFPC)	The FPC possesses the entrepreneurial spirit to handle the networks of the farmers.	They have efficient and skilled labour for managing agro-processing.	The SKFPC makes sure that fruits meet the health, safety, and quality standards for exporting across countries.	They have good technology for processing the fruits.	The products are natural, fresh, and nutritious	The fruits possess all the health safety standards.

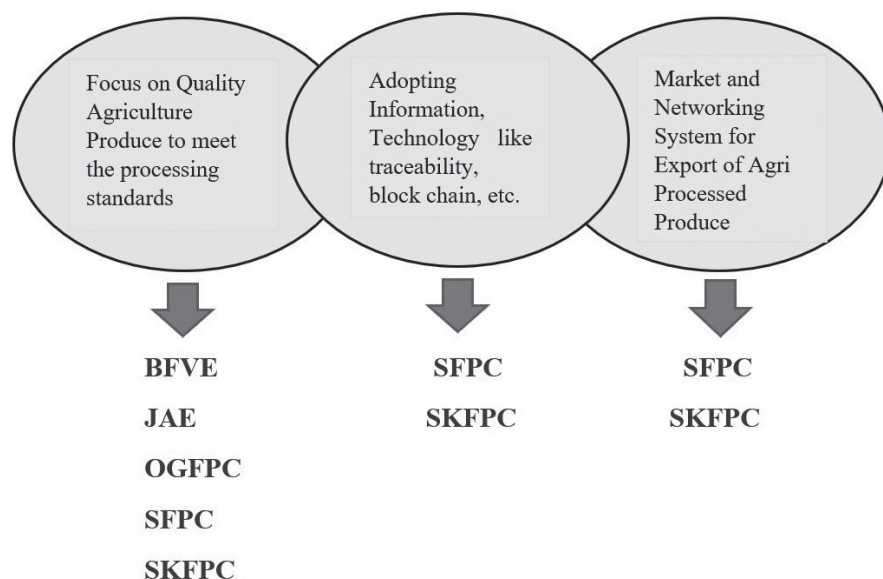
Source: Created by Authors

Table 10.2: Situation Analysis of the Collectives
Internal Environment Analysis

<i>Collectives</i>	<i>Leadership</i>	<i>Innovation</i>	<i>Product</i>	<i>Promotion</i>	<i>Place</i>	<i>Price</i>
Bombay Fruits and Vegetables Export (BFVE)	The Company connects with the farmers for different agro produce	It maintains the fast delivery and quality produce	The Company exports fruits and vegetables	The Company has good publicity for exports	The Company is located and has a network with buyers and sellers across	The farmers get a fair price for the agricultural produce
Jay Agro Exports (JAE)	Team building and consistent guidance to the farmers have made it the leading supermarket chain in India	It provides a modern pack house/cold storage facility for grapes, pomegranate, fresh vegetables, and an onion packing facility.	JAE focuses on the primary processing and fresh produce of pomegranate, mangoes, grapes, onion, tomato, and vegetables	They export under a joint venture cultivation programme with Bayer crop science and Germany food chain partnership.	The Company is located in Mumbai and has a wide network of buyers and sellers	The international market helps the farmers in getting a fair price for their produce
Om Gayatri Farmer Producer Company (OGFPC)	The FPC under the Chairmanship of Madhukar Ishwadas Gavli has led the farmers to produce quality products to get the right price	They have focused on innovative technology like pack houses, cold storage, refrigerated containers, pre-cooling systems, and processing techniques for value addition.	The FPC focuses on fresh and processed products from fruits and vegetables like tomato, okra, chillies, mangoes, onion, capsicum, drumstick, grape, watermelon, musk melon, and pomegranate.	They have participated in the world food market export and invited many foreign delegates for discussing the possibilities for agro exports.	The FPC is located in Nashik but welcomes an international forum for linking the market with agricultural produce.	The primary aim of the FPC is to provide the right price to the farmers.

<i>Collectives</i>	<i>Leadership</i>	<i>Innovation</i>	<i>Product</i>	<i>Promotion</i>	<i>Place</i>	<i>Price</i>
Sahyadri Farmer Producer Company (SFPC)	It is a company owned by the farmers, ensuring connectivity for the farmers.	The FPC has implemented Systems, Applications & Products in Data Processing (SAP)) solutions, traceability, blockchain technology, and has launched a business-to-consumer (B2C) application for the customers. It has also launched incubation for 50 farmer collectives.	The prime focus is given to processed fruits and vegetables.	The FPC focuses on capacity building for promoting their quality produce	The FPC is located in Nashik but finds buyers from all over the world.	Every farmer gets a fair deserved return for their agricultural produce.
Shree Agro Krushi Farmer Producer Company (SKFPC)	It has focused on building connections with farmers and the market	Shree Agro Krushi FPC focuses on the agriculture value chain resulting in gaining a competitive advantage by generating a surplus for the farmers.	The diversified range of fruits is focused on the FPC	The FPC has worked on a strong network and promotion of their quality products.	The FPC finds its place in Gujarat, Maharashtra, Tamil Nadu, Andhra Pradesh, and Karnataka	Shree Agro Krushi FPC ensures that the right price and information are provided

Source: Created by Authors

**Figure 10.1:** Service Mix Portfolio*Source:* Created by Authors

Marketing Strategy SOSTAC Strategic Alternatives

Table 10.3 focuses on the 5 S approach, viz., sell, serve, speak, save and sizzle. These approaches involve in consistent functioning of all the stages in order like sorting the produce for sale, grading, monitoring the quality specifications for serving, publicity of their produce, marketing and expanding the market. These approaches were chosen concerning the collectives. BFVC, JAE, and OGFPC serve the agri exports. The SFPC and SKFPC are more prone to adopt global international standards.

Table 10.4 presents agro-processing exports by clusters using Ansoff Matrix. The Ansoff Matrix has highlighted the clusters that have focused on the existing produce and new produce to target the market.

Table 10.5 presents the agro-processed exports by collectives using the GE McKinsey Matrix. Since SFPC focuses on processed produce without compromising on the quality therefore it comes under build selectively. The SKFPC has good products and is trying to expand the market, therefore, it comes in the Expand/Harvest. They have the potential of increasing their market. Most of the clusters face problems as they lie in the product positioning. They have a good market but the quality of the product is very poor. These clusters are required to have handholding support to increase their quality.

Table 10.3: SOSTAC Approach

<i>Collectives</i>	<i>Sell</i>	<i>Serve</i>	<i>Speak</i>	<i>Save</i>	<i>Sizzle</i>
Bombay Fruits and Vegetables Export (BFVE)	The Company sells fruits and vegetables	They serve the international market covering different countries	The Company has good publicity for being quality consciousness	The collective growers' agriculture produce saves the cost	The Company has been expanding its client list each year and increasing agriculture export
Jay Agro Exports (JAE)	The Company is involved in selling fruits and vegetables	They have served quality produce to the Netherlands, Germany, France, Italy, Canada, the UK, Malaysia, Thailand, Singapore, and Gulf Countries.	They have a strong privilege to fulfill the requirements of the customers	Excellent produce has led to good pricing of the produce	They have set up global good agricultural practices to provide safe food products
Om Gayatri Farmer Producer Company (OGFPC)	The FPC is involved in selling fresh and processed fruits and vegetables.	The FPC has shown active participation in attracting the global market for its produce.	The FPC welcomes agri tour, experts, and foreign delegates to promote the export business	The collective approach has led to saving the cost and increasing the revenue for the farmers.	The FPC aims to build up a network of 1,00,000 farmers.
Sahyadri Farmer Producer Company (SFPC)	Sahyadri FPC has focused on selling prominent crops, fresh and processed fruits, and vegetables	They serve the domestic market as well as export their produce to Africa, Gulf, California, and other countries	The FPC explores new markets and access to technological practices	The farmer collectives have been widely benefited by the Company	The FPC is on the path to integrated value chains empowered by technology and efficient management
Shree Agro Krushi Farmer Producer Company (SKFPC)	The FPC is involved in selling domestic fruit and exporting processed fruits.	The FPC is owned and managed by the farmers who make the best in agriculture practices.	The farmers and labourers were involved in getting the maximum guidance.	The FPC with a cluster approach has saved the expenses of the small and marginal farmers generating revenue.	The FPC adopts global agriculture practices for uncompromised quality standards.

Source: Created by Authors

Table 10.4: Agro-Processing Exports by Clusters Using Ansoff Matrix Approach

	Existing Produce	New Produce
Existing Market	Market Penetration Agro Processed Produce sale in the country. Different clusters at the micro-level are excelling in producing and marketing the processed produce. BFVC, JAE, OGFPC	Product Development Different small SHGs and clusters have transformed their products to increase the marketing of agricultural processed produce. SFPC, SKFPC
New Market	Market Development The product has an excellent scope in export as there is a good market waiting for the processed agriculture commodities. BFVC, JAE, OGFPC SFPC, SKFPC	Diversification Clusters, as discussed in the chapter, have produced diversified products like fruit pulp, frozen food, jams, ketchup, etc., which finds a good market in the foreign. SFPC, SKFPC

Source: Created by Authors

Table 10.5: Agro-Processing Export by Collectives Using GE McKinsey Matrix

High	Product Positioning Clusters having low-quality standards fail to find the market for agro-processing and export though such produce finds a place in the domestic market.	Invest to Build Some collectives build the agricultural produce but are not able to maintain the secondary processing to go ahead.	Build Selectively These are those clusters that have very good quality agriculture products and can attract a good market. Some of the clusters have been discussed in the case study (Kumari et al., 2021a). SFPC	Market Attractiveness
Medium	Build Selectively These are those collectives having low-grade produce	Selectivity These collectives need to expand their market as well as work on agricultural produce. They can expand by focusing on processed produce. OGFPC	Expand/Harvest This category falls for those collectives that make high-quality processed products and are trying to expand their market. Such collectives need hand-holding support for increasing their market. SKFPC	
Low	Protect Position and Focus Clusters having very low-quality standards fail to find the market in domestic and export. Problems with the Cluster	Manage for Earnings Such collectives need to be given the training to diversify their products for finding a better market. Such collectives only manage the produce for their earnings.	Divest Some collectives have high productivity but are not able to attract the market due to a lack of knowledge and process about market attractiveness.	
	Low	Medium	High	

Competitive Strength of Agro Processed Export

Source: Created by Authors

Action Plan for Agro Processed Export

The study highlights the strategies to sustain the export of agro-processed produce. Krishi Vigyan Kendras (KVKs) and agriculture institutions should offer training to the farmers to enhance the efficiency of agriculture production. The KVKs and agriculture institutions need to handhold the farmers to grow the right quality of agricultural produce demanded in the foreign markets. Most of the agriculture commodities fail to meet international quality standards which are tested by the maximum residual limits. The use of pesticides and agrochemicals also needs to be understood for better agriculture processed produce. There is also a need to build up farmer-exporter linkages as there is no direct farmer-supplier relationship. Despite the farmers understanding of the quality and variety of agricultural produce demanded from the foreign market, they are not able to directly market the produce (Kumari et al., 2021b). The FPO is a good source for building up a direct link between the cluster of agricultural produce and the value addition followed by the export of processed produce. Few countries suspended a few agriculture products from India because of poor quality standards and health safety measures. Therefore, agricultural production in the country should be harmonised by the quality standards of the agencies like AGMARK, APEDA, BIS, and FSSAI. The Food Processing Industry accounts for 32 percent of the total food market (ET, 2021).¹¹ The share can further increase by tapping the market opportunities for other processed fruits and vegetables in the form of tomato ketchup, jams, jellies, sauce, juice, sugar, curry paste, etc. The export of processed products like processed meat, processed cereals like sweet biscuits, noodles, toasted rusks, infant food, pasta, cocoa, tea, coffee, etc., can enhance their market share around the globe. India's growth in agriculture exports is driven largely by cereals, spices, oilseed, marine produce, and meat.

Root Cause Analysis for Poor Agro-Processed Export

There has always been a concern for low agro-processing and agro exports. A questionnaire was prepared and the collectives were asked about the root causes for low agro-processed exports. The problems were identified and analysed in Figure 10.2 using root cause analysis. After undergoing extensive literature, it has been found that the primary cause for poor agro-exports is poor quality and networking. The farmers and clusters will have to stress

¹¹ Available at ET (2021). https://economictimes.indiatimes.com/industry/cons-products/food/level-of-food-processing-must-be-raised-from-just-10-pc-now-minister/articleshow/85687454.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst as accessed on 4th April 2022.

the quality product and build linkages with the export market. The fishbone diagram also tells that the need for investments and awareness is required for boosting agro export in the country.

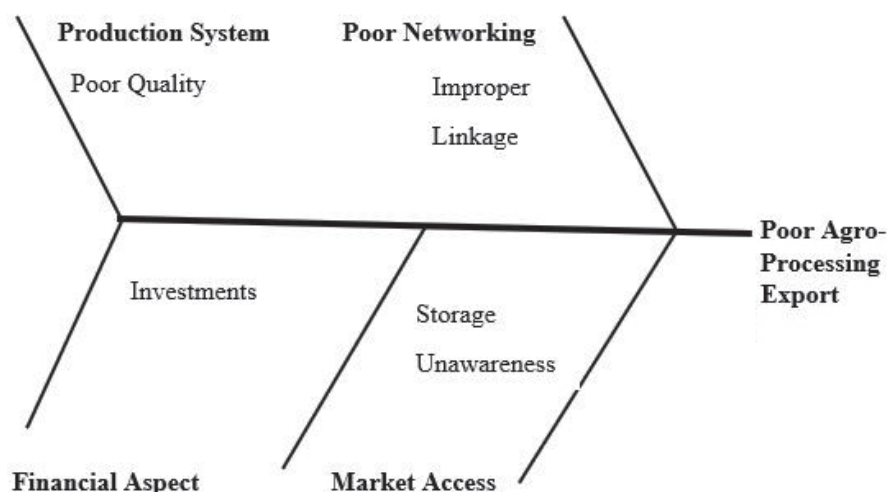


Figure 10.2: Fish Bone Diagram

Source: Created by Authors

After undergoing an extensive study, it can be concluded that agro-processed export requires strategic as well as operational approaches to boost the export sector (Table 10.6).

Table 10.6: Strategic and Operational Approaches for Agri Export Sector

<i>Strategic</i>	<i>Operational</i>
Network building among private public stakeholders	Cluster approach needs to be promoted
Infrastructure and logistics support	Investments need to be attracted in the processing sector
Training	Quality control
Farmer exporter linkages	Enhancing the yield of the fruit crops
Promotion of collectives in the form of cooperatives, FPOs, and FPC	Infrastructure and logistics

Source: Created by Authors

Figure 10.3 is derived from a conceptual model after analysing the clusters and undergoing an extensive literature review. It has been found that the drivers for the supply chain are infrastructure, training, areas of operation, customer focus, market strategy, linkages in the exports, and quality control.

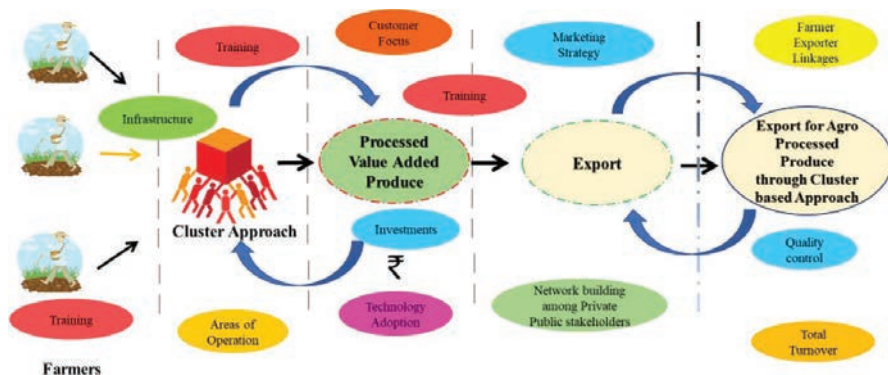


Figure 10.3: Model for Export of Agro Processed Produce using Cluster Approach

Source: Created by Authors

Conclusions

The construction of dynamic networks among countries can lead to competitiveness in the agriculture trade (Liu et al., 2019). Agri export is the primary contributor to agriculture development. Collectives have increased agriculture export. The agro-processing sector faces constraints like insufficient raw materials, inconsistent quality, inappropriate packaging material, poor technology, and the absence of management (Kumari et al., 2021c). The EXIM Policy of 2002-07 endeavours necessary directions for agriculture export. With self-sufficient agriculture inputs, the country has a competitive advantage for the export of agricultural commodities. Nearly 80 per cent of the trade in the world market is shared by agricultural products like cotton, rice, soybean, sugar, tea, tobacco, spices, vegetable oil, and wheat. The cases highlighted have the utmost potential for the collectives to pave a way forward in understanding their strengths and opportunities for agro-processed exports. The case study is limited to five cases chosen from FPO dominant state. For boosting agriculture processed produce export, it is essential to understand the drivers and strategies to be undertaken by the clusters.

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Attaining US\$ 100 Billion Agriculture and Food Exports: The Way Forward

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Introduction

The Agriculture Export Policy (AEP) 2018 of the Government of India (GoI), aims at achieving an agriculture export target of \$60 billion by 2022 and US\$ 100 billion within a few years, thereafter. This is indeed a challenging task and would need a resetting of the timelines for achieving the targets. A reasonable timeline for achieving the target of US\$ 60 billion could be Financial Year (FY) 2023-24, and a target of US\$ 100 billion could be set for 2027-28. Record achievement of US\$ 50.2 billion agriculture exports from India in 2021-22 is a beacon of hope for achieving the target. Quick and transformative reforms, and the signing of Free Trade Agreements (FTAs) with India's major trade partners, could fast track the achievement of the target to 2026-27. The prerequisite for achieving the agriculture export targets would be a well-calibrated, comprehensive, strategic, and result-oriented agri-export policy and action plan, along with overall reforms in the agriculture and allied sector.

Reforms Agenda for Attaining US\$ 100 Billion Agri-Exports

The Government of India's vision of Doubling Farmers' Income (DFI) signified a paradigm shift in agriculture policy from ensuring food security to income security of farmers, by maximising their gains through post-production activities, including exports. Agriculture export reforms, FTAs, agriculture marketing reforms, developing efficient agri-value chains, and building agriculture export infrastructure, are some of the major reform

measures that could be expedited to attain the agriculture export milestone of US\$ 100 billion.

To control prices in the domestic market, the Government has at different times resorted to banning exports of major agri-commodities, be it rice, wheat, sugar, or onion. Imposition of Minimum Export Price (MEP) is another tool often used to tame inflation. Such moves bring relief to domestic consumers, but create uncertainty among importing countries, and deprive farmers of higher returns from their produce, which also discourages them to increase the cultivation of the crop in the subsequent season. It has been observed that exports of onion drop sharply whenever a high MEP is imposed (Gulati and Wardhan, 2019). Therefore, a stable export policy and agri-marketing reforms are the right recipe to ensure higher exports and remunerative prices to farmers.

The AEP provides a blueprint for agriculture export reforms in India (GoI, 2018). It has made wide-ranging recommendations for policy reforms, to propel India's exports of agricultural products to US\$ 100 billion (Box 11.1). The policy states as follows:

India's quest is to grow sustainably, trade abundantly, and progress harmoniously. Agriculture export, if properly supported by infrastructure, institutional backup, packaging, freight transport, and connected to the internal production system backed by market access will be in a position to transform the agricultural economy.

The AEP envisions a focus on agriculture export-oriented production, export promotion, as well as better farmer realisation and synchronisation within policies and programmes of GoI. It underscores the need to have a 'Farmers' Centric Approach' for improved income through value addition at the source itself which will help to minimise losses across the value chain. The objectives of the Policy are as under:

- To double export to US\$ 60 billion by 2022 and US\$ 100 billion within a few years;
- To diversify India's export basket and destinations, and boost high value, and value-added agricultural exports;
- To promote novel, indigenous, organic, ethnic, as well as traditional and non-traditional agri-products for export;
- To provide an institutional mechanism for pursuing market access, tackling barriers, and dealing with Sanitary and Phytosanitary (SPS) issues;
- To strive to double India's share in world agri-exports by integrating with the global value chain at the earliest;
- Enable farmers to get the benefit from export opportunities in overseas markets.

The Policy aims at:

- Assuring that processed agricultural products and all kinds of organic products will not be brought under the ambit of any kind of export restriction;
- Identification of a few commodities which are essential for food security in consultation with the relevant stakeholders and ministries. Any kind of export prohibitions and restrictions on the identified commodities would be taken up in a World Trade Organization (WTO) compatible manner;
- Liberalised import of agricultural products for value addition and re-export.

Box 11.1: Agriculture Export Policy: Major Recommendations

- **Infrastructure and logistics:** Pre-harvest and post-harvest handling facilities, storage and distribution, processing facilities, roads, and world-class exit point infrastructure at ports facilitating swift trade.
- **Holistic approach to boost exports:** To address issues of: (a) Research and Development (R&D) for improved varieties, value addition, and packaging; (b) Establishment of a good standards regimen; (c) A holistic response to SPS and Technical Barriers to Trade (TBT) barriers faced by Indian products; and (d) Identification of winning sectors and strategies for augmenting exports in those sectors.
- **Greater involvement of State Governments in agriculture exports:** (a) Identification of a nodal State Department/Agency for the promotion of agriculture export; (b) Inclusion of agricultural exports in the State Export Policy; (c) Infrastructure and logistics to facilitate agricultural exports; (d) Institutional Mechanism at Union, State, and cluster levels to support exports.
- **Focus on clusters and transition to Agri Export zones:** Export-oriented cluster development across States will be key to ensuring surplus produce with standard physical and quality parameters which meet export demands. Subject to the successful implementation of these clusters, a transition to Agri Export Zones (AEZs) could be thought of to facilitate value addition, common facility creation, and higher exports from such zones.
- **Promoting value-added exports:** (a) Focus on the promotion of value added, indigenous and tribal products for export; (b) Promote value-added organic exports; (c) Promotion of R&D activities for new product development for the upcoming markets; (d) Skill development.

- **Marketing and promotion of 'Brand India':** (a) Marketing of India's best products as 'Make of India', by stepping up advertising and investing in Geographical Indication (GI) of unique products; (b) Benchmarking of agriculture export promotion activities with peer-group countries and best countries in the world.
- **Attract private investments in export-oriented activities and infrastructure:** (a) Packhouse; (b) Processing infrastructure; (c) Cold storage; (d) Exit point infrastructure; (e) Air cargo; (f) Infrastructure abroad.
- **Ease of doing business and digitisation:** (a) Digitisation of farmer land records; (b) Market Intelligence Cell at the Department of Commerce (DoC) and Portal for Information Dissemination; (c) Trade procedures and facilitation.
- **Developing sea protocol:** Developing sea protocols for perishables must be taken on priority for long-distance markets.
- **Establishment of strong quality regimen:** The role of the Food Safety and Standards Authority of India (FSSAI), Export Inspection Council of India (EIC), plant and animal quarantine, and different Commodity Boards in setting standards, enforcing such standards, and a robust accreditation and certification arrangement to identify export worthy establishments will be facilitating further exports.
- **Establish and maintain a single supply chain and standards for domestic and export markets:** There has to be a convergence of Policy related to quality standards set for the domestic market and those set for the export market.
- **Sanitary and phytosanitary and technical barriers to trade response mechanism:** Respond to rapid alerts and warnings and ensure that the concerns/problem areas percolate to the producers/processors and exporters.
 - Submission of pest risk analysis, a dossier on animal health and disease control programme, addressing safety concerns of the importing countries/intending countries.
 - Drawing up Residue Monitoring Plans (RMP) would help in
 - (a) Creating an online platform for maintaining traceability;
 - (b) Facilitating exports by standardising testing protocols. The Agricultural and Processed Food Products Export Development Authority (APEDA) has already initiated this for grapes.
 - The United States Food and Drug Administration (USFDA) and the European Union (EU) have developed a system of reflecting import rejections on their web portal. As part of the AEP, the

Department of Commerce proposes to develop a common portal to monitor all export rejections and provide a platform for different nodal agencies to take up a root cause analysis, take corrective action, and in case of requirement, respond to the partner country regarding action taken.

- **Conformity assessment:** EIC, APEDA, the Marine Products Export Development Authority (MPEDA), Spice Board, etc., will continue to strive for conformity assessment procedure to be recognised for smooth export of agriculture exports.
- **Research and development:** (a) Agricultural R&D led by private industry along with higher infrastructure spending by the Government will be the key to boosting agricultural exports; (b) Importing export-oriented germplasm; (c) Testing laboratories with strong infrastructure in the North-East (NE) region to support the export of organic produce.
- **Creation of agri-start-up fund:** Entrepreneurs are to be supported to start a new venture in agri products exports during their initial period of establishment.

Agriculture Export Reforms

Trade liberalisation under the WTO regime involves individual countries' commitments to lower customs tariffs and other trade barriers, and opening up of services markets. Governments are required to make their trade policies transparent by notifying the WTO about laws in force and measures adopted. However, issues relating to market access drag on for months, and sometimes years together before countries allow market access for products.

Apart from tariff barriers, which have been declining over the years on account of FTAs and Regional Trade Agreements (RTAs), the Non-Tariff Barriers (NTBs), including SPS standards and TBT are becoming the norm for restricting/preventing market access. In the absence of a response mechanism, the likelihood of a temporary restriction/ban looms large and sometimes it may take years to lift the ban.

The WTO rules on SPS measures help to ensure that agricultural products are traded safely. In recent years a number of Indian agricultural products have been facing rejection and export bans in the EU—a key export destination for India's agricultural exports—due to SPS measures. Therefore, Mukherjee et al. (2019) have suggested the following measures to address the issue of SPS barriers: Establishment of product traceability; proactive measures to counter bans; implementation of Good Agricultural Practices (GAP); strengthening testing procedures, and following global best

practices; establishment of specific state-of-the-art export infrastructure facilities, which could be accessed by poor farmers; the need for the creation of database by APEDA to raise an SPS issue with any trading partner; scientific research on agricultural commodities and sharing the findings with importing countries, exporters and other stakeholders; discuss SPS issue in the WTO and also bilaterally with trade partners; signing of equivalence agreements with trading partners to recognise each other's conformity assessment systems based on international standards; and knowledge sharing and collaboration with the EU. These measures can ensure higher returns to exporters and farmers. It is, thus, eminently important to sensitise and educate Farmer Producer Organisations (FPOs) and other stakeholders in the agri-export value chains, on ways to address SPS-related issues.

It is recommended by authors Goyal and Mukherjee in Chapter 7, 'Behind the Border Measures: Examination of Sanitary and Phytosanitary Barriers Faced in the Case of Food Export From India' (in this book) that to counter rejection by a partner country in forums like the WTO's SPS Committee or TBT Committee, there is a need for data collection and scientific evidence-based reports. Further, it is important to build the capacity of our small and medium farmers and processors and inform them about the export market requirements.

The development of export-based clusters and contract farming will ensure traceability of farm produce, a key export requirement under SPS Agreement, and ensure a significant rise in farmers' income. QR codes or RFID chips would enable traceability of agriculture produce, a major factor in building importer confidence and enabler of export market expansion.

Doubling Farmers' Income

The GoI has envisioned the achievement of DFI by 2024-25. The following seven-point strategy for DFI is mostly under implementation: (i) Irrigation with a focus on water-use efficiency, viz., 'Per Drop More Crop (PDMC) through Pradhan Mantri Krishi Sinchayee Yojana (PMKSY); (ii) Quality seed and soil health; (iii) Investments in warehouses and cold chains; (iv) Value addition through food processing; (v) Electronic National Agriculture Market (e-NAM); (vi) Increase in the coverage and effective implementation of Pradhan Mantri Fasal Bima Yojana (PMFBY); and (vii) Promotion of ancillary activities like dairy, poultry, bee-keeping, and fisheries. The strategy for DFI, involving an increase in private investment by 6.62 per cent per annum from the base year 2015-16 at the national level, should also include among others: (a) Promoting higher agricultural growth in less developed regions, including rainfed areas, with a focus on marginal and small holders;

(b) Strengthening livestock-related activities and crop diversification to high value produce like horticulture, in line with market signals; (c) Shifting priority focus to post-production management and the agricultural marketing system; (d) Sizeable increase in institutional credit to farmers; (e) Allocation of more resources by state governments towards minor irrigation; and (f) Incentivising private corporate sector to participate in investments in agriculture (GoI, 2017). To achieve DFI, GoI can use an income policy to protect the poor, free up prices for farmers, and allow private trade to stock and operate freely and have unhindered exports (Gulati and Hussain, 2017).

Agriculture Marketing Reforms

A critical problem faced by India's agriculture sector is the fragmented and distortions-ridden state of agricultural markets. One of the major reasons for the low income of farmers is unremunerative prices for their produce due to the lack of a competitive market structure, which is bereft of a transparent price discovery system. The majority of farmers in the country belong to the small and marginal category, who lack the bargaining power to sell their produce at remunerative prices in the Agriculture Produce Marketing Committee (APMC) markets. More often than not, they are forced to sell their produce at unremunerative prices due to distress sales during the immediate post-harvest season, because of their lack of holding capacity, and the exploitation by traders (*arhatiyas*) in APMC markets. The lack of aggregation of produce makes it uneconomical for farmers to transport their produce to the APMC markets for their sale. APMC Acts require that farm produce be sold only at regulated markets through registered intermediaries. Therefore, without the options for alternative and competitive marketing channels near the farm gate, small and marginal farm holders, on most occasions sell their produce at unremunerative prices.

According to the National Commission on Agriculture (1976), the objectives of an efficient marketing system are as follows:

- (a) To enable the farmers as primary producers to reap the best possible benefits;
- (b) To provide facilities for lifting all the produce the farmers are willing to sell, at a price incentive;
- (c) To reduce the price spread between the primary producer and ultimate consumer; and
- (d) To make available all products of farm origin to consumers at a reasonable price without impairing the quality of the produce.

Coinciding with the Green Revolution wherein productivity enhancement was achieved, the country witnessed the emergence of state-regulated

markets. Well-laid out market yards and sub-yards were constructed, and for each market area, an APMC was constituted to frame the rules and enforce them. There are more than 6,600 APMCs in the country. In addition, the country has more than 22,000 Rural Periodical Markets or Grameen Haats (GRAMs) under the control of local bodies, panchayats, councils, APMCs, etc., which lack even the basic amenities and marketing infrastructure. The APMC Acts require that farm produce be sold only at regulated markets through registered intermediaries.

The GoI announces a Minimum Support Price (MSP) in respect of 23 commodities. However, only a few states have strong procurement systems like Punjab, Haryana and Madhya Pradesh, and FCI procures major quantities of wheat from these states (82.5 per cent during Rabi Marketing Year 2020-21). Farmers in these states can sell wheat and paddy at MSPs, which over the years have incentivised farmers to shift to water-guzzling paddy farming from traditional maize cultivation, leading to over-exploitation of groundwater. However, the same is not true in respect of other states and other commodities like pulses and oilseeds, and farmers have been found to receive prices below MSP. Open-ended MSP itself is a big challenge at present. If it is decided for any reason to 'mandate' MSP, we are staring at disappearing export markets, a disrupted domestic supply chain, unmanageable surpluses, and an unaffordable subsidy burden (Kumar, 2020). In the current scenario of complex demands in a surcharged atmosphere, a tectonic shift to a highly decentralised food and agriculture management, giving more legal authority, financial support, and responsibilities to states may be an option worth considering (Kumar, 2020).

Notwithstanding moves to deregulate, fragmented market players continue to dominate. The transportation, marketing, and distribution of agri-food commodities have also not developed scientifically.

The e-NAM is a transformative idea to reform the fragmented agriculture market in the country. The Union Budget 2021-22 had announced the availability of the Agriculture Infrastructure Fund (AIF) to APMCs for augmenting their infrastructure facilities. Also, 1,000 more APMC mandis were to be integrated with e-NAM. Presently, 1.72 crore farmers are registered in the existing 1,000 e-NAMs in 18 states and 3 Union Territories, which have displayed transparency and competitiveness in the agricultural market. However, the goal of a national agriculture market, which would allow farmers to sell their produce at the best available price, through transparent price discovery, anywhere in the country, is still a distant dream.

The enactment of the Farmers' Produce Trade and Commerce (Promotion and Facilitation) Act, 2020 (FPTC Act, 2020), Farmers (Empowerment and Protection) Agreement on Price Assurance and Farm Services Act, 2020

(FAPAFS Act, 2020), and Essential Commodities (Amendment) Act, 2020 (ECA, 2020), signified the ushering in of the long-awaited comprehensive agri-marketing reforms. However, the Acts have since been repealed, in response to the year-long agitation by a section of farmers against the Acts. It is, therefore, imperative for the central and state governments, along with agriculture scientists, economists, farmers, agri-tech companies, the corporate sector, and all stakeholders to start a consultative process to facilitate state governments to enact agriculture marketing reform Acts, and for GoI to enact a law facilitating the easy inter-state movement of agri-commodities/produce. Further, to develop an efficient nation-wide agri-marketing system, e-NAMs need to be scaled up and made more efficient, and all private markets and accredited warehouses should be linked to e-NAMs. Reforms in the agriculture marketing structure in the country would also facilitate the linkage between domestic and export markets.

Research and Development (R&D) and Agriculture Advisory Service

Export-oriented R&D needs to be prioritised to develop varieties of commodities in demand, and comply with packaging, traceability, and food safety (GoI, 2018). For instance, a new variety of Basmati, viz., Pusa 1718, developed by the Indian Agricultural Research Institute (IARI) has the potential to increase the export of Basmati rice, through higher yield and the ability to fight bacterial blight disease.

An effective and technology-driven Agriculture Advisory Service (AAS) along the lines of the United States Department of Agriculture (USDA) and the EU need to be considered, to ensure that farmers adopt an optimal cropping pattern that maximises their income (NITI Aayog, 2018). There is also a need to strengthen both government and private extension services, to function in tandem with AAS.

The needs of farmers in terms of information and technology support have become more complex, due to the rapid pace of developments in the agriculture sector. India needs a vibrant, responsive, market-oriented, and globally competitive agricultural research ecosystem (NITI Aayog, 2017). Budgetary resources for R&D on seeds (HYV and GM), and agri-technology need to be enhanced significantly. The private sector, too, needs to enhance investment in R&D. Further, there is a need to revitalise agriculture extension services by making them more relevant and useful to improve agricultural productivity. Also, efforts need to be made to enhance post-harvest processing and value-added activities at the farm, while also aiming at enhancing exports. FPOs/Farmer Producer Companies (FPCs) could be developed into alternative agencies for providing extension services to farmers.

Climate Mitigation and Adaptation for Sustainable Agriculture Development and Green Trade

Climate Smart Agriculture (CSA) works to reconcile the objectives of sustainably increasing agricultural productivity and incomes, building resilience and adapting agriculture to climate change, and reducing and removing Greenhouse Gas (GHG) emissions from agriculture (FAO, 2019). Drip irrigation is a CSA technology which saves water and energy, while reducing GHG emissions. Expansion in the use of solar-powered Artificial Intelligence (AI)-based drip irrigation systems across all states in India and for major crops, viz., rice, wheat, horticultural crops, and sugarcane can be an integral part of a Water-Energy-Food (WEF) nexus approach to support water-use efficiency, use of renewable energy, and the mitigation of GHG emissions, food security, and sustainable agriculture.

Methane (CH₄) emissions contribute to a third of the current anthropogenic GHG warming. Paddy cultivation contributes about 15-20 per cent of the total anthropogenic CH₄ emissions. Methods like System of Rice Intensification (SRI), drip irrigation, soil amendments, organic matter management, different tillage, rotation, and cultivar selection can facilitate mitigation of methane emission (Roy, 2020).

Green trade has gained prominence in recent years and the WTO has committed to promoting it. Therefore, environment and climate-change concerns are being incorporated into FTAs across the world. Palit (2022) has observed that multilateral efforts to align trade closely to deliver outcomes achieved by the COP26, such as reaching emission reduction goals and facilitating adaptation, should trickle down to narrower trade policy discussions as well. However, this could pose policy challenges for large Emerging Market Economies (EMEs) like India and Brazil. India's new FTA negotiations as well as re-negotiations with existing FTA partners need to incorporate green trade issues to move in the right direction towards achieving the country's 'net zero' ambition by 2070. However, the EU's proposed Carbon-Border Adjustment Mechanism (CBAM), advocating 'carbon prices' or higher tariffs on carbon-intensive imports into the EU will be difficult for India and several other developing countries to accept (Palit, 2022). Nevertheless, green trade needs to be high on India's trade agenda and pursued in a systematically and calibrated manner.

Economic Diplomacy and Promotion of Brand India

Economic diplomacy is one of the most vital factors which determines India's export performance. Diplomatic efforts are also imperative to promote Brand India. The US, for instance, has imposed stricter norms to check pests

and pesticides in case of exports of mangoes and rice from India. Also, some of India's agricultural product test laboratories are not recognised by Russia. Therefore, intense diplomatic efforts are needed to address these as well as SPS-related issues, with India's major trade partners, viz., the EU, the US, the United Kingdom (UK), China, the Association of Southeast Asian Nations (ASEAN), the United Arab Emirates (UAE), and South Asian Association for Regional Cooperation (SAARC) countries, as well as potential export markets across the globe.

The DFI Committee had recommended that a post of Advisor (Agri-trade) be created in Indian embassies, initially in ten selected export markets, to focus on developing trade in all kinds of agricultural goods, beyond cereals and meat (GoI, 2017). The preferred option for such trade could be a short supply chain having a direct linkage with FPOs (GoI, 2017).

Free Trade Agreements for Growth of Agricultural Exports and Fostering India's Agricultural Export Competitiveness

David Ricardo (1817), who popularised the concept of free trade, argued that free trade expands diversity and lowers the prices of goods available in a nation while better exploiting its homegrown resources, knowledge, and specialised skills. FTAs have spread rapidly in the last three decades, as they reduce or eliminate barriers to trade across international borders.

Pohit and Pal (2020) have warned that, in general, an FTA, by changing the rule of the existing trade regime, may increase the transaction cost of trading unless complementary steps are taken, so that the ecosystem of trading does not turn out to be inefficient due to additional complexity. Sun and Reed (2010) find only limited evidence that FTAs have led to multilateral lowering of trade barriers for agricultural products. They show that dynamic results discover more import diversion among FTAs than the static results and that this import diversion is likely due to continued high agricultural tariffs for many non-FTA members. They assert that there is still much work to be done in the WTO to lower tariffs on agricultural products if the world is to reap the benefits from global free trade.

Pal and Mukherjee in Chapter 4, 'Agriculture Trade of India and Implications for Current and Future Trade Agreements, (in this book) have pointed out that India's FTAs and comprehensive economic partnership agreements (CEPAs) have not significantly raised agricultural trade. They have also stated that in most of the FTAs, signed by India, the country has kept quite a few agricultural commodities on the negative list. Further, for many commodities, India has committed a long time horizon to implement the tariff cuts.

According to the High-Level Advisory Group (HLAG) set up by the Ministry of Commerce, GoI, the lack of competitiveness of India's exports acts as a major bottleneck in tapping potential from trade enabled through FTAs/RTAs (GoI, 2019). One of the reasons for India not joining the Regional Comprehensive Economic Partnership (RCEP), which is the largest ever FTA, was the apprehension that the signing of the agreement would flood the Indian dairy market with cheaper imports from New Zealand and Australia, based on the admission that Indian dairy industry is not globally competitive. A multitude of stakeholders, including farmers' organisations, trade unions, and industry associations, spoke in one voice on the adverse implications of the agreement (Dhar, 2019). It has been argued by Dhar (2019) that the FTAs that India has with ASEAN, Korea, and Japan were expected to increase India's exports. However, while exports did not increase as Indian enterprises lack competitiveness, imports from the partner countries expanded. Therefore, Dhar (2019) emphasised that India's future participation in FTAs must be conditioned on improving the competitiveness of domestic entities.

India has in place ten FTAs and six Preferential Trade Agreements (PTAs). Further, India is negotiating sixteen new and expanding seven existing agreements, including with trading partners such as Australia, Canada, the EU, the UK, and the US. India entered into a CEPA with the UAE on 18 February 2022, which is expected to significantly enhance agriculture exports from India. This was followed by the signing of India-Australia Economic Cooperation and Trade Agreement (ECTA) on 2 April 2022, which is the first step towards the signing of a CEPA, within a reasonable time. Further, India and the UK have launched formal FTA negotiations on 13 January 2022. The early harvest agreement between the two countries aims to achieve up to 65 per cent of coverage for goods and up to 40 per cent coverage for services. The coverage for goods is expected to go up to more than 90 per cent of goods, by the time the final agreement is signed. A majority of FTAs/CEPAs under negotiations are comprehensive, covering goods, services, investment, Intellectual Property Rights (IPR), etc. Non-Tariff Measures, regulatory procedures, and trade facilitation are part of such negotiations.

It is reported that India will safeguard the interests of its farm, dairy, and fishery sectors while finalising multilateral or bilateral trade deals, including talks at the 12th Ministerial Conference of the WTO as well as ongoing bilateral trade negotiations.¹ To benefit from FTAs/RTAs, Indian agricultural

¹ Available at <https://www.livemint.com/news/india/india-will-safeguard-agri-dairy-sectors-while-negotiating-ftas-11641496320973.html>, accessed on 28 January 2022.

commodities, as well as dairy and other processed food products, need to be globally competitive in terms of quality and price. This could be ensured with the adoption of hi-tech and precision agriculture through AI and the Internet of Things (IoT), water-use efficiency through solar micro-irrigation, and the development of efficient agri-export value chains. Sectors allied to agriculture, viz., horticulture, dairy, and fisheries have high export potential, especially for value-added products. Therefore, it is imperative to develop efficient export-oriented agriculture and allied sector value-chains to boost export competitiveness, under FTA/RTA regimes. A significant policy reform in this regard is the Production Linked Incentive (PLI) Scheme for the food processing industry, which promises to make processed food globally competitive.

Efficient Export-oriented Agri-Value Chains

Primary products constitute about 75 per cent of APEDA products exported from India, in terms of value (US\$). The AEP has, therefore, underscored the need to promote the export of value-added agri-products to achieve the formidable target of US\$ 100 billion. The AEP has also recommended the establishment of AEZs, to facilitate the value addition of agri-commodities for increasing exports in a WTO-compliant manner.

The agriculture export strategy should prioritise the development of export-oriented value chains in respect of dairy products, processed marine products, processed fruits and vegetables, cereal preparations, and organic food. The agriculture export strategy should include the integration of value-added agriculture produce with Global Value Chains (GVC), by adopting the best agricultural practices involving productivity gains and cost competitiveness (Roy, 2021).

Nearly one-third of the global food production is wasted, yet up to 800 million people are chronically undernourished (World Economic Forum, 2019). In this context, food processing assumes great significance in raising the value of agricultural produce and generating income and employment along the agri-value chains, while reducing wastage of food and alleviating poverty and malnourishment. The majority of India's agriculture exports are low value, raw or semi-processed products that are marketed in bulk. The share of India's high value and value-added agriculture produce in its agriculture export basket is less than 15 per cent, compared to 25 per cent in the US and 49 per cent in China. India's low export of its vast horticultural produce is due to a lack of uniformity in quality, standardisation, and its inability to curtail losses along the value chain. The sector as a whole provides employment opportunities to more than 6.5 million people, which is likely to reach 9 million by 2024 (NABARD, 2018).

The strength of the food processing sector lies in the fact that India is the leading producer of a number of commodities like cereals, milk, banana, mango, chillies, ginger, meat, etc. The country is also the second-largest producer of fruits and vegetables after China, the third largest in marine products, and fifth in poultry production in the world. However, the major cause of concern lies in poor post-harvest infrastructure facilities. The level of processing is the highest in the dairy sector (35 per cent), followed by the meat processing sector (21 per cent), marine fisheries (10.7 per cent), and poultry (6 per cent) (NABARD, 2018).

There needs to be a policy focus on promoting inclusive agri-value chains, for the benefit of small and marginal farm holders. An effective way to make it possible is through strong and efficient FPOs/FPCs. The promotion of Micro, Small and Medium Enterprises (MSMEs) and services sectors assumes significance in the context of reducing over-dependence of the rural population on agriculture and providing alternative livelihood options for farmers. These activities could be made profitable as part of food and agri-value chains. Therefore, DFI requires strong linkages with the manufacturing and service sector to transform the 'agricultural units into agricultural enterprises' (GoI, 2017).

Enlargement in the scope of the 'Operation Greens Scheme', from Tomatoes, Onions, and Potatoes (TOP) to include 22 perishable products, by GoI is a step in the right direction. The Scheme promoted by the Ministry of Food Processing Industries, GoI, aims to boost value addition in agriculture and allied products and their exports, and provide support to promote FPOs, agri-logistics, processing facilities, and professional management. The integrated development of horticulture value chains would provide support to farmers when prices of agri-produce are low. Therefore, the expansion of the Scheme promises to provide income security to a sizable number of farmers, while boosting exports.

Dairy

India's low value of export of dairy products may be attributed mainly to the high domestic consumption demand for milk and milk products. Also, about 81 per cent of the Indian dairy and milk processing market is part of the unorganised sector, which produces milk under unhygienic conditions.

India is the largest producer of milk in the world, having increased from 146.3 million tonnes in 2014-15 to 198.4 million tonnes in 2019-20 (GoI, 2021). However, the country was ranked 36th among exporting countries of dairy products in the world. India's export of dairy products is led by Gujarat Cooperative Milk Marketing Federation Ltd (GCMMF) (Amul), which has emerged as a global brand and is also part of the global dairy trade network.

Amul's success rests on a strong cooperative movement in Gujarat and a technologically developed, professionally managed, and efficient export-oriented dairy value chain. Mother Dairy is another major exporter of dairy products as well as fresh and processed fruits and vegetables, which has developed a strong export value chain.

India's exports of dairy products have experienced fluctuations during the 10-year period (from 2011-12 to 2020-21) (Figure 11.1). The year 2013-14 recorded the highest ever exports at US\$ 546 million, but fell sharply to touch US\$ 115 million in 2015-16, which was followed by a steady increase to US\$ 346 million in 2018-19. Subsequently, exports fell sharply to US\$ 187 million in 2019-20 and rose to US\$ 201 million in 2020-21 (Figure 11.1). The Compound Annual Growth Rate (CAGR) of dairy exports stood at 3.8 per cent during the 10-year period under review (Figure 11.2). The first 5-year period (2011-12 to 2015-16) witnessed a CAGR of 10.8 per cent, while the second period (2016-17 to 2020-21) experienced a CAGR of 8.3 per cent.

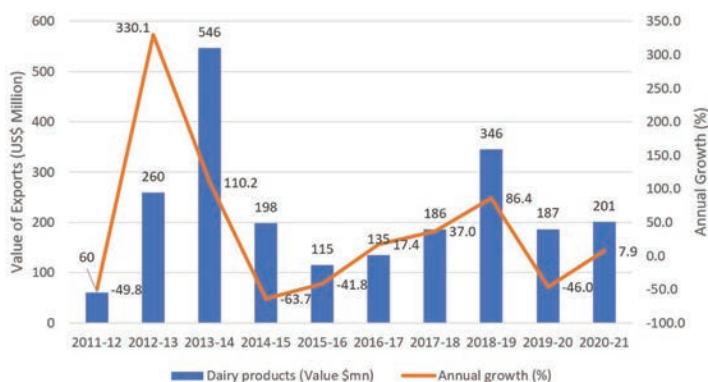


Figure 11.1: India's Exports of Dairy Products

Source: Chart prepared by the author based on data accessed from APEDA Agri Exchange

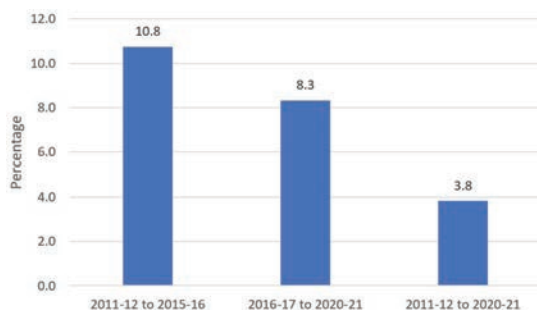


Figure 11.2: CAGR (%) of Exports of Dairy products

Source: Chart prepared by the author based on data accessed from APEDA Agri Exchange

The major destinations of India's dairy products in 2020-21 are the UAE (US\$ 39 million, with a share of 19.5 per cent), Bangladesh (US\$ 24 million; 12 per cent), the US (US\$ 22 million; 11.3 per cent), Bhutan (US\$ 22 million; 11.2 per cent), and Singapore (US\$ 15 million; 7.6 per cent).² Considering India's efforts towards signing FTAs with the UK, the EU, and the UAE, there is a need to expand India's exports of dairy products to these economies, by focusing on the expansion of dairy processing capacity and strategic marketing and branding of dairy products.

To boost the export of dairy products and make the dairy sector globally competitive, GoI needs to consider the development of Dairy Export Zones (DEZs) in collaboration with state governments, in leading milk producing states like Uttar Pradesh, Rajasthan, Madhya Pradesh, Gujarat, Andhra Pradesh, Punjab, Maharashtra, Haryana, Tamil Nadu, and West Bengal (Roy, 2021). Such zones could involve the creation of common infrastructure like a cold chain, chilling plants, processing facilities, R&D facilities, logistics, and connectivity to ports and airports. Leading dairy producers could set up modern hi-tech dairy processing units in the DEZs, for producing globally competitive high-value dairy products. The units in the DEZs could enter into contract farming arrangements with dairy FPOs/FPCs/cooperatives for sourcing milk. Such an arrangement would be mutually beneficial in terms of cost efficiency and higher export revenue to the dairy companies, and higher income for farmers. To ensure higher income for farmers, FPOs need to be linked to AEZs to supply SPS-compliant agri-products.

Fisheries and Marine Products

India is the second largest fish-producing country in the world. A focus on the development of efficient fisheries and marine products value chains could significantly increase employment and improve the income of smallholder farmers.

During the 10-year period from 2011-12 to 2020-21, exports of marine products reached the highest value of exports at US\$ 7,082 million in 2017-18, after 6 years of fluctuations (Figure 11.3). Subsequently, exports witnessed a steady decline to touch US\$ 5,957 million in 2020-21, which could be due to the impact of the Covid-19 pandemic. While during the first 5-year period (from 2011-12 to 2015-16) exports of marine products grew at a CAGR of 10.9 per cent, they slumped to 0.03 per cent during the subsequent 5-year period (from 2016-17 to 2020-21) (Figure 11.4). During the 10-year period, the CAGR stood at 7.3 per cent.

² Source: APEDA Agri Exchange

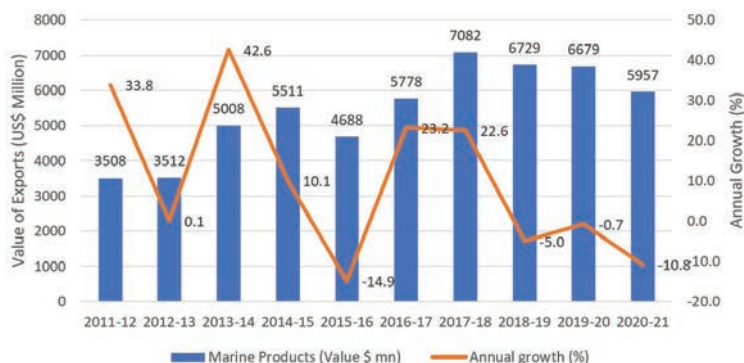


Figure 11.3: India's Exports of Marine Products

Source: Chart prepared by the author based on data accessed from MPEDA

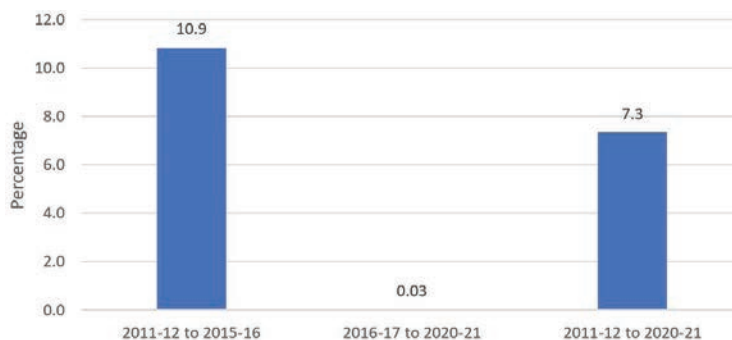


Figure 11.4: CAGR (%) of Exports of Marine Products

Source: Chart prepared by the author based on data accessed from MPEDA

India's major export destinations for marine products are the US (\$2,451.0 million), China (US\$ 939.2 million), the EU (US\$ 821.8 million), South East Asia (US\$ 665.6 million), Japan (US\$ 412.1) and the Middle East (US\$ 251.1).³ The MPEDA, which is the nodal agency for the holistic development of the seafood industry in India to realise its full export potential as a nodal agency, needs to not only focus on consolidating the export growth of marine products to these regions, but also facilitate the expansion of exports to other regions, viz., Australia, Africa, and South America.

There are 621 marine products processing centres in India, under the aegis of MPEDA, with a total capacity of 35,911.5 MT,⁴ located in 13 centres.⁴ Further, the expansion in capacity of the processing centres to meet the growing export demand needs to be prioritised.

³ Data 2020-21 available at https://mpeda.gov.in/?page_id=438, accessed on 30 January 2022.

⁴ Available at http://e-mpeda.nic.in/registration/Rpt_Region_wise_Plants_With_Capacity.aspx, accessed on 11 April 2022.

Processed Cereals, Fruits, and Vegetables

Value addition by way of food processing will play a major role in DFI. Therefore, GoI has sanctioned 42 mega food parks and 315 cold chain projects under PMKSY. Also, investments under PMKSY include the creation/expansion of food processing/preservation capacities; infrastructure for agro-processing clusters; creation of backward and forward linkages; and food safety and quality assurance infrastructure. Infrastructure created under PMKSY can be instrumental in significantly increasing exports of processed food products. Linking of FPOs with the infrastructure so created, through contract farming arrangements with food processing companies, would facilitate an increase in income of small and marginal farm holders, along with small dairy and fish farmers. Further, under Atmanirbhar Bharat's vision, the scheme of the Formalization of Micro Food Processing Enterprises (FME), with an outlay of INR 10,000 crore, can boost value-added agri-exports. The PLI Scheme for the food processing sector has the potential to give a big boost to exports.

Among processed food exported from India, the major items are: (i) cereal preparations; (ii) processed fruits, juices, and nuts; and (iii) processed vegetables. 'Cereal preparations' was the sixth largest item of APEDA exports in 2020-21. The exports of cereal preparations grew by 17.2 per cent in 2020-21 over the previous year, to reach an all-time high of US\$ 635.8 million (Figure 11.5). During the 10-year period (from 2011-12 to 2020-21), exports grew at a CAGR of 4.6 per cent (Figure 11.6). The first 5-year period under review (from 2011-12 to 2015-16) witnessed a CAGR of 7.5 per cent, which declined sharply to 3.4 per cent during 2016-17 and 2020-21. The major

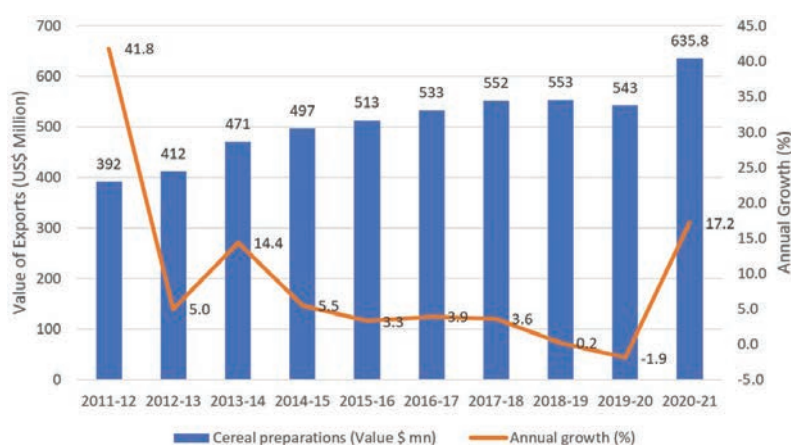


Figure 11.5: India's Exports of Cereal Preparations

Source: Chart prepared by the author based on data accessed from APEDA Agri Exchange

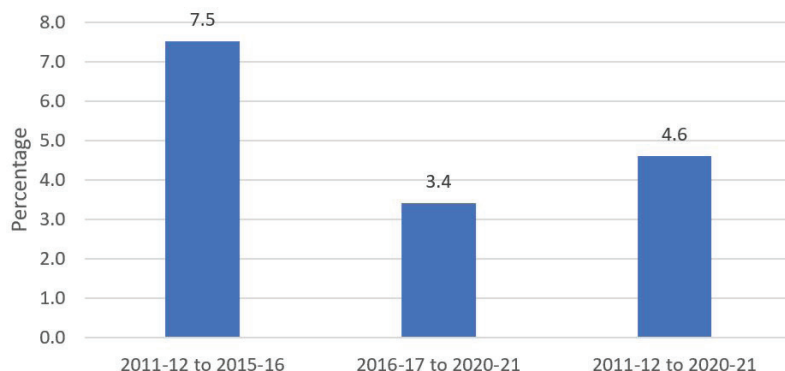


Figure 11.6: CAGR (%) of Exports of Cereal Preparations

Source: Chart prepared by the author based on data accessed from APEDA Agri Exchange

export destinations of cereal preparations are US\$ 102 million, with a share of 19.2 per cent in 2020-21), Nepal (US\$ 44 million; 8.4 per cent), the UAE (US\$ 37 million; 7 per cent); Bangladesh (US\$ 34 million; 6.5 per cent), and the UK (\$33 million; 33.6 per cent). India is a leading producer of cereals in the world and there need to be concerted efforts to not only increase exports to the leading export destinations but also to expand exports to other regions of the world.

India is a leading producer of horticulture crops in the world and there is immense potential for the production and export of processed fruits, juices and nuts. The 10-year period (from 2011-12 to 2020-21) has witnessed a steady growth in exports of fruits, juices and nuts, to touch a record level of US\$ 432 million in 2019-20, which was followed by a marginal decline to US\$ 428 million in 2020-21 (Figure 11.7). The CAGR during this period was 7 per cent (Figure 11.8). However, while the first 5-year period (from 2011-12 to 2015-16) experienced a CAGR of 10.2 per cent, the second period (from 2016-17 to 2020-21) witnessed a sharp decline to 3.3 per cent (Figure 11.8). The major export destinations for this item are the US (\$55 million; with a share of 12.8 per cent in 2020-21),⁵ the Netherlands (US\$ 47 million; 11.1 per cent), Saudi Arabia (US\$ 36 million; 8.5 per cent), the UAE (US\$ 31 million; 7.4 per cent), and Iran (US\$ 17 million; 4.2 per cent). There is a significant potential for exports of fruits, juices, and nuts. Therefore, the sector needs to become globally competitive.

India is a major producer of vegetables and there is a significant potential for the export of processed vegetables. The country witnessed a sharp growth of exports of 9 per cent in respect of processed vegetables in 2020-21 to record an all-time high of US\$ 502 million (Figure 11.9). The

⁵ *Source:* APEDA Agri Exchange

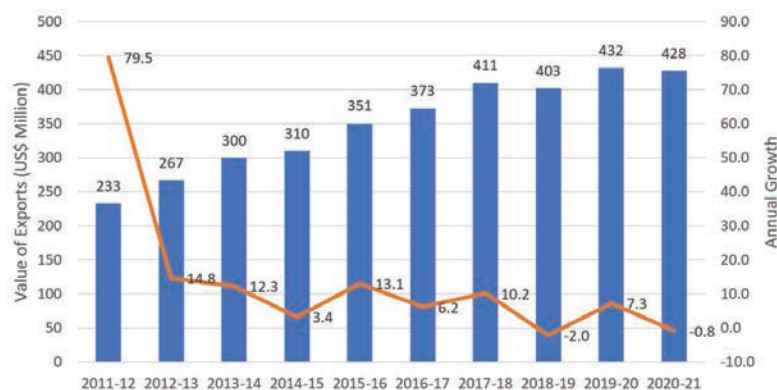


Figure 11.7: India's Exports of Processed Fruits, Juices, and Nuts

Source: Chart prepared by the author based on data accessed from APEDA Agri Exchange

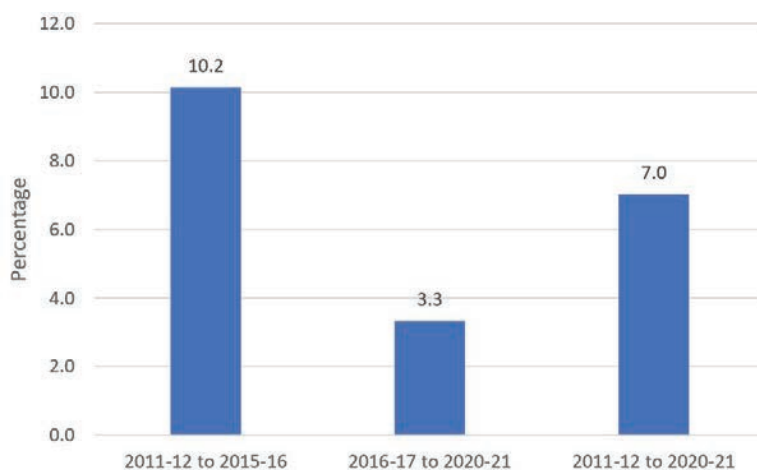


Figure 11.8: CAGR (%) of Exports of Processed Fruits, Juices, and Nuts

Source: Chart prepared by the author based on data accessed from APEDA Agri Exchange

10-year period (from 2011-12 to 2020-21), experienced a decent CAGR of 6.7 per cent (Figure 11.10). While the exports of processed vegetables in the first 5-year period (from 2011-12 to 2015-16) grew at a CAGR of 6 per cent, the second period (from 2016-17 to 2020-21) witnessed a sharp increase in CAGR to 9.3 per cent (Figure 11.10). Such high growth of exports in this sector should encourage further investments and exports, especially under the PLI Scheme. The major export destinations for processed vegetables in 2020-21 are the US (\$102 million, with a share of 20.4 per cent), the UK (US\$ 47 million; 9.4 per cent), Germany (US\$ 31 million; 6.3 per cent), Thailand (US\$ 26 million; 5.3 per cent), and Canada (US\$ 22 million; 4.4 per cent).



Figure 11.9: India's Exports of Processed Vegetables

Source: Chart prepared by the author based on data accessed from APEDA Agri Exchange

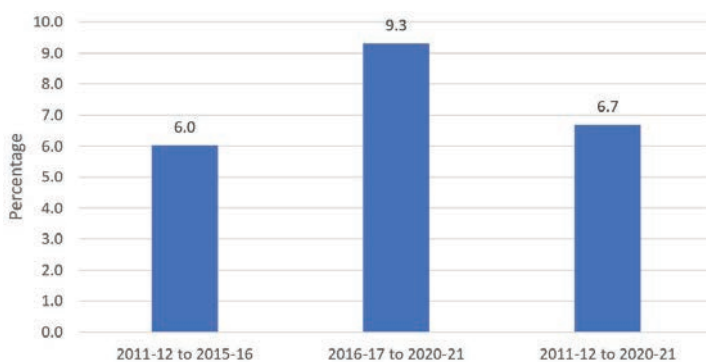


Figure 11.10: CAGR (%) of Exports of Processed Vegetables

Source: Chart prepared by the author based on data accessed from APEDA Agri Exchange

Organic Exports

The Agricultural and Processed Food Products Export Development Authority is implementing the National Programme for Organic Production (NPOP), which involves the accreditation of Certification Bodies, standards for organic production, promotion of organic farming and marketing, etc. The European Commission and Switzerland have recognised NPOP standards for production and accreditation systems for unprocessed plant products as equivalent to their country standards. Similarly, USDA has recognised NPOP conformity assessment procedures of accreditation as equivalent to that of the National Organic Program (NOP) of the US. Further, APEDA is also in the process of bilateral equivalence with South Korea, Taiwan, Canada, Japan, and other countries.

With global trade in organic products estimated to be around US\$ 90 billion, there is a huge opportunity for exports of value-added organic products from India, which exported 8.88 lakh MT of organic products, valued at US\$ 1,041 million in 2020-21.⁶ Further, under the aegis of NPOP, new categories of products such as livestock and aquaculture having good potential for exports, could bolster value-added organic exports. Total production of organic products in India stood at 34,68,992 MT in 2020-21, of which 25.6 per cent was exported. Madhya Pradesh (US\$ 394.6 million),⁷ Maharashtra (US\$ 134.4 million), Gujarat (US\$ 106.3 million), Kerala (US\$ 52.3 million), Haryana (US\$ 51.3 million), Karnataka (US\$ 47.3 million), Telangana (US\$ 41.3 million), Uttar Pradesh (US\$ 41 million), and West Bengal (US\$ 39.7 million) were the major exporters of organic products in 2020-21. The major producers of organic products are Madhya Pradesh (13,92,095.9 MT, which is 40.1 per cent of India's total organic production), Maharashtra (7,75,775 MT), Karnataka (3,55,718.7 MT), Rajasthan (2,56,386.2 MT), Uttar Pradesh (1,83,409 MT), Odisha (1,31,852 MT), Gujarat (1,17,805.7 MT), and Uttarakhand (4,66,454 MT). It is desirable to create Organic Clusters and Organic Product Export Zones (OPEZs) in these states, with common infrastructure for processing, standardisation, storage, logistics, and connectivity to ports and airports. Branding of products and registration as GI could further facilitate exports of value-added organic products. FPOs of organic farmers could be formed and linked to the OPEZs, to ensure higher income for farmers.

The North Eastern Region (NER) produces high quality organic products. But there is hardly any export of these products from this region. FPOs could be promoted in the NER to be part of an efficient organic product export value chain. The airport at Guwahati could be developed for handling cargo for exports of agri-products to South-East Asia and the Indo-Pacific Region.

The major organic items exported from India are processed food (6,55,986.2 MT, valued at US\$ 588.5 million)⁸ having a share of 56.5 per cent in terms of the value of total exports in 2020-21, followed by oilseeds (84,072 MT, valued at US\$ 94.1 million) with a share of 9.0 per cent, cereals and millets (59,907 MT, valued at US\$ 76.0 million), spices and condiments (10,022 MT, valued at US\$ 56 million), and tea (6,164.2 MT, valued at the US\$ 50.7 million). Key markets for India's organic products are the US, the EU, Canada, the UK, South Korea, Israel, and Switzerland. India's FTA

⁶ Available at <https://apeda.gov.in/apedawebsite/organic/data.htm>, accessed on 30 January 2021.

⁷ Ibid.

⁸ Available at https://apeda.gov.in/apedawebsite/organic/data.htm#Category_wise_production_2021, accessed on 30 January 2022.

negotiations with major economies could lead to a significant increase in exports of organic products, especially processed food and other major export items.

Globally, organic products have their niche with high growth potential, owing to an increasing number of health-conscious individuals due to perceived benefits of the 'purity' or 'quality' of the organic ingredients used like herbs and spices. Organic tea tops the list among organic beverage categories. Organic fruit/vegetable juice is projected to have the highest growth rate within the organic beverage category.

Development of Agri-Export Infrastructure

Investment in rural infrastructure is a pre-condition to enable the acceleration of agricultural growth, the creation of new economic opportunities, and the generation of employment. Robust infrastructure is a critical component of efficient agricultural and agri-export value chains. This includes pre- and post-harvest handling facilities, storage and distribution, cold chain, processing facilities, roads, railways and world class exit point infrastructure at ports and airports facilitating quick exports. It is also important to attract private investments in export-oriented activities and infrastructure, in addition to public investment. Further, while the central government may advise and allocate funds, proper implementation of agriculture and market infrastructure reforms lies at the behest of state governments.

Agri Export Zones

Sixty AEZs were notified in twenty states from 2001 to 2004, but they were not able to achieve their objectives and were discontinued. The AEP has recommended the establishment of AEZs, which could be redesigned, to facilitate value addition and common facility creation for increasing exports in a WTO-compatible manner. To ensure higher income for small and marginal holders, FPOs need to be linked to AEZs to supply agri-commodities, which are SPS-compliant.

Agri Export Zones across the country should have food parks and easy connectivity to expressways, railways, airports, and ports. Developing and upgrading airports in two-tier cities as international airports, with easy road and railway connectivity from AEZs and districts under the One District One Product (ODOP) scheme, could facilitate exports of agricultural commodities, processed food, horticulture and dairy products, significantly reducing transport time and minimising loss due to wastage of perishable commodities. A case in point is the Lal Bahadur Shastri International Airport at Varanasi, where the setting up of custom clearance and cold room

facilities, have aided exports of agricultural and processed food products from the Poorvanchal region of Uttar Pradesh consisting of 17 districts. Varanasi also has linkages with a robust network of FPOs. During the 6-month period (July-December 2022), more than 20,000 tonnes of cereals, fruits, and vegetables sourced from farmers in this region have been exported to Bangladesh, Nepal, the UAE, Bahrain, Qatar, Saudi Arabia, the UK, and Australia.

Food Parks and Cold Chain Infrastructure

Setting up of mega food parks, integrated cold chains, food processing units, agro-processing clusters, and implementation of Operations Greens Scheme, under GoI's comprehensive package of PM Kisan SAMPADA Yojana (PMKSY), will not only provide a big boost to the growth of food processing sector in the country but also ensure higher income to farmers, while creating huge employment opportunities, especially in the rural areas, reducing wastage of agricultural produce, and enhancing the export of processed foods. The PLI Scheme for the food processing sector is a step in the right direction, which would enable global competitiveness of the Indian food processing industry.

Linking of FPOs through contract farming arrangements with export-oriented food processing units of food parks created under PMKSY, for producing processed cereals, fruits, vegetables, fish and marine products, would boost exports of processed food and raise the income of small and marginal landholders and small fish farmers.

One District One Product

The Government of India's scheme of ODOP aims to enable products to reap the benefit of scale in terms of procurement of inputs, availing common services and marketing of products. The Scheme provides the framework for value chain development and alignment of support infrastructure. Support for agricultural products under the Scheme is for their processing along with efforts to reduce wastage, proper assaying, storage, and marketing. The state governments identify the food product for a district, keeping in perspective the focus of the Scheme on perishables. The ODOP product could be a perishable agri produce, cereal-based product, or food product widely produced in a district and its allied sectors.

New units, whether for individuals or groups would only be supported for ODOP products. Support for the common infrastructure, marketing, and branding would only be for ODOP products. In case of support for marketing and branding at the state or regional level, the same products of districts not having that product as ODOP could also be included.

The Department of Commerce, Ministry of Commerce and Industry, GoI, is focusing on agriculture crops on a cluster approach for support for exports under the AEP, and the Ministry of Agriculture and Farmers Welfare is also focusing on a cluster approach for the development of specific agriproducts in districts having a comparative advantage. The ODOP approach of the Scheme would lead to easing in providing common facilities and other support services. The ODOP scheme is a systematic and comprehensive approach to boost the production and export of value-added agriculture, horticulture, dairy, and fisheries products, with a balanced development approach, benefitting most districts throughout the country.

Concluding Remarks

India faces the challenging task of propelling its agriculture exports to reach US\$ 100 billion by 2026-27. The prerequisite for achieving the agriculture export targets would be a well-calibrated, comprehensive, strategic, and result-oriented agri-export policy and action plan, along with overall reforms in the agriculture and allied sector. The agriculture export strategy should aim at the integration of value-added agri-produce with the global value chain, by adopting the best agricultural practices along with attaining productivity gains, cost competitiveness, and enhancing farmers' income.

The issues related to SPS, TBT and traceability also need to be firmly addressed. The action plan should include investments in AEZs/agri-export clusters, agro-processing clusters/zones, marketing infrastructure, cold chains, warehouses, roads, railways, and logistics along the export-oriented agri-value chains, connecting to ports and airports through public, private, and Public Private Partnership (PPP) modes. Also, investments in R&D and technology, in the form of IoT, AI, and blockchain-based technology, through a well-defined start-up ecosystem, supporting pre- and post-harvest activities for agri-exports, need focussed attention.

Growing protectionism across major economies is a serious threat to raising exports. This would require intense diplomatic efforts with India's trading partners to finalise trade deals. Efforts to upgrade ECTA to CEPA with Australia, and finalise CEPAs with the EU, the UK, the US and Canada, within the shortest possible timeline, and to promote diversified agri-exports need to gather momentum. Also, business promotion and diplomatic efforts are needed to tap potential agri-export markets on all continents (Roy, 2021). India's new FTA/CEPA negotiations as well as re-negotiations with existing FTA partners also need to incorporate green trade issues to move in the right direction towards achieving its 'net zero' ambition by 2070.

Concerted efforts by GoI, state governments, APEDA, MPEDA, National Dairy Development Board (NDDB), GCMME, exporters, food and agro processing industry, RBI, NABARD, EXIM Bank, banks, agri-tech start-ups, FPOs/FPCs, and all other stakeholders in the agri-export value chains, would be able to address a whole range of issues pertaining to the promotion of agriculture exports. These initiatives and comprehensive reforms in the agriculture sector could propel India into the top bracket of agricultural exporters in the world, while attaining US\$ 100 billion in exports of agriculture and food products by 2026-27.

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