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Processed Fruit and Vegetable Industry Roadmap

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Hector Kobbekaduwa Agrarian Research and Training Institute

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Workshop Proceedings

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FOREWORD

Enhancing nutrition and reducing postharvest losses are two potential benefits of the expanding market for processed fruit and vegetable products. Sri Lanka is well-positioned to serve both local and international markets, as it is blessed with a wide variety of unique and diverse tropical fruits and vegetables.

This roadmap for the processed fruit and vegetable industry includes: (i) the characteristics and structure of the industry; (ii) government policies and available support; (iii) SWOT analyses; and (iv) proposed policy recommendations. Hence, it is my expectation that the policy recommendations derived from this study will contribute to the development of the processed fruit and vegetable industry in Sri Lanka.

I urge decision-makers, the international community, academia, and civil society to view this study not as the conclusion of an analytical endeavour, but as the starting point for a meaningful dialogue on strategic policy decisions and processes to further strengthen Sri Lankan processed fruit and vegetable industry.

Prof A.L. Sandika
Director/Chief Executive Officer

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This workshop would not have been possible without the valuable contributions of fruit and vegetable processors, exporters, and personnel from both government and private institutions, who willingly provided information for the research study and actively participated in the workshop. I also extend my gratitude to all individuals who actively participated in this workshop.

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Finally, I wish to place on record my appreciation to the staff of the Information and Communication Division, HARTI for their assistance and to the Printing Unit, HARTI for publishing the workshop proceedings.

A.K.A. Dissanayake
Workshop Coordinator

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BOI	Board of Investment
CAGR	Compound Annual Growth Rate
CDVI	Cuddy Della Valle Index
CRIB	Credit Information Bureau of Sri Lanka
DEC	Dedicated Economic Centers
DOA	Department of Agriculture
EDB	Export Development Board
FRDI	Fruit Research and Development Institute
FRU	Food Research Unit
FTA	Free Trade Agreements
GMP	Good Manufacturing Process
HARTI	Hector Kobbekaduwa Agrarian Research and Training Institute
IDA	Industrial Development Authority
IDB	Industrial Development Board
IFAD	International Fund for Agricultural Development
IPS	Institute of Policy Studies
ITI	Industrial Technology Institute
LFVPPEA	Lanka Fruit and Vegetable Producers, Processors and Exporters Association
MDA	Mahaweli Development Authority
MOA	Ministry of Agriculture
MOF	Ministry of Finance
MOI	Ministry of Industries
MOT	Ministry of Trade
NEDA	National Enterprise Development Authority
NES	National Export Strategy
NIPHM	National Institute of Post-Harvest management
NRC	National Research Council
NSF	National Science Foundation
SAPP	Smallholder Agribusiness Partnerships Programme
SED	Small Enterprises Development
SLCARP	Sri Lanka Council for Agriculture Research Policy
SLFPA	Sri Lanka Food Processors Association
SLSI	Sri Lanka Standards Institution
SME	Small and Medium Enterprises
TBT	Technical Barriers to Trade
WTO	World Trade Organization

INTRODUCTION

This study aims to formulate a roadmap to strengthen the processed fruit and vegetable industry in Sri Lanka. It is based on a key recommendation from the research study titled: "Processed Fruit and Vegetable Industry in Sri Lanka: Potentials, Barriers, and Prospects", conducted in year 2023 by the Data Management Division of Hector Kobbekaduwa Agrarian Research and Training Institute (HARTI), Sri Lanka.

The processed fruit and vegetable industry roadmap is based on an analysis of secondary data and extensive consultations with relevant stakeholders from both the government and the private sector. Secondary data were mainly obtained from institutions such as Sri Lanka Customs, Department of Census and Statistics, the Ministry of Industries, and Export Development Board. Primary data were collected through a pre-tested structured questionnaire survey, key informant interviews, and case studies conducted in 2023 as part of HARTI research. Further, in order to validate the findings of this research and contextualize the roadmap's development, the Data Management Division of HARTI organized a workshop on "Multi-stakeholder Participatory Approach to Processed Fruit and Vegetable Industry Roadmap Development" on August 7, 2024 at HARTI, Colombo 07. The workshop included participation from government and private sector officials, processors, exporters, and researchers involved in the sector.

This processed fruit and vegetable industry roadmap includes: (i) the characteristics and structure of the industry; (ii) government policies and available support; (iii) SWOT (Strengths, Weaknesses, Opportunities and Threats) analyses; and (iv) proposed policy recommendations.

The industry structure includes: (i) the sectoral coverage of the industry; (ii) its economic performance; and (iii) the profile of industry players and associations. The policy environment section outlines the development framework of the industry, covering a brief history of government support programmes, current policies and programmes, and the relevant regulatory agencies. The SWOT analyses examine the processed fruit and vegetable industry's internal factors (strengths and weaknesses) and external factors (opportunities and threats) that influence its growth and development potential.

This report concludes with specific policy recommendations aimed at addressing the key constraints to the industry's growth and development. These recommendations include improvement strategies to tackle identified challenges, a detailed action plan to implement these strategies, and the designation of responsible institutions for each key activity.

This report is divided into four sections. Section one presents the characteristics and structure of Sri Lanka's processed fruit and vegetable industry, while section two examines the industry's policy environment. Section three provides results of the SWOT analysis. Finally, section four presents the Processed Fruits and Vegetable Roadmap.

INDUSTRY OVERVIEW

Overview of Sri Lankan Processed Fruit and Vegetable Industry

The fruit and vegetable processing sector is a key segment of Sri Lanka's food processing industry. Its development is crucial for the expansion and diversification of the agricultural sector. Sri Lanka has strong potential to produce processed fruit and vegetable products for both domestic and export markets, thanks to the abundance of diverse and flavourful tropical fruit and vegetable varieties.

According to the National Export Strategy of Sri Lanka (2018-2022), the processed food and beverages industry is flourishing, diversifying, and gearing for its next phase of growth. Sri Lanka's potential to expand exports of fresh and processed fruit products is significant because of the high diversity of climatic zones appropriate for growing crops year-round (Department of National Planning, 2019). Key product categories identified for development and promotion in overseas markets include processed vegetables, fruits, concentrates, and juices, all of which have shown rapid growth during the past decade. High-quality canned fruit products such as pineapple juice in light syrup, sliced pineapples, pieces, chunks, and mixed fruits packed in glass jars/tins are among the most sought-after exports from Sri Lanka. Tropical juices made from passion fruit, mango, papaya, pineapple, soursop, and mixed fruits hold strong potential in the tropical fruit juice market due to their unique tropical flavours that are unmatched by other suppliers. Further, gherkin preserved in brine or vinegar have emerged as a noteworthy high-demand product.

According to the Export Development Board, Sri Lanka earned US $ 348.14 million from food and beverage sector in 2024. It earned Rs. 68,961 million from processed fruit and vegetable exports in 2022, and imported 163,127 metric tons of processed fruits and vegetables amounting to Rs. 17,433 million, the same year (Ministry of Industries, 2023).

Statistical Snapshot of Processed Fruit and Vegetable Industry

Fruit and Vegetable Processing Industry Performance in Sri Lanka

The fruit and vegetable processing industry is a core segment of Sri Lanka's food processing sector, and its development is vital for expanding and diversifying the country's agro-industry. By the end of 2023, there were 73 fruit and vegetable processing firms registered with the Sri Lanka Food Processors Association and 26 registered with the Export Development Board. Table 1 presents the growth of fruit and vegetable processing establishments with employees 25 or more from 2015 - 2020.

Table 1: Fruit and Vegetable Processing Industry Indicators (2015-2020)

Year	Indicator				
	No. of Establishments	No. of Employees	Output (Rs.)	Input (Rs.)	Value Added (Rs.)
2015	116	11,595	30,727,170,466	21,815,728,812	8,911,441,655
2016	135	13,695	46,826,515,039	33,267,659,243	13,558,855,796
2017	194	17,387	57,980,500,133	41,079,442,482	16,901,057,651
2018	102	16,637	65,076,101,733	42,407,020,914	22,669,080,819
2019	90	14,460	59,660,502,565	41,769,802,744	17,890,699,821
2020	100	11,001	58,414,779,968	37,075,408,701	21,339,371,267

Source: Authors' Compilation based on Annual Industry Survey, DCS, Various Issues

Number of Processed Fruit and Vegetable Manufacturing Industries and Engaged Persons in Sri Lanka

Table 2: Processing and Preserving of Fruits and Vegetables

Industry	Micro		Small		Medium		Large	
	No. of Estab.	No. of PE	No. of Estab.	No. of PE	No. of Estab.	No. of PE	No. of Estab.	No. of PE
Preserving fruits and nuts in oil or vinegar, excluding preservation in sugar	2	5	2	12	1	25	2	322
Preserving vegetables in oil or vinegar, excluding preservation in sugar	7	12	2	15	1	148	-	-
Manufacture of vegetable-based food products, including packing & canning	9	16	-	-	1	25	-	-
Manufacture of fruit-based food products including packing/canning & the production of jams, marmalades, table jelly	35	68	7	59	6	308	4	1,340
Manufacture of pickle and chutneys, etc	100	139	6	58	-	-	-	-
Manufacture of fruit juices and their concentrates (cordial)	53	112	21	190	4	352	-	-
Processing, preserving, and roasting of nuts, potatoes, and manioc	2,270	3,566	140	1302	9	373	-	-
Manufacture of nut foods and pastes	14	27	9	107	2	50	1	211
Processing and preserving of other F&V products n.e.c (including copra, desiccated coconut)	787	1,493	70	529	34	2,604	2	1,200
Total	**3,277**	**5,438**	**257**	**2,002**	**58**	**3,885**	**8**	**3,073**

Note: PE means Persons Engaged

Source: Department of Census and Statistics (2013/2014 Economic Census) as cited in Ministry of Industries, Industry Data Book, (2022)

Processed Fruit and Vegetable Imports (2020-2022)

Table 3: Total Processed Fruit and Vegetable Imports (2020-2022)

Item	2020		2021		2022	
	Quantity (MT)	Value (Rs. Mn)	Quantity (MT)	Value (Rs. Mn)	Quantity (MT)	Value (Rs. Mn)
Processed Fruit and Vegetable Imports	137,123	10,075	125,939	10,363	163,127	17,433
As % of Total Processed Food Imports	6.40	4.79	6.08	4.20	7.34	4.58

Source: Sri Lanka Customs

Processed fruit and vegetable imports by product category are mentioned in Table 4 and Table 5 respectively.

Table 4: Imports of Fruit Preparations (2021-2022)

Crop	2021			2022*		
	Quantity (t)	Value (Rs 000)	CIF Price (Rs/Kg)	Quantity (t)	Value (Rs 000)	CIF Price (Rs/Kg)
Dried Dates	9,792	2,204,168	225	7,023	2,137,199	304
Frozen Orange Juice	642	228,749	356	747	532,261	712
Non - frozen Orange juice	151	25,091	166	394	95,639	243
Dried Grapes	3,167	796,282	251	1,665	603,746	363
Grape Juice	86	27,120	316	139	62,758	450
Dried Apple	11	9,644	911	7	7,530	1,010
Apple Juice	524	127,071	242	724	283,580	392
Mango Pulp	307	55,217	180	294	110,135	375
Pears	23	2,803	120	15	3,655	251
Cashew Nuts	22	21,984	1,007	85	69,518	822
Kiwifruit	38	25,989	676	10	8,672	847
Pineapples Juice	162	72,880	449	215	203,090	943
Pineapple, Mango	12	2,850	235	10	4,157	428
Frozen Strawberries	0.5	2,930	6,511	36	27,596	758
Preserved Strawberry	4	3,222	774	9	9,588	1,080
Single Citrus Juice	8	9,075	1,120	21	24,208	1,169
Preserved Other Citrus	26	23,463	913	14	10,689	776

Note: * Provisional data
Source: Agricultural Statistics, (2023)

In 2022, Sri Lanka's major processed fruit imports included dried dates, dried grapes, orange juice, apple juice, and mango pulp. For processed vegetables, tomatoes - whether fresh, ketchup and sauces - were the major imports in the same year.

Table 5: Imports of Vegetable Preparations (2021-2022)

Crop	2021			2022*		
	Quantity (t)	Value (Rs 000)	CIF Price (Rs/Kg)	Quantity (t)	Value (Rs 000)	CIF Price (Rs/Kg)
Tomatoes: Whole or in pieces	64	10,405	163	130	30,108	231
Tomatoes: Other	2,720	441,322	162	2,535	715,545	282
Tomato ketchup and sauces	192	57,190	297	217	100,590	463
Beans (*Vigna spp, Phaseolus spp*): Other	93	22,054	237	67	24,586	369
Beans (*Vigna spp, Phaseolus spp*) shelled	31	9,381	300	23	7,738	341
Asparagus	8	1,489	180	7	3,637	504
Gherkins	7	1,238	189	18	6,066	331
Mushrooms of the genus Agaricus: Dried	7	7,021	1,046	1.1	2,029	1,796
Mushrooms of the genus Agaricus: Pre-pared or preserved	268	47,552	177	287	92,052	321
Mixtures of vegetables	171	123,450	722	139	157,257	1,129
Other leguminous vegetables (Dried)	150	8,952	60	92	10,352	112

Note: * Provisional data
Source: Agricultural Statistics, (2023)

Processed Fruit and Vegetable Exports (2020-2022)

Table 6: Total Processed Fruit and Vegetable Exports (2020-2022)

Item	2020		2021		2022	
	Quantity (MT)	Value (Rs. Mn)	Quantity (MT)	Value (Rs. Mn)	Quantity (MT)	Value (Rs. Mn)
Processed F and V Exports	96,675	34,158	114,580	47,184	111,297	68,961
As a % of Total Processed Food Exports	24.57	25.13	26.06	25.45	27.38	27.32

Source: Sri Lanka Customs

Table 7: Exports of Fruit Preparations (2021-2022)

Crop	2021			2022*		
	Quantity (t)	Value (Rs 000)	FOB Price (Rs/Kg)	Quantity (t)	Value (Rs 000)	FOB Price (Rs/Kg)
Cashew	25	56,286	2,212	32	81,450	2,540
Frozen Orange Juice	16	9,261	594	16	18,236	1,125
Non - frozen Orange Juice	27	15,064	557	13	18,618	1,463
Dried Plantains	14	9,258	646	18	23,581	1,299
Dried Other Bananas	348	263,607	757	211	220,556	1,044
Dried Grapes	2	1,195	723	2	1,837	1,036
Dried Pineapple	233	138,652	595	152	199,513	1,311
Preserved Pineapple	219	158,720	724	268	353,158	1,317
Pineapple Juice	475	244,934	515	427	407,388	953
Pineapple, Mango	20	12,145	594	3	6,556	2,060
Passion Juice	55	36,161	661	102	95,733	942
Dried Lemon	1	676	540	13	21,369	1,620
Dried Mango	149	61,722	414	63	165,943	2,648
Mango Pulp	3	1,444	455	1	756	1,508
Dried Other Melons	18	4,150	232	3	1,961	665
Dried Guava	44	23,967	550	72	79,330	1,095

Note: * Provisional data

Source: Agricultural Statistics, (2023)

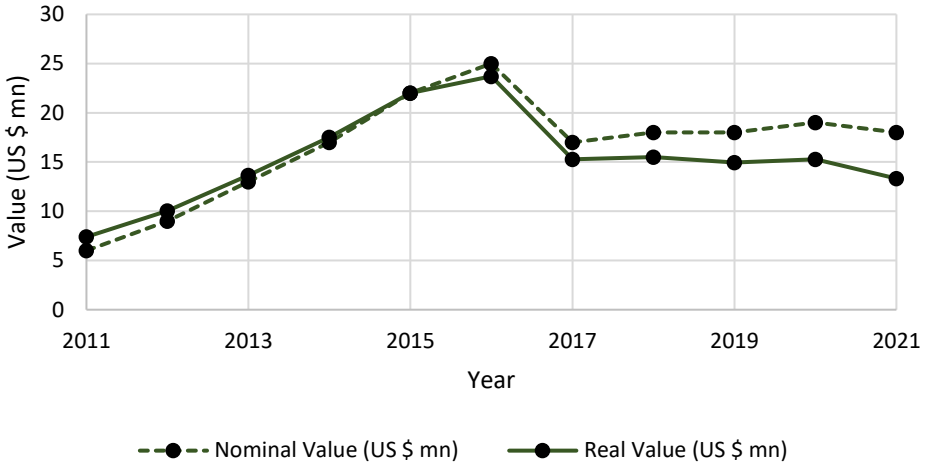
Table 8: Exports of Vegetable Preparations (2021-2022)

Crop	2021			2022*		
	Quantity (t)	Value (Rs 000)	FOB Price (Rs/Kg)	Quantity (t)	Value (Rs 000)	FOB Price (Rs/Kg)
Tomato ketchup and sauces	188	83,145	442	139	74,296	534
Gherkins	6,995	1,519,618	217	6,477	2,523,214	390
Beet sugar (Raw Sugar)	20	2,675	133	-	-	-
Other mushrooms and truffles	2	4,077	2,307	4	8,578	1,922
Other Vegetables (Cooked)	131	69,358	531	279	226,532	812
Vegetable fats and oils and their fractions	29,674	8,480,476	286	8,371	3,955,399	472

Note: * Provisional data

Source: Agricultural Statistics, (2023)

Processed Fruit and Vegetable Exports Trend in Sri Lanka from 2011 – 2021



Note: for real value GDP Deflator, base year =2015.
Source: Dissanayake *et al.,* (2024)

Figure 1: Processed Fruit and Vegetable Exports (2011-2021)

Figure 1 illustrates an overall increasing trend in Sri Lanka's processed fruit and vegetable exports, both in nominal and real terms, except for the years 2017 and 2021.

Table 9: Growth Rates and Instability of Total Processed Fruit and Vegetable Exports (2011-2021)

Indicator	Growth Rate	Instability
Export Value (Nominal)	8.83*	27.08
Export Value (Real)	3.99	30.74

Note: * denotes significant at 10 % level of probability
Source: Dissanayake *et al.,* (2024)

The results revealed positive growth rates for export values in both real and nominal terms. While export values in nominal terms exhibited moderate instability, those in real terms showed high instability.

Table 10: Growth and Instability of Selected Major Processed Fruit and Vegetable Exports (2011-2022)

Product	CAGR (%)		Instability (CDVI %)	
	Export Quantity	Export Value	Export Quantity	Export Value
Processed Pineapple				
Dried pineapple (HS 08043020)	-0.39	-6.21	40.08	55.90
Pineapple (HS 200820)	-5.88*	1.99	29.07	33.28
Pineapple juice (HS 200949)	6.47	11.65	71.66	70.46
Processed Mango				
Dried mango (HS 08045040)	23.64	18.02*	108.09	83.44
Mango pulp (HS 20089910)	-13.85	-12.94*	51.80	49.91
Processed Gherkin				
Gherkin (HS 20011020)	0.26	2.10*	19.85	14.29
Gherkin (HS 07114090)	10.60*	13.80*	237.44	28.75
Processed Tomatoes				
Tomato ketchup (HS 210320)	12.40*	19.89*	55.18	38.70

Note: * indicates significance at 5%, (0-15 = low instability, 15- 30= medium instability and 30 & above = high instability)

Source: Dissanayake *et al.,* (2024)

Growth Rates of Major Processed Fruit and Vegetable Exports from Sri Lanka

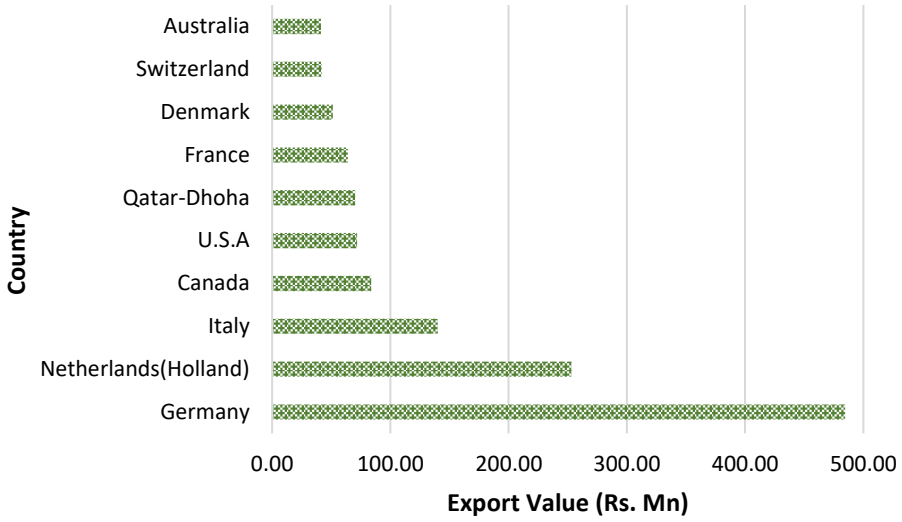
Among processed pineapple products exported, the quantity of pineapple juice has shown a positive growth rate, and dried pineapple has experienced a decline. Both the quantity and value of dried mango exports have grown positively, contrasting with the negative rates observed for mango pulp. For gherkins, exports of both, vinegar/acetic acid preserved and provisionally preserved products have shown positive growth rates. Similarly, the quantity and value of tomato ketchup exports have increased. Comparatively, the export quantity of mango has recorded the highest positive growth rate, while the value of ketchup has shown the highest positive growth rate.

Instability of Major Processed Fruit and Vegetable Exports from Sri Lanka

In processed pineapple products, the export quantities and values of pineapple juice were more unstable than those of juice and raw preparations. Among mango products, dried mango exhibited the highest instability. Of all the processed exports mentioned, only processed gherkin (HS 20011020) showed medium instability in both export quantity and value. However, processed gherkin (HS 07114090) experienced the highest instability in export quantity. Tomato ketchup exports were highly unstable throughout the period under review.

Market Structure for Processed Fruit and Vegetable Exports

Major Processed Fruit Markets in 2022



Note: Fruits considered in this analysis are mango, pineapple, banana, passion fruit, fig, guava, orange, grapefruit, pomelo, lemon and lime.

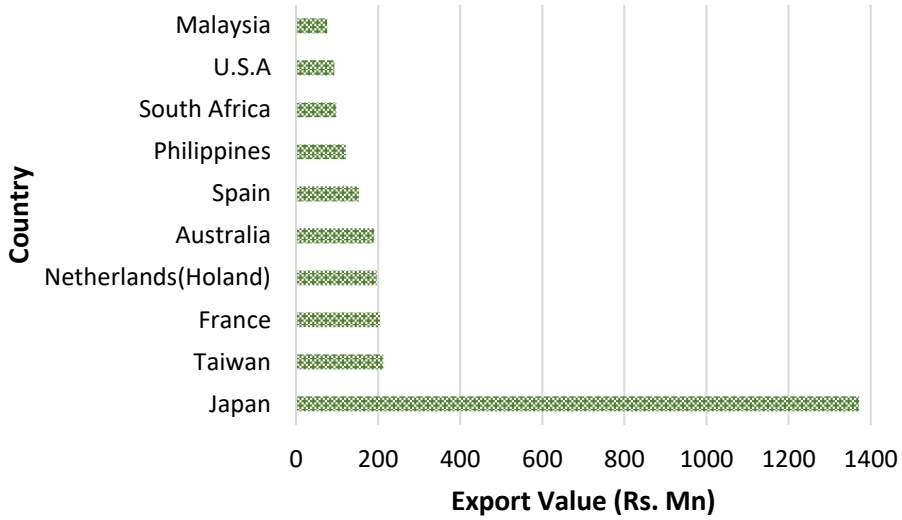
Source: Author's Calculation based on Customs Data, Sri Lanka (2022)

Figure 2: Major Markets for Processed Fruit Exports (2022)

Figure 2 presents Sri Lanka's main export destinations for processed fruits and the export values for each country in 2022. The top importing countries were Germany, the Netherlands, Italy, Canada, the U.S.A., Qatar-Doha, France, Denmark, Switzerland, and Australia (Figure 2). Among these, Sri Lankan processed fruit exports to Germany were recorded the highest, amounting to Rs. 487 million during the year.

Major Processed Vegetable Markets in 2022

Figure 3 presents Sri Lanka's main destinations for processed vegetable and the export value for each country in 2022. The top importing countries were Japan, Taiwan, France, the Netherlands, Australia, Spain, the Philippines, South Africa, the U.S.A., and Malaysia. Among these, processed vegetable exports to Japan recorded the highest value at Rs. 1,372 million in the same year. Gherkin preserved in brine or vinegar are in high demand in the export market, with Japan being the largest importer, followed by Australia, Taiwan, and the Netherlands.



Note: Vegetables considered in this analysis are cucumber, gherkin, tomato, and bean.
Source: Author's calculation based on Customs Data, Sri Lanka (2022)

Figure 3: Major Markets for Processed Vegetable Exports (2022)

POLICY ENVIRONMENT

Government Policy and Support Available in the Sector

Government policies, acts, and strategies related to the processed fruit and vegetable industry in Sri Lanka are summarized in Appendix A and B. This section reviews the most relevant policies and acts affecting the processed fruit and vegetable sector.

National Agriculture Policy (Suggested in 2021)

The National Agriculture Policy, developed under the National Policy Framework, "*vistas of prosperity and splendor"* (2020-2025), aims to transition Sri Lanka's agriculture from subsistence farming to a demand-driven, entrepreneurial, and export-oriented agriculture with import substitution. It also seeks to improve the living and social standards of the farming community, with special emphasis on youth, all within an environmentally sustainable agricultural environment. Within this framework, under thematic area 6, Agri-Entrepreneurship and Markets Policy Statement 8 highlights the importance of fostering strategic collaboration among the value chain actors, with a particular focus on value-added products, targeting both domestic and international markets.

National Industry Policy

The government's industrial policy encourages investment, joint ventures, importation for value addition, and re-exports of specific products to increase the country's most needed foreign exchange (Export Development Board, 2022). In 2023, the National Industry Policy was prepared and submitted to the Cabinet of Ministers and the Committee for Economic Stabilization, Revival, and Growth Enhancement as an urgent measure to support Sri Lanka's industrial growth (Ministry of Industries, 2023).

National Export Strategy (2018-2022)

In 2018, the National Export Strategy (NES) of Sri Lanka was developed under the guidance of the Ministry of Development Strategies and International Trade and the Sri Lanka Export Development Board (EDB), with financial support from the European Union. The NES was a timely initiative aimed at reforming Sri Lanka's export sector. It provides a detailed roadmap for accelerated export growth and highlights the need for a comprehensive work plan to increase trade's contribution to the country's economic development. The NES was developed in consensus with the entire export community, outlining key tasks and addressing barriers that hinder the smooth progress of export trade (Ministry of Development Strategies and International Trade, 2018). The processed food and beverage (F and B) sector is one of the six focus sectors identified in the NES.

Food Act No. 26 of 1980

Food Act No. 26 of 1980 regulates and controls the manufacture, importation, sale, and distribution of food through a Food Advisory Committee by repealing the Food and Drugs Act of 1949 and addresses related and incidental matters.

Regulations Related to the Processed Fruit and Vegetable Industry

- Food Act No 26 of 1980, amended the Food Labelling and Advertising Regulation, 2022
- Colour Coding for Sugar Levels – Liquid Regulation, 2022
- Control Import, Labeling, and Sale of Genetically Modified Foods Regulation, 2006 – No 1456/22
- Food (Preservatives) Regulation, 2019 No. 2113/16
- Food (Additives-General) Regulation, 2019 – No. 2131/2
- Food (Registration of Premises) Regulation, 2019 – No. 26/1980
- Food (Colour Coding for Sugar, Salt, and Fat) Regulation, 2019 – No. 26/1980
- Food (Colour Coding for Sugar Levels) Regulation, 2016 - No. 1965/18
- Food (Sweeteners) Regulation, 2014 – No.1905/36
- Food (Flavouring Substances and Flavour Enhancers) Regulation, 2013 – No. 1795/51
- Food (Shelf Life of Imported Food Items) Regulation, 2011 No.1927/57
- Food (Shelf Life of Imported Food Items) Amended Regulation, 2011 No.1927/57
- Food (Hygiene) Regulation, 2011- No. 1733/47
- Food (Colouring Substances) Regulation, 2006 – 1, No.472/19
- Food (Colouring Substances) Amendment Regulation, 2011- No.1688/28
- Food (Packaging Materials and Articles) Regulation, 2010 – No.1660/30
- Food (Adoption of Standards) Regulation, 2008- No.1838/12
- Food (Vinegar Standards) Regulation, 2007- No.1503/8-2007
- Food (Irradiation) Regulation, 2005 – No 1420/5
- Food (Labelling and Advertising) Regulation, 2005 – No. 1376/9
- Food (Standards) Regulation,1989 – No. 637/18

Standards Introduced for the Processed Fruits and Vegetables Industry

The Sri Lanka Standards Institute (SLSI) has introduced 34 standards (SLS) introduced for fruits and vegetables (Appendix C). Among these, the following three are mandatory for the processed fruits and vegetables industry.

- SLS 214 Compulsory - Fruit Squashes, Fruit Syrups, Fruit Cordials
- SLS 729 Compulsory - Ready to Serve Fruit Drink
- SLS 730 Compulsory - Fruit Squashes Concentrate, Fruit Syrups Concentrate, Fruit Cordials Concentrate

Main Institutes Related to the Processed Fruit and Vegetable Industry and Their Functions

The processed fruit and vegetable industry is an important sub-sector of the Sri Lankan economy, supported by various government, semi-government, and private institutions. Key public sector institutions include the Ministry of Industries (MOI), Industrial Development Board (IDB), Export Development Board (EDB), Fruit Research and Development Institute (FRDI), Department of Agriculture (DOA), Ministry of Agriculture (MOA), Industrial Technology Institute (ITI), and National Institute of Post-Harvest Management (NIPHM). Additionally, premier quality institutions such as Sri Lanka Standards Institution (SLSI) and SGS Lanka Pvt Ltd, play important roles in certification process. Well-established private sector associations such as the Lanka Fruit and Vegetable Producers, Processors and Exporters Association (LFVPPEA) and the Sri Lanka Food Processors Association (SLFPA) also contribute significantly to the advancement of the processed fruit and vegetable industry. The proceeding section discusses the most relevant public, semi-government, and private organizations involved in this sector.

Ministry of Industries (MOI)

Ministry of Industries, the key government Ministry responsible for the processed food industry, provides a range of services including: registration of fruit and vegetable processing industries, provision of credit facilities through funds such as SMILE III – Revolving Fund (RF) Loan Scheme and E-Friends II – Revolving Fund (RF) Loan Scheme; allocation of land and infrastructure through its Development Divisions, supply of inputs, duty concessions for value-added products; recommendations for entry and residence visas, support for entrepreneurship/market linkage programmes, training opportunities, access to laboratory and special facilitation centers, assistance in organizing annual exhibitions/fairs , and tax incentives for exports.

Industrial Development Board (IDB)

The Industrial Development Board (IDB) is a premier state organization under the Ministry of Industries, enacted by the Industrial Development Act No.36 of 1969 to develop the Industrial Sector in Sri Lanka. The IDB provides a wide range of services, including identifying business opportunities, improving product quality and productivity, facilitating project feasibility studies and submission of reports, managing development and consultancy services, providing business information, and developing linkages, engaging in product development, promoting innovation and new technologies, and facilitating infrastructure facilities.

Furthermore, the IDB provides facilities for testing food products assess sugar, salts, fat levels, the nutritional composition for labelling, determining shelf life, food spoilage, food safety, pesticide residues, heavy metals and antibiotics content. It also conducts testing to ensure compliance with SLS and other international standards (Ministry of industries, 2023).

Food Research Unit (FRU)

Food Research Unit (FRU) is a unit of the Department of Agriculture's Horticultural Crop Research and Development Institute (HORDI), primarily responsible for conducting post-harvest technology research and developing value-added food crop products. This unit is also responsible for evaluating the quality of samples obtained through the crop enhancement programme. FRU collaborates with government, semi-government, and private sector entities to develop, transfer, and use machine technology. In addition, it provides facilities and supervision for undergraduate and postgraduate students to research on various aspects of postharvest and food processing technologies.

Fruit Crop Research and Development Institute (FRDI)

Fruit Crop Research and Development Institute (FRDI) was initially established as a Fruit Crop Research and Development Centre on 6th October 2001 at the Kananwila Farm of the Department of Agriculture (DOA) with the mandate to develop and disseminate appropriate technologies to increase commercial fruit production in the country and improving the living standard of farmers. The main objectives of FRDI include providing improved fruit varieties accepted by farmers, introducing technologies for higher productivity and profitability, promoting eco-friendly plant protection methods, reducing post-harvest losses, enhancing value addition, supplying quality seeds and planting materials, and raising awareness among stakeholders about fruit crop-related technologies.

Industrial Technology Institute (ITI)

Industrial Technology Institute (ITI) a pioneer research and development institution in Sri Lanka, is the successor to the Ceylon Institute of Scientific and Industrial Research (CISIR), established in 1955 to provide technical services, conduct research and development, serve as a science information service center and provide testing facilities for quality assurance.

ITI's Contribution to Processed Fruits and Vegetables Sector

The Food Technology Section of the ITI conducts training and workshops on key areas for stakeholders in the food industry upon request. These programmes also include specialized training on fresh and processed fruits and vegetables. To date, ITI has introduced 368 food-based technologies of which 152 are specifically for the processed fruits and vegetables industry.

The training provided by ITI to stakeholders in the food industry includes:

Postharvest Technology

1. Pre and Postharvest quality management of fruits and vegetables
2. Postharvest handling of fresh produce intended for supermarkets/exports
3. Pack house management for better quality and safe produce
4. Postharvest treatments to extend the storage life of fruits

5. Proper packaging and transportation for high-quality produce
6. Minimal processing / fresh-cut technology of fruits and vegetables
7. Safe fruit ripening technology

Fruit and Vegetable Processing Technology

1. Fruit and vegetable dehydration technology/fruit and vegetable powders
2. Osmotically dehydration technology and high sugar preservation
3. Ready to serve drinks/cordials from fruits and vegetables
4. Fruit purees/pulps/concentrates technology
5. Pickling /sauces /brining technology of perishables

Food Microbiology

1. Training on Good Manufacturing Practices (GMP) for food industry
2. Microbiological tools for food industries
3. Probiotic and prebiotics in food industry

Other Training and Workshops Offered by the Food Technology Section

1. Food canning and bottling technology
2. Safety management in the food industry
3. Non-thermal processing technology for fruits and vegetables
4. Shelf-life evaluation of food, real-time method
5. Food safety and quality management
6. Food machinery and unit operations
7. Food packaging and labeling

National Institute of Post-Harvest Management (NIPHM)

The National Institute of Post-Harvest Management (NIPHM) is the main institution in Sri Lanka, to improve post-harvest technologies in rice, other grains, field crops, fruits, vegetables, and spices. The institute conducts post-harvest research, training, extension, consultancy, advisory, and other development activities.

Activities of the National Institute of Post-Harvest Management (NIPHM) related to the Fruit Processing Industry

The National Institute of Post-Harvest Management (NIPHM) conducts training programme on banana dehydration and value addition for small and medium-scale entrepreneurs. These training cover key areas of banana processing; banana dehydration, banana flour production, the use of banana flour in bakery products, and production of banana chips and snacks. NIPHM also conducts training on producing jams, jellies, and other value-added banana products. NIPHM actively engages in technology transfer activities within the Sri Lankan agriculture sector. As a result, numerous new, small, and medium-scale enterprises have been established across the island - producing quality products for their customers. NIPHM also plans to commercialize its technologies, focusing primarily on processed fruit and vegetable-based products, cereal-based products, and bio wax.

Export Development Board (EDB)

The Export Development Board (EDB), established in 1979 under the Sri Lanka Export Development Act No. 40, with the influence and guidance of the International Trade Center (ITC) and the United Nations Conference on Trade and Development (UNCTAD), is Sri Lanka's apex organization for the development and promotion of exports. The EDB consists of several divisions, including the Market Development Division, Export Agriculture Division, Industrial Products Division, Export Services Division, Regional Development Division, Trade Facilitation and Trade Information Division, and Policy and Strategic Planning Division. Its main stakeholders comprise farmers, processors, exporters, government and private institutions, international buyers and affiliated associations.

The EDB has initiated several programmes to support export-oriented agriculture projects at the regional level. These include various awareness programmes on horticultural crops, soil testing, crop selection, crop protection, polyhouse farming, post-harvest technologies such as pack houses, quality certifications, interrelated agriculture projects, and good manufacturing practices (Export Development Board, 2019).

The EDB conducts training programmes and certificate courses for exporters and potential exporters in international trade. Further, it provides export marketing support to enhance the Sri Lankan export industry through market research, advisory services, market intelligence, trade promotion, organizing inward and outward buying and selling missions, along with auxiliary services. The EDB maintains both online and offline versions of the Sri Lanka Exporters Directory - a comprehensive database of Sri Lankan export products, and service providers, and suppliers - offering exporters direct access to global markets and buyers.

Sri Lanka Standards Institute (SLSI)

Sri Lanka Standards Institution (SLSI) is the National Standards Body of Sri Lanka, established under the Bureau of Ceylon Standards Act No. 38 of 1964 and functioned under the name, Bureau of Ceylon Standards until the Act was repealed and replaced by the Sri Lanka Standards Institution Act No. 6 of 1984. SLSI functions under the Ministry of Science, Technology, and Research and is governed by a council appointed by the Minister. The stakeholders of the SLSI are the government, local and foreign organizations registered with SLSI, scientific institutions, and consumers. Functions of SLSI include formulation, revision, and amendment of national standards, product certification, system certification (ISO 9001, ISO 22000, HACCP, GMP, ISO 14001, OHSAS 18001, and SA 8000), laboratory testing services, industrial metrology and instrument calibration services, inspection of imports, quality assurance of exports, training on standardization and quality management, providing information and acting as the national inquiry point to WTO Agreement on Technical Barriers to Trade (WTO/TBT).

Lanka Fruit and Vegetable Producers, Processors and Exporters Association (LFVPPEA)

The Lanka Fruit and Vegetable Producers, Processors and Exporters Association (LFVPPEA) was established in 1986 to create a single platform for all stakeholders involved in the export supply chain of fresh and processed fruits and vegetables in Sri Lanka. At present 54 members are registered in the LFVPPEA. The mission of LFVPPEA is to increase the production of crops with high export potential through improved agricultural productivity, reduce post-harvest losses, improve the quality and safety of available produce, provide linkages between producers and buyers, and, facilitate imports and exports by easing the businesses. Over its 36 years of existence, LFVPPEA has functioned as a bridge between its members and other stakeholders including growers, government ministries, departments, statutory authorities, commercial organizations, and international buyers by facilitating communication and sharing information. Further, LFVPPEA as a premier association in the fruit and vegetable sector influences and advocates national and international business environments, policies, tariffs, and trade agreements, favourably, on behalf of its members and the broader horticulture industry in Sri Lanka.

Sri Lanka Food Processors Association (SLFPA)

The Sri Lanka Food Processors Association (SLEPA) was founded in 1997 as an advocacy group for its apex body comprising small, medium, and large food processors. Its current membership is over 140 companies. The members of SLEPA are producers of food ingredients, grocery items, confectionary and bakery products, frozen foods, fruit and vegetable-based products, and beverages. The association's is to uplift local food and beverage safety and service standards throughout the supply chain to a globally accepted level, foster innovation and collaboration within the industry by supporting services, promote global knowledge and technology transfer, lead the Sri Lankan food and beverage industry to achieve global presence and be a key interface among the government, food processors and the consumer.

SWOT ANALYSIS OF PROCESSED FRUIT AND VEGETABLE INDUSTRY, SRI LANKA

Strengths	Weaknesses
1. Availability of a wide variety of fruits and vegetables offering a material base with a vast potential for agro-processing activities, supported by diverse climate conditions 2. Presence of a variety of underutilized fruits and vegetables with various functional properties 3. Advantage of having well-trained research and extension personnel 4. Ability to adhere to international and national quality standards and obtain certification 5. Availability of protocols, standards, and technologies 6. Availability of assistance to explore export markets 7. Unique flavour and characteristics of products 8. Established demand from processors and exporters	1. Land fragmentation limiting agricultural lands 2. Skilled labour scarcity 3. Price fluctuation of raw materials 4. Migration of skilled workers 5. Absence of well-developed value chains 6. Inadequate infrastructure facilities 7. Lack of appropriate machinery or high technologies compared to competing countries 8. Lack of awareness of government's services and lapses in service delivery 9. High cost of production (wages, costs for packaging, transport, air freight, electricity, etc.) 10. Lack of quality control and testing methods in par with international standards 11. Inadequately developed linkages between research institutes and the industry 12. Minimum facilities for research and development 13. Inadequate supply of quality raw materials 14. Lack of credit facilities for SMEs
Opportunities	**Threats**
1. Development of new value-added products 2. Support from Trade Secretaries at Sri Lankan embassies abroad 3. Rising income levels and changing consumption patterns 4. Bilateral knowledge-sharing opportunities among countries on know-how [e.g., Malaysia, Bangladesh, Free Trade Agreements (FTA)]	1. Lack of bargaining power compared to other competing countries (India, Vietnam, Thailand, China) 2. Trade barriers and regulations 3. Foreign exchange rate fluctuation 4. Changing government procedure

Source: HARTI Processors Survey, (2023); Key Informant Interviews (2023); HARTI Validation Workshop (2024)

SPECIFIC ACTION PLAN

The processed fruit and vegetable industry roadmap identifies key issues and recommends a strategic framework to address critical barriers and constraints to industry expansion. This report incorporates the strategies suggested by experts from both private and government sectors. Furthermore, this roadmap is organized around a number of key issues as follows:

1. Production process related issues
2. Government policies and regulations related issues
3. Financial issues
4. Marketing system related issues
5. Export market related issues

During the HARTI workshop, held on August 7, 2024, several technical issues were identified under the five themes impacting the processed fruit and vegetable industry in Sri Lanka. The workshop also recommended strategies to address these challenges. The outputs from the working groups were synthesized into a comprehensive roadmap for the industry in Sri Lanka. A summary of the key findings from each group discussion is presented below.

Table 11: Production Process Related Issues

Issues	Problems	Improvement strategy to overcome problems	Key Actions	Responsibility
Supply of raw materials	Inadequate supply of quality raw materials	Identification of raw material availability	• Establishing a supplier database	Department of Agriculture (DOA), Ministry of Agriculture (MOA), Ministry of Trade (MOT) - Dedicated Economic Centres (DEC)
		Supply chain development	• Identify potential fruit and vegetable varieties • Variety development • Supply of quality raw materials for primary production • Establish raw material distribution network • Improve the storage facilities	DOA, Private sector organizations, Mahaweli Development Authority (MDA), MOA
		Proper pre-harvest management / adhere to Good Agricultural Practices (GAP)	• Train to adhere proper cultural practices in order to obtain a quality raw material for processing	DOA
	Limited availability of suitable F&V varieties for processing	Development of suitable varieties	• Research and development • Collection and introduction of germplasm for breeding programme	DOA
		Information dissemination	• Disseminate relevant information to farmers and processors	DOA, Private Companies

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Issues	Problems	Improvement strategy to overcome problems	Key Actions	Responsibility
Prices of raw materials	Inconsistency of raw material prices	Forward contract agreements	• Identifying suitable suppliers and processors	MOA, Export Development Board (EDB), Farmer companies, DOA, National Institute of Post-Harvest Management (NIPHM), Government Projects
		Contract grower system	• Establish contract grower system	Private Companies, Farmer Organizations
		Establishment of own farms by processing companies	• Facilitate for establishment of own farms	Private Companies
		Facilitate linkages with leading processors/ farmer groups	• Provision of extension services • Establishing farmer groups	DOA, Department of Agrarian Development (DAD), MOA, Private companies
Cost of production	High cost of inputs: raw material, labour, other inputs (additives/ packaging)	Increase the productivity of land/labour	• Provision of proper extension/ awareness	DOA, MOA, MDA
		Increase the production efficiency and technology adoption / new technology	• Introduce high yielding varieties • Introduce crop cultivation packages/ technical packages / irrigation facilities	DOA, MOA
	High machinery cost	Provide financial facilities	• Introduce financial programmes	Ministry of Finance (MOF), Ministry of Industries (MOI), Industrial Development Board (IDB)
		Granting tax concessions for the importation of machinery and equipment	• Amend favourable policies	MOF, MOI

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(..cont'd Table 11)

Issues	Problems	Improvement strategy to overcome problems	Key Actions	Responsibility
		Encourage local fabricators	• Awareness programmes for manufacturers	MOI, IDB
	High energy cost, Frequent breakdown of electricity	Encourage use of renewable energy	• Facilitate solar/wind power • Introduce subsidized rates	National Engineering Research & Development Centre (NERDC) Ministry of Energy
Awareness on technology	Lack of knowledge to select proper equipment and machinery	Educate and provide necessary information	• Awareness programmes for manufacturers	IDB, Industrial Technology Institute (ITI) NIPHM, Universities
	Lack of appropriate processing technology/ Lack of product consistency	Introduction of appropriate technology	• Awareness programmes for processors • Facilitate the accessibility of advanced technology • Exposure to the foreign expertise/ latest knowledge developed in the field	ITI, IDB, NIHPM, DOA, Sri Lanka Food Processors Association (SLFPA), Lanka Fruit and Vegetable Producers, Processors, and Exporters Association (LFVPPEA)
Packaging	Lack of awareness on selecting suitable packing materials	Capacity building	• Awareness programmes for processors • Training and financial support	MOI, IDB, ITI
	Inadequate packing technology/ suitable packaging	Develop/ adapt from existing technologies	• Develop suitable packaging technology	MOI, IDB, ITI
Infrastructure facility	Lack of cold storage facilities (raw materials/ finished products)	Improving the cold storage facilities	• Provide technology and financial assistance	MOF, DOA, MOA

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Issues	Problems	Improvement strategy to overcome problems	Key Actions	Responsibility
	Shortage of storage facilities at the farm level and refrigerated storage at the markets, ports	Create favourable policy environment for investment	• Encourage financial support from government and private sector	Government, Private Companies, Donor Agencies
		Research and development to determine cost and benefit of storage systems	• Conduct cost-benefit analysis on different storage systems	
Standards and certificati ons	Lack of complying to product certification and system certification	Develop national standards and promote	• Continuous research and development, assessment and dissemination • Implementation and maintenance through training	Sri Lanka Standards Institute (SLSI), Standard Regulatory Authority, Private companies
Laboratory facilities/ services	High cost for testing, Lack of accredited testing/ laboratory facilities	Enhance laboratory facilities/ services	• Introduce advanced technologies • Provide infrastructure facilities to existing laboratories and trained workforce	MOI
		Capacity building	• Training programmes	MOI

Table 12: Government Policies and Regulations Related Issues

Issue	Problems	Improvement strategy to overcome problems	Key Actions	Responsibility
Tax and tariffs	Very high import tax rates, particularly on raw materials such as purees, food additives, machinery, and packaging materials	Revising the tariff policy	• Collection and analysis of data on the existing tax system • Providing policy recommendations	Department of Trade and Investment Policy, MOF, Institute of Policy Studies (IPS), MOI, MOT, SLFPA
License and registration	Difficulties in obtaining license and registration	One-stop facility to obtain the service	• Identification of key stakeholders and gather relevant information • Study the present system and formulate a guideline (checklist) • Amalgamate the institutes involved in the process as much as possible	MOI
Knowledge on rules and regulations	Lack of Knowledge on policies/acts/ regulations/ standards/ guidelines	Information dissemination	• Make participants aware through media campaigns that information exists • Provide production, marketing and technical information • Train users in the use of the information	MOI, IDB, SLSI, MOF, MOA
Institutional procedures	Problems related to government institutional procedures	Establish strong two-way dialogue between government and stakeholders	• Develop a detailed strategic plan to support the vision for the horticulture value chain • Develop specific industry strategic development plans	MOF, MOA, MOI, Donor agencies

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			• Form industry peak body councils comprising producers, processors, wholesalers, retailers, logistic sector service providers, and exporters	
Coordination among related institutes	Lack of coordination among related institutes	Enhance the coordination among relevant institutes	• Adherence to the vision and its supporting developmental strategies • Use facilitators with communication skills as a precondition for receiving further aid • Government legislation to support vertical (contract) and horizontal (cluster farms)	All levels of government legislation: (National, regional, and local), Donor agencies
Importation	Failure to protect locally processed product through illegal/legal importation of all kinds of products.	Amend favourable policies	• Collection and analysis of data on the existing tax system • Provide policy recommendations	MOF, MOI

Source: HARTI Validation Workshop (2024)

Table 13: Financial Issues

Issue	Problems	Improvement strategy to overcome problems	Key Actions	Responsibility
Access to finance	Less access to finance (Starting and working capital) (Producer and industry) - conventional collateral-based products - No security on repayment, no cash flow	Developing/ adopting alternative models Adopting successful models from other countries (Africa/Latin America, India) - Agri value chain finance models/product - Supplier finance models (SME working capital)	• Facilitate structured value chain development • Development and promotion of attractive models • Farmer groups/farmer companies'/ farmer village programme-based financing • Introduction of digital platforms to connect farmers, processing companies and buyers (a platform to operate the model) • Public private collaborative approach (Pre requirement: - structured value chain)	MOI, MOF, Banking sector
Financial literacy	Lack of financial literacy of the farmers - CRIB issues - Effective credit – debt management - Earning and expenses handling	Enhance financial literacy through awareness	• Provision of knowledge and awareness on effective finance management	MOI, MOF, MOA, other relevant organizations work with farming communities
Attitude	Attitude and dignity issues	Upgrading from farmer to entrepreneur	• Knowledge and attitude development programmes	MOI, MOA, DOA

Source: HARTI Validation Workshop (2024)

Table 14: Problems Related to Marketing System

Issue	Problems	Improvement strategy to overcome problems	Key Actions	Responsibility
Consumer Awareness	Lack of consumers awareness regarding processed fruits and vegetable products (quality, labelling, and nutritional content etc.)	Enhance consumers awareness on processed food	• Digital awareness (Television Programmes/ social media) • Highlighting value of processed fruit and vegetables • Promotion campaigns at supermarkets • Establishing special outlets for branded fruit and vegetable products (e.g., Organic)	MOA, DOA, Other relevant authorities, Private sector
Entry barriers	Entry market barriers - Difficult to find buyers - Difficult to enter into new markets/ supermarkets	Creating market linkages	• Trade Exhibitions • Sales outlets • Digital platforms	MOA, DOA, MOI, IDB, Other relevant stakeholders
		Develop strategic alliances with multinational companies and corporations	• Advertising through mass media	MOI, EDB
Data availability	Lack of information and data on existing demand and supply	Conducting market research	• Market researches in provincial or national level	HARTI
Marketing strategies	Lack of marketing strategies	Establishing national/ regional information networking system	• Develop market information systems and appropriate marketing strategies	MOT, MOI, IDB, EDB
Regulations	Too many foods related regulations and gazettes	Need one regulatory body	• Proper coordination mechanism • Establishment of Food Regulatory Authority	MOH, MOI

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			• Periodical issuing of gazettes (5 years' period)	
Packaging	Use of poor packaging technologies and materials reduces marketability of the products	Adoption to modern technology integration	• Introducing modern packaging technology and materials for processors 1. Active packaging 2. Nano-technology	NIPHM, DOA
			• Providing subsidies / loan schemes for processors who are willing to adopt novel technologies, as some require initial high costs	Government banks, Private banks
		Continuous research and development - Conduct consumer surveys	• Conducting continuous research on global novel packaging trends and exploring how they can be customized for Sri Lanka • Investing in research and development to explore new materials that are more durable, cost-effective, and environmentally friendly • Conducting training programmes to disseminate knowledge on modern packaging technologies	NIPHM, DOA, MOA, Universities, Research Institutes
Novel product develop-ment	Lack of new product innovation	Innovation of new product other than utilizing current products	• Developing new product formats that can cater to modern consumer preferences (specially targeting teenagers) - ready-to-eat snacks, single-	NIPHM, DOA, Food Research Unit (FRU), Fruit Research and Development Institute (FRDI),

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			serving portions, exotic flavour profiles from underutilized fruits/yams • Investing in research and development to create innovative products • Conducting consumer surveys and focus groups to understand preferences, concerns • Conducting training programmes to disseminate knowledge on novel product innovations	Universities
High prices compared to fresh produce	High-cost involvement with compare to the fresh fruit and vegetables	Customize products for local/ foreign markets using low-cost packaging materials	• Use of cost-effective lightweight packaging to reduce transportation costs and improve efficiency	DOA, EDB, MOA, MOI, Certification Bodies
		Establish long-term contracts with suppliers to secure better prices for raw materials	• Establish contract agreement/ MOA with raw material/ packaging material suppliers to ensure fair pricing.	MOA, MOI
		Automation of some steps in the production line which reduce the labour cost	• Introducing modern equipment and adopt energy-efficient technologies to reduce utility costs	MOI, DOA,

Source: HARTI Validation Workshop (2024)

Table 15: Export Issues

Issue	Problems	Improvement strategy to overcome problems	Key Actions	Responsibility
Government assistance	Lack of awareness among processors and exporters regarding government services. Lack of government assistance	Increase awareness of processors and exporters	• Re-registration with e technology • Invite the industry to registration through EDB by sector • Raise awareness among registered exporters • B-B programmes • Exporter development programmes • Disseminate awareness/ programmes via platforms e.g., WhatsApp, Newsletter, email	EDB, IDB
		Government monitoring	• New exporters development programmes	DOA, National Plant Quarantine Service (NPQS), EDB, IDB
	Lack of effective export facilitation (from firm establishment to export)	Increase export facilitation by centralizing all relevant authorities	• Single window approach/ one stop shop	EDB, MOI, Ministry of Foreign Affairs (Embassies)
Cost of exporting	High cost of exporting	Establish export lead commercial cultivation	• Micro-village community establishment with amenities and facilities	DOA, Department of co-operatives, EDB, DAD, Mahaweli Authority, Ministry of Irrigation
		Increase economies of scale	• Collective cultivation through co-operatives, government land leases, and farmer hubs for equipment lease • GAP system expansion • High technology e.g., precision agriculture, drone technology, solar system	

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International competition	Strong international competition from other countries	Research and development, Adhere to standards and certification, Identify market opportunities through product diversification e.g., Product: King coconut wine Brands: Ceylon Pineapple	• Large scale production • Monitor quarantine activities • Provide training for researchers • Market research and market promotion • Capacity building for researchers, industry players • Promote attitude change among government officials and update regulations on new products • Incentives to the processors • Relax local regulations for export based products, such as re-exports (strengthen TIEP-temporary imports for export purposes) • Provide facilities for quick freezing	DOA, Sri Lanka Customs, MOT, Private Sector
Foreign exchange rates	Unfavourable foreign exchange rate	Government policies to help exporters	• Provide special benefits for exporters such as relaxed rates and subsidies, re- activation of the Export Development Reward Scheme-(EDRS), Two tire exchange rates	EDB, MOF, Central Bank of Sri Lanka (CBSL)
Trade barriers and non-trade barriers (NTB)	Trade barriers and tariffs Non trade barriers	Identify the NTBs and negotiate at the trade negotiations	• Strategically implement Free Trade Agreements (FTAs) through negotiations to avoid trade barriers, such as estate tariffs imposed by India • Identify the NTB and strategies to minimise those barriers	Department of Commerce, MOF, Ministry of Foreign Affairs

Source: HARTI Validation Workshop (2024)

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APPENDICES

Appendix A: Programmes/ Services Provided by Related Institutes

Programme/Services	Responsible Institutes
Agriculture Modernization Project Financial support for SMEs IFAD/SAPP	MOA
Research (introduce new technologies/ novel products) 50-50 credit facility for machinery and obtaining quality certificates	DOA
Extension (training programmes) Testing facilities Research	FRU
Extension and promote marketing (sales outlet – Gannoruwa)	Agribusiness development division - DOA
Extension (Training programmes)	Provincial Agriculture Ministries
Promote Marketing (sales outlets – Makumbura, Waskaduwa and Katunayake)	Agro Services Authority (WP)
Research (introduce new technologies/ novel products) Extension (training programmes) Testing facilities Development projects	NIPHM
Funding of research	SLCARP/NSF/NRC
Introduce 34 standards for processed fruit and vegetable The Product Certification (the SLS Marks Scheme) Systems Certification such as ISO 9001, ISO 14001, GMP, ISO 22000 Providing training Providing laboratory services Providing information services Calibration of equipment and checking quality of certain identified products are some of the services thus provided SLSI acts as a facilitator for quality but it is not a regulatory body	SLSI
SME loans schemes	MOF and MOI
Tax incentives for exports Financial assistance (Loan schemes)	MOI
Food based technologies (368) – 152 technologies for processed fruit and vegetable Product training programmes Testing facilities R and D on food base technologies Consultancy and contract projects Environmental management services	ITI
Training Programmes Market linkage programmes (domestic and export)	IDB

Testing facilities for food products	IDB and Ministry of Foreign Affairs Food Laboratory, IDB
Market linkage programmes (IDA shop)	IDA
Market linkage programmes (B-B platforms) Export services Training programmes	EDB
Trade exhibitions	IDB, MOI, SLFPA
50-50 credit facility to obtain quality certificates (e.g., GMP)	Divisional Secretariat Divisions
Research and Extension	Research institutes/ Universities/ Vocational University
Entrepreneurship development/market linkage programmes	NEDA
Entrepreneurship development/training	SED
Promote food products Establish sale centers Develop farms Conduct pilot projects	National Food Promotion Board (NFPB)
Offers various incentives for investors	BOI

Source: Author's Own Compilation based on Existing Literature and HARTI Validation Workshop (2024)

Appendix B: National Policies and Acts Available in Processed Fruit and Vegetable Industry

National Policies/Acts/Strategies	Institutes
National Agriculture Policy (2003,2007,2019 and 2021) NAP 2021 (draft) Thematic Area (6) Agri-Entrepreneurship and Markets Policy Goals to be Achieved Link to SDGs Responsible Agencies. Policy Statement 8. Foster strategic collaboration among the value chain actors, especially focusing on value added products, targeting domestic and international markets	Ministry of Agriculture
National Industry Policy (Draft) The 5-year strategic plan (2023-2027) related to the industrial policy Amendment of the Industrial Promotion Act No.46 of 1990 National Policy Framework for SME development	Ministry of Industries
Food Act No. 26 of 1980 Food (Amendment) Act No.20 of 1990 Food (Amendment) Act 2011 National Nutritional Policy National Food Safety Policy (Draft)	Ministry of Health
National Export Strategy (NES) 2018-2022 Trade policy reforms Foreign Direct Investment Policy	Ministry of Investment Promotion Ministry of Trade
National Agricultural Research Policy and Strategy (2018-2027)	SLCARP

Source: Author's Own Compilation based on Existing Literature and HARTI Validation Workshop (2024)

Appendix C: SLS Standards Regarding Fruit and Vegetable Industry

SLS No.	Title
SLS 209	Code of hygienic practice manufacturing of fruit and vegetable products (processed)
SLS 214	Fruit squashes, fruit syrups, fruit cordials
SLS 260	Tomato sauce
SLS 265	Jams, jellies and marmalade
SLS 266	Canned pineapple
SLS 274	Fruit juices
SLS 348	Determination of total solids in fruit juices and extracts
SLS 390	Tomato juice
SLS 399	Pickles
SLS 446	Mango chutney
SLS 536	Canned mangoes
SLS 581	Chili sauce
SLS 729	Ready to serve fruit drink
SLS 730	Fruit squashes concentrate, fruit syrups concentrate, fruit cordials concentrate
SLS 813	Mango nectar
SLS 853	Dried whole chilies
SLS 873-1	Code of hygienic practice for canned foods - Low acid canned foods
SLS 927	Passion fruit juice
SLS 945	Tomato concentrate
SLS 967	Frozen confections and freeze drinks
SLS 997	Canned mushrooms
SLS 998	Canned jackfruit (ripe)
SLS 1041	Mango juice
SLS 1324	Requirement for organic agriculture production and processing
SLS 1332-1	Methods of test for fruit and vegetable products - Fruit juice
SLS 1328	Fruit juice and nectars
SLS 1412 Part 2	Code of practice for fresh fruits and vegetables - Ready-to-eat fresh pre-cut fruits and vegetables
SLS 1572	Table apple
SLS 1584	Table mango
SLS 1611	Fruits and vegetables – physical conditions in cold stores - definitions and measurement
SLS 1612	Apples - Cold storage
SLS 1743	Chutney
SLS 1751	Specification for table grapes
SLS 1767	Requirements for induced fruit ripening

Source: Sri Lanka Standards Institute, (2024)

Appendix D: List of Key Informants and Focus Group Discussion Participants

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