



UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION



STANDARDS *and* TRADE
DEVELOPMENT FACILITY

VALUE CHAIN ANALYSIS ON **PEPPER, CLOVE, AND NUTMEG** IN SRI LANKA



Directorate of Technical Cooperation and
Sustainable Industrial Development (TCS)

Division of SME Competitiveness,
Quality and Job Creation (SME)

August 2023



Co-funded by
the European Union

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ISBN (paper) 978-624-5609-12-3

ISBN (electronic) 978-624-5609-13-0

Published by: United Nations Industrial Development Organization, UNIDO - Project Offices, 133 Kynsey Road, Caritas New Building, Colombo 08, Sri Lanka.

Attribution - Please cite the work as follows: United Nations Industrial Development Organization (UNIDO) 2023. Value chain analysis on pepper, cloves and nutmeg in Sri Lanka. Colombo: UNIDO.

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This publication was funded by the Standards and Trade Development Facility (STDF) and the European Union. Its contents are the sole responsibility of the author(s) and do not necessarily reflect the views of the Standards and Trade Development Facility (STDF) and the European Union.

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Foreword

UNIDO is a specialized agency of the United Nations that promotes industrial development for poverty reduction, inclusive globalization and environmental sustainability. The mandate of UNIDO is to promote and accelerate inclusive and sustainable industrial development in developing countries and economies in transition.

The Directorate of Technical Cooperation and Sustainable Industrial Development (TCS) oversees the Organization's development of capacities for industrial development and industrial policy advice, statistics and research activities, and the Organization's normative contribution to Member States and the global development community in achieving the SDGs. The Directorate also ensures the application of strategies and interventions for sustainable industrial development related to Environment, Energy, SMEs, Competitiveness and Job creation, as well as Digitalization and Artificial Intelligence.

The Division of SME Competitiveness, Quality and Job Creation (TCS/SME) works towards increasing the competitiveness of industries in developing countries and countries in transition, especially emphasizing business development of SMEs engaged in manufacturing and creating jobs therein. It aims at increasing competitiveness among SMEs in two interconnected ways: first, by modernizing businesses through the transfer of advanced technologies adapted to local conditions, product innovation, productivity improvement and upgrading, developing market and value chain readiness as well as improved access to finance; and second, by improving the quality of SME manufactured products and their compliance with market requirements through capacity building for the development of industrial production and trade-related quality infrastructure including for standardization, metrology, accreditation and of conformity assessment service institutions (testing, certification, inspection and calibration) and the strengthening of their capacities.

The Competitiveness, Quality and Compliance Unit (TCS/SME/CQC) builds national and regional production and quality infrastructure systems, with an emphasis on providing internationally recognized services, facilitating SME participation in regional and global value chains; strengthening institutional quality infrastructure capacities (i.e., standardization, metrology, and accreditation); building conformity assessment capacities (testing, inspection, certification, calibration, etc.); and supporting trade facilitation and quality awareness with the public sector, economic operators and consumers, placing a special emphasis on capacitating SMEs.

This publication was prepared by the principal author, Dr. Jairo Villamil, International Value Chain Specialist (TCS/SME/CQC), under the supervision of Mr. Juan Pablo Diaz-Castillo, Industrial Development Officer (TCS/SME/CQC), within the framework of the Project Preparation Grant (PPG) titled "Strengthening food safety and quality compliance for selected Sri Lankan spices," funded by the Standards and Trade Development Facility (STDF). This value chain analysis is the basis for the formulation of a project that intends to strengthen food safety and quality-related (FSQ) compliance with international standards (e.g., Codex Alimentarius), technical regulations, and market requirements along each stage/node of the supply chain for selected Sri Lankan spices.

The principal author wishes to acknowledge his strong collaborators, Sampath Senanayake, National Agri-business Specialist (TCS/SME/CQC), Pamela Sumithrarachchi, National Government Relations Advisor (TCS/SME/CQC), and Sandeepa Gunaratne, National Value Chain Consultant, UNIDO for their support in this effort. Interested readers are invited to contact UNIDO (tcs@unido.org) with any feedback or constructive criticism that might help improve the content of this report.



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Executive Summary

On multiple fronts, Sri Lanka is experiencing a period of profound change due to demand and supply shocks to the spice trade flow. While the convergence of the COVID-19 pandemic and the financial crisis have protracted and posed challenges to the consolidation of this value chain analysis, the primary and secondary research undertaken by international and national experts has materialized in incisive takeaways and a project design that, when implemented, would have immediate to long-term bearing on Sri Lanka's spice industry and export prospects as well as its undergirding food control and quality infrastructure systems.

Sri Lankan spices, especially pepper, cloves and nutmeg (PCN), have a good reputation in the international market. These spices can be used in the preparation and processing of sweets, syrups, juices, sauces, seasonings, and other food-related products. Furthermore, extracts, oils, and resins are used in cosmetics, cleaning products, and pharmaceuticals. However, the integration of Sri Lankan PCN into global value chains is minimal. The international price of Sri Lankan pepper is high, though its share of world exports is low; the main export destination is India. The same trend is true for Sri Lankan nutmeg. Sri Lanka has a fairly high market share of world clove exports at 3.3% and a mid-range price in the international market.

PCN are not yet cultivated on a commercial scale; these spices grow in small farm estates and home gardens of less than 1 hectare on average. Minimal post-harvest activities (primary processing), such as cleaning, drying and grading, take place during the collection process when sold to exporters. Sorting is critical for pepper because prices are mainly based on volumetric density. Pepper has a potential for value addition, with white pepper capturing higher prices. The same applies for oils, oleoresins, and ground pepper. Humid and heavy rainfall are breeding conditions for toxigenic moulds, which increases exposure to aflatoxin contamination. The occurrence of mycotoxins in spices is still prevalent in Sri Lanka. On rare occasions, lead contamination has been detected, possibly due to poor quality control of soil and water for producing and processing.

There is a low institutional capacity to enforce sanitary and phytosanitary (SPS) measures. Very few public laboratories are accredited and the certification of standards (e.g., GAP) for spices is still at an incipient stage. As such, farmers and manufacturers show poor implementation of Good Agricultural Practices (GAP), Good Manufacturing Practices (GMP), Hazard Analysis and Critical Control Points (HACCP), ISO 22000, FSSC 22000 or related schemes in the production, processing, and transport of PCN in Sri Lanka.

The European Union has set stringent maximum residue levels (MRLs) for pesticides in and on food products. As there is no organized pest control system for spices in Sri Lanka, insecticides and fungicides are sometimes used in the cultivation of PCN without any guidelines. Therefore, the risk of non-compliance with respect to pesticide MRLs is high. Sustainability is increasingly critical as the international market tends towards sustainable sourcing and buyers pay more attention on supply chain quality and transparency, such as pesticide use, carbon footprint, water footprint, soil degradation, deforestation, loss of biodiversity, and fair wages for smallholders.

In view of the gaps and constraints facing Sri Lanka's spice industry, there are emergent opportunities for the private sector to capture a far greater market share should they mainstream the self-regulatory application of standards, supported by a stronger enabling environment with respect to food control, quality infrastructure and trade.

Spice-related policies should be conducive to fostering safer and value-added production, rather than basic products sold in raw and bulk form, targeting niche and high-end markets. Further, a strategy for increasing market share, recognition and prices, including for value addition, should be established.

Practices to produce, process and transport spices should be based on standards, product specifications, technical guides, or other such normative documents. Farmers should be encouraged towards minimal and correct application of agro-chemicals and GAP in spice cultivation. Processing and storage facilities should be upgraded to reduce post-harvest damage and loss.



Proper storage and transport systems protected from the elements (e.g., rain, sun, and excessive heat), should be widely established. The self-regulatory application of quality assurance and traceability systems should be adopted to reduce the risk of export rejection and to improve overall food safety, food quality, and enterprise productivity.

The government should promulgate and enforce food control measures, particularly conformity assessment (e.g., test, inspect and audit), for the issuance of certifications based on food safety, quality and environmental standard requirements. Likewise, better quality infrastructure, investment in advanced testing facilities able to detect lower limits of pesticides, aflatoxins, ochratoxins etc., is critical to facilitating exports to developed markets.

Strategic guidance should be given to local associations for better coordination amongst smallholder producers. Likewise, greater attention should be paid to cluster development to establish and formalize linkages between farmers and intermediaries and modern trade. In this manner, clusters can explore organic village concepts for group certification, which, due to economies of scale, yield higher return on investment. This would enable lowering the cost of certification for participating group members.

These recommendations have been incorporated in the solution design for a prospective project titled,

“Strengthening export-oriented quality performance of the spice sector through quality schemes, digitalization and cluster development”. The project aims to contribute to strengthening quality performance and export-orientation of the spices and concentrates (S&C) sector by mainstreaming standards-based best practices towards the achievement of quality schemes, reinforced by the application of ICT-based traceability solutions over the supply chain. This would, thereby, secure quality-based price differentials and facilitate greater price predictability and market access. By establishing a common denominator through standards-setting and defining product specifications, by fostering technical upskilling and upscaling of the S&C sector through the dispersion of standards-based best practices, by leveraging ICT-based tools to reinforce and to demonstrate standards compliance and traceability, particularly for pepper, and by facilitating cluster development to strengthen value chain coordination, governance, and access to trade support services, the sector would enjoy greater organization and convergence under a harmonized system of shared rules of production and practices. These actions would effectively elevate the collective quality reputation of Sri Lankan spices on par with the renowned Ceylon Cinnamon, which had achieved protected geographical indication in the EU under the technical guidance of UNIDO.

List of Abbreviations

ACWL	Advisory Centre on World Trade Organization Law
ADB	Asian Development Bank
AFT	Aflatoxin
APTA	Asia Pacific Free Trade Agreement
ASL	Above Sea Level
B2B	Business-to-Business
BOI	Board of Investment
CAB	Conformity Assessment Body
CAGR	Compound Annual Growth Rate
CAS	Conformity Assessment Services
CBI	Centre for the Promotion of Imports from Developing Countries
CCC	Ceylon Chamber of Commerce
CNCI	Ceylon National Chamber of Industries
CRM	Certified Reference Material
CTM	Community Trade Mark
DEA	Department of Export Agriculture
DEAT	Digital Export Assurance Tool
D/I&EC	Department of Import & Export Control
DOA	Department of Agriculture
DOC	Department of Commerce
ECCSL	European Chamber of Commerce of Sri Lanka
EOI	Expression of Interest
ER	Expected Result
EU	European Union
FAO	Food and Agriculture Organization
FCCISL	Federation of Chambers of Commerce in Sri Lanka
FDA	US Food & Drug Administration
FSQ	Food Safety and Quality
GI	Geographical Indication
GIZ	German Federal Enterprise for International Cooperation
GMP	Good Manufacturing Practices
GSP	Generalised Scheme of Preferences
HACCP	Hazard Analysis and Critical Control Points
ICT	Information and Communication Technology
ICTA	Information and Communication Technology Agency
IELPO	International Economic Law and Policy
IFC	International Finance Corporation
IPS	Institute of Policy Studies
ISFTA	Indo-Sri Lanka Free Trade Agreement
ISO	International Organization for Standardization
IT/BPO	Information Technology/Business Process Outsourcing
ITC	International Trade Centre
ITES	Information Technology Enabled Services
ITI	Industrial Technology Institute
MIC	Ministry of Industry and Commerce of the Government of Sri Lanka
MIP	Multiannual Indicative Programme
MOH	Ministry of Health
MUSSD	Measurement Units, Standards and Services Department
NCE	National Chamber of Exporters of Sri Lanka





NES	National Export Strategy
NIOE	National Institute of Exporters
NPQS	National Plant Quarantine Service
NQIS	National Quality Infrastructure System
NQP	National Quality Policy
NSPSC	National Sanitary and Phytosanitary Committee
NTFC	National Trade Facilitation Committee
NTM	Non-tariff Measure
NTS	National Trade Strategy
OVI	Objectively Verifiable Indicators
PCU	Project Coordination Unit
PCN	Pepper, Cloves and Nutmeg
PHASU	Post-harvest Advisory Service Unit
PSLFTA	Pakistan-Sri Lanka Free Trade Agreement
PPDP	Public-private Dialogue Platform
PPDSC	Public-private Dialogue Steering Committee
PPG	Project Preparation Grant
PSC	Project Steering Committee
QFS	Quality and Food Safety
QI	Quality Infrastructure
RIP	Regional Multi-annual Indicative Programme
RCA	Revealed Comparative Advantage
SAARC	South Asian Association for Regional Cooperation
SAARC-TIP	SAARC Trade Information Network
SAARC-TPN	SAARC Trade Promotion Network
SAFTA	South Asian Free Trade Area
SDG	Sustainable Development Goals
SIMT	Strategy Implementation Management tool
SLAB	Sri Lanka Accreditation Board
SLASSCOM	Sri Lanka Association for Software and Services Companies
SLEDB	Sri Lanka Export Development Board
SLSI	Sri Lanka Standards Institution
SLIP	Sri Lanka Institute of Packaging
SME	Small and Medium-sized Enterprise
SMTQ	Standard, Metrology, Testing and Quality
SPS	Sanitary and Phytosanitary
STDF	Standards and Trade Development Facility
SW	Single Window
TBT	Technical Barriers to Trade
TC	Technical Committee
TFA	Trade Facilitation Agreement
TSI	Trade Support Institution
TVEC	Tertiary and Vocational Education Commission
UAE	United Arab Emirates
UK	United Kingdom
UNIDO	United Nations Industrial Development Organization
USA	United States of America
USAID	United States Agency for International Development
VC	Value Chain
WTI	World Trade Institute
WTO	World Trade Organization

Important Definitions

Accreditation	The formal recognition for a conformity assessment body, which assesses its technical competency and demonstrates that its services are reliable, consistent, and meet recognized international standards.
Accreditation body	Organization responsible for assessing and formally recognizing the competence of conformity assessment bodies.
Agro-climatic Zone	A land unit in terms of major climates, suitable for a certain range of crops and cultivars.
Agro-climatic Zones in Sri Lanka	Wet zone, dry zone, and intermediate zone
Agro-ecological Zones	An Agro-ecological Zone is a land resource mapping unit, defined in terms of climate, landform and soils, and/or land cover, and having a specific range of potentials and constraints for land use (FAO 1996). The essential elements in defining an agro-ecological zone are the growing period, temperature regime and soil mapping unit.
Certificate	Written approval for a product or production process showing compliance with underlying standards. Certificates are usually used only in business-to-business relations (e.g., seller, and buyer) and not with the end consumer (label). Most food safety certification programmes are of this type.
Certification	The procedure by which a third party gives written assurances that a product or a process conforms with a corresponding standard. With certification, a product or process may be labelled as certified.
Chena	The oldest form of cultivation in rain-fed lands in Sri Lanka.
Chena Cultivation	Chena cultivation, or shifting agriculture, is the most primitive type of agriculture known to man from the dawn of civilization, practised in Sri Lanka & some other Asian countries. It does not use the same piece of land (unlike where paddy is grown) and goes on the rotation of crops.
Cropping Seasons	Two major crop seasons of cultivation in Sri Lanka based on these rainfall seasons are Yala and Maha seasons (Department of Agriculture, 2022).
Dry Zone	Mainly the Northern and Eastern parts of the country, low mean annual rainfall (<1,750 mm) with a distinct dry season from May to September (Department of Agriculture, 2022).
Intermediate Zone	Region skirting the central hills (except in the south and the west) separates wet and dry zones, with a mean annual rainfall between 1,750 to 2,500 mm with a short and less prominent dry season (Department of Agriculture, 2022).
Low Country	The region below 300 m in elevation, has 03 agro-climatic zones, low country wet zone, dry zone, and intermediate zone (Department of Agriculture, 2022).
Maha Season	Second Inter Monsoon and North East Monsoon rains are the primary growing season for the country (Department of Agriculture, 2022).
Mid-country	The region ranges from 300 – 900 m elevations, 02 agro-climatic zones, mid-country wet zone and intermediate zone (Department of Agriculture, 2022).
Rainfall seasons	There are four rainfall seasons in Sri Lanka: March to April – First Inter Monsoon (FIM), May to September – South-West Monsoon (SWM), October to November – Second Inter Monsoon (SIM), and November to February – North East Monsoon (NEM) (Department of Agriculture, 2022).
Up-country	The region over 900 m in elevation, with 02 agro-climatic zones, up-country wet zone and intermediate zone (Department of Agriculture, 2022).
Wet Zone	The Southwestern region, including the western slope of the central hills, has relatively high mean annual rainfall (>2,500 mm) without pronounced dry periods (Department of Agriculture, 2022).
Yala Season	FIM and SWM rains are in effect, as SWM is ineffective in the Dry zone; the Yala season is restricted to 02 months (mid-March to early May). Considered the minor growing season for the Dry zone (Department of Agriculture, 2022).



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1 Introduction

1.1 Objective

UNIDO is acting under a Project Preparation Grant (PPG) funded by the Standards and Trade Development Facility (STDF) to formulate a project proposal/document to strengthen food safety and quality-related (FSQ) compliance with international standards (e.g., Codex Alimentarius), technical regulations, and market requirements along each stage/node of the supply chain for selected Sri Lankan spices through the application of information and communication technology (e.g., ICT-based traceability solutions).

This document intends to offer comprehensive value chain (VC) analyses on three spices produced in Sri Lanka, i.e., Pepper, Cloves, and Nutmeg (PCN). It focusses on existing gaps in FSQ and the environment required to access international markets to increase competitiveness in international trade.

Attention is given to value chains, which process and transform primary products into consumable goods, thereby generating value addition. We present the prevailing product non-conformities due to breaches in SPS (e.g., mycotoxin or microbiological contamination) and quality-related (e.g., mixing with low-value produce) parameters. We also explore the potential for competitive advantage in terms of quality differentiation and cost for these spices.

This report offers a practical approach and diagnostics of industrial value chains. It presents an analytical framework and rationale, suggests parameters and indicators, and gives guidance based on data and evidence to make results transparent and concrete.

As part of the analysis, we present the current situation, and the impact of the Covid-19 pandemic on production and trade. The assessment will ascertain if there is a critical mass of farms and enterprises producing the spices that have the potential to achieve sufficient internal (at the provincial or district level) organisation, such as well-defined processes and methods of operation, a quality management system, and qualified staff to pursue associative collaboration for exports (e.g., standard traceability system, export consortia).

The document presents consumption patterns and health issues at the national level. It also considers

the interaction of producers, processors, associations, government agencies and competent authorities, and their willingness to accept forms of third-party inspection/verification/control, and to invest in compliance-related upgrades. The required support of financial instruments for such actions and investments are also considered.

Additionally, we examine the potential application of an Export Assurance System, a methodology used to create enough control and procedures to minimise the risk of rejection of exports while providing the opportunity to increase quality and value addition. Furthermore, we explore the benefits of using a Digital Export Assurance Tool (DEAT), which includes the record-keeping of compliance, management systems, certification, testing, inspection, and product traceability. Similarly, a cost-effective approach for traceability in respect of the current operations of supply chain actors is applied.

As one of the analytical tools, the value chain approach allows for defining competencies and opportunities that lead to competitive advantage. Hence, this study presents the key findings on value chain opportunities of the three selected spices, outline the current situation, identify constraints and issues that are predominant in the value chains starting from farm gate to distribution channels and end markets. We trust that the findings of this report will serve as a basis for designing value chain development activities, and further research on business-oriented spice value chains in Sri Lanka.

We end the document by giving recommendations and presenting a potential way forward for each spice. The recommendation for Sri Lankan spices will be based on these VC analyses that determine the product's relevance, opportunity, and feasibility concerning the potential for market development via export promotion. Within the time frame of the PPG, potential donors would be consulted to gauge interest in the resulting project. The final output of this PPG is the VC analyses and the project proposal document, including a synopsis of VC analyses, a bibliography of reference documents, a list of proposed activities, a logical framework, a tentative budget and a compendium of key activities carried out during the PPG.



1.1.1 Scope

This study covers the following areas:

- Analytical work to identify food safety gaps in the spices pepper, clove and nutmeg (PCN);
- Consideration of Codex standards for spices, specifically the code of hygiene practice for spices and dried herb spices;
- Research on VC key stakeholder compliance levels on Safety, Quality Standards & Certification to build relationships and explore the insights;
- Focus on improving food safety practices with training on good agricultural and hygiene practices;
- To identify and prioritise actions needed to reduce alerts and border rejections and develop global competitiveness for value chain actors;
- Exploration of using ICT-based technologies such as DEAT.

1.1.2 Audience

This report is written to provide evidence-based information and actionable recommendations to spice associations, training and support centres, government agencies, spice exporters, farmers, manufacturers, and government sector stakeholders.

This report should help them to decide a way forward on how to improve competitiveness, food safety, market compliance, and quality. Moreover, it will be the base of a project proposal to provide the sector with the necessary technical assistance to achieve the required level of compliance and the desired level of competitiveness.

1.2 Methodology

1.2.1 Conceptual Framework

Simply put, a value chain (VC) describes the full range of activities required to bring a product from the producer to the final consumer through different phases of value addition and processing. It provides a more holistic picture of the socio-economic environment that VC stakeholders operate in, describes the structure of the market, traces the distribution of benefits along the chain, diagnoses the opportunities, constraints and competitive advantage of a firm/industry, and allows for the formulation of more integrated solutions.

The standard VC Analysis method was used to study the PCN spices; this framework consists of 4 steps (Fig. 1): 1) data collection; 2) value chain mapping; 3) analysis of opportunities & constraints; and 4) vetting findings

& proposing recommendations. Both primary and secondary data were collected in the first step. These collected data will be analysed in the mapping exercise in the second step to identify the constraints, and opportunities in the third step.

1.2.2 Data Collection & Sampling

The study utilized a mix of quantitative and qualitative methods for data collection, and a participatory/consultative approach was adopted throughout the process. Secondary data collection included a

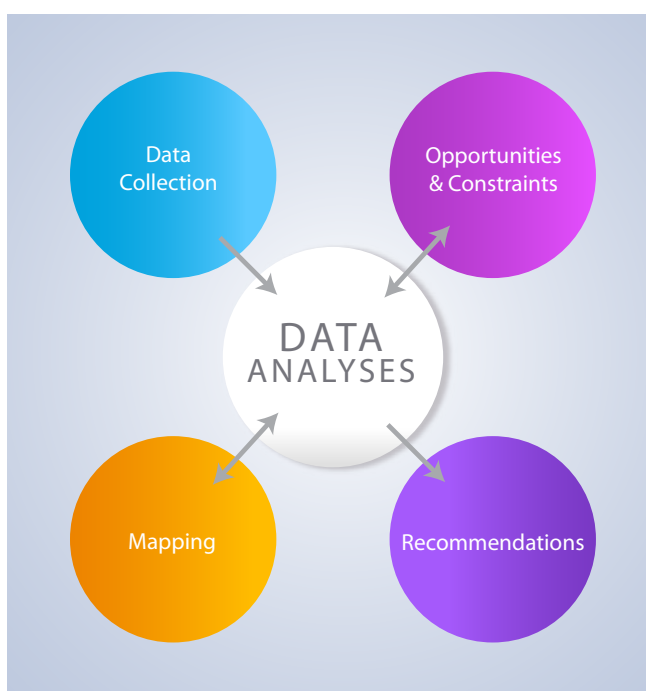


Figure 1: VC analysis process

Source: UNIDO-SL VC analysis of pepper, clove, and nutmeg

compilation of documents with relevance to the focus of the study through a desk review. Sources of information included: academic journals, libraries, educational institutions, organizational reports, articles, documents, nationally published data sources, the internet, etc.; the desk review was undertaken before the fieldwork/primary data collection.

The Department of Export Agriculture (DEA) is the state organization responsible for increasing foreign exchange earnings from the Export Agricultural Crops (EAC) Sector through increasing the production, productivity, quality improvement of products and enhancing the value addition capacity of primary produce. The DEA was consulted to obtain sectoral information on pepper, nutmeg and cloves. The data related to exports were obtained from the Sri Lanka Export Development Board (SLEDB) and trademap.org, the apex organization handling exports from Sri Lanka.

1.2.3 Study Area Selection

The main criteria for selecting the major producing districts for primary data collection were the extent of cultivation and the quantity produced.

Pepper is mainly cultivated in the low and mid-country wet and intermediate agro-climatic zones. The total extent of pepper in Sri Lanka is approximately 42,989 ha, and Matale, Kandy, Kegalle, Badulla, Ratnapura, Monaragala, and Kurunegala are the major districts (Department of Export Agriculture, 2022).

Cloves are mainly grown in the mid-country wet zone of Sri Lanka. The total extent of cloves is 7618 ha, and Kandy, Kegalle and Matale districts are the major growing areas (Department of Export Agriculture, 2022).

Nutmeg prefers a cooler climate; hence the mid-country areas of Sri Lanka are ideal for their growth. The total extent of nutmeg in Sri Lanka is 2788 ha of which 80% of the extent is in the Kandy district. Other major growing areas are Kegalle and Matale districts (Department of Export Agriculture, 2022).

For this study, producers and intermediaries were interviewed from the Kandy, Matale, and Kegalle districts, given the cultivated extent and quantity, time and resource constraints.

schematically and explained for a better understanding of the market structure, dynamics, and nurturing environment, including quality standards and safety regulations.

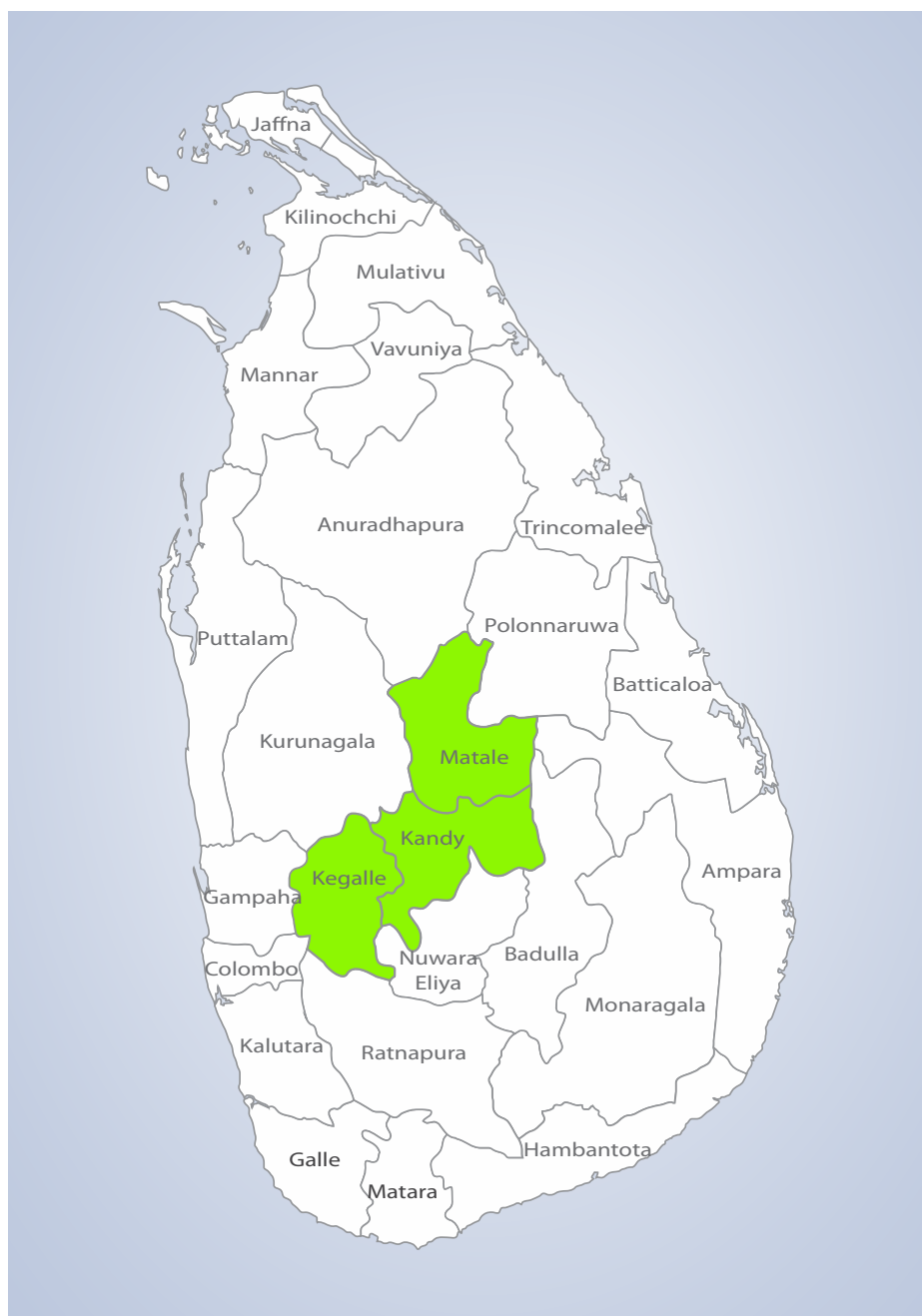


Figure 2: Areas covered by the field survey for three spice crops
Source: UNIDO-SL VC analysis of pepper, clove, and nutmeg

1.2.4 Data Analysis & Mapping

Qualitative and quantitative information was used for mapping actors, their functions and relationships, and identifying constraints and opportunities in the value chains. Final products and markets, key functions/activities, different market channels, actors, enabling environment and linkages/relationships were mapped

Value chain mapping is developing a visual depiction of the basic structure of the value chain. A value chain map illustrates how the product flows from raw materials to end markets and presents how the industry functions. Final products and markets, key functions/activities, different market channels, actors, enabling environment and linkages/relationships are mapped schematically.



1.2.5 Secondary Research

Secondary research helped to prevent repetition by mapping out existing analysis and concentrating on exploring apparent gaps and potential recommendations.

Secondary research allowed existing data to better understand research findings and identify knowledge gaps. We cannot account for the validity of the existing research materials, but it helps to corroborate and contrast data and first-hand information.

The literature review covered three broad areas:

1. The PCN spice sector and its contribution to the Sri Lankan economy;
2. SPS-related compliance and trade performance and enhancement potential;
3. Female labour force participation in the spice sector.

Moreover, after considering the information from previous reports and secondary sources, we concentrated on primary research that gave further and more updated insights into the situation on the PCN value chain. Sri Lanka's female labour force participation rate, at 36% of the population over the age of 15 in 2016, is among the lowest in the region. Yet women's workforce participation in Sri Lanka's Northern Province is even lower (25 % in 2016) and an even greater cause for concern (Gunatilaka & Vithanagama, 2021)

However, due to the prevailing COVID-19 restrictions and movement limitations, FGDs and KII were not conducted. The selection of the sample of farmers and intermediaries was made in consultation with the Department of Export Agriculture (DEA) and its Extension Officers (EO) and Development Officers (DO) to ensure optimum representation of the stakeholders (e.g., small, medium and large players).

The survey forms of the UNIDO for farmers and the intermediary category comprising spice collectors and traders in the districts were shared with the DEA, and the Assistant Directors as officers-in-charge of the three districts, in turn, shared with the selected DOs to implement the survey activities. UNIDO conducted a virtual training session for the DEA officials to elaborate on the survey activities.

Primary data was collected through the questionnaire survey, complemented by direct observation by the Development Officers of the DEA in the field. These methods allowed for an in-depth exploration of value chains and yielded information that facilitated a deeper understanding of the constraints and opportunities in the respective value chains.

A semi-structured questionnaire was prepared towards this end to gather information. The key stakeholders in the spice value chain interview included: large-scale



1.2.6 Primary Research

Primary data was gathered through a mix of data collection methods: 1) questionnaire survey, 2) focus group discussions (FGDs), and 3) key informant interviews (KIIs), which were complemented by direct observation in the field. These methods allow for an in-depth exploration of value chains and yield information that facilitates a better understanding of the constraints and opportunities in the respective value chains.

vertically integrated companies, plantation companies, processors/exporters, agents/ brokers, wholesalers (regional and Colombo), village collectors, government officials (from ITI, SLSI, DEA, etc.), and private associations representing the industry (Spice Council, SAPPTA). After an initial mapping for the interviews, we identified the stakeholders purposefully to capture diverse responses. The informant pool expanded using snowballing techniques whereby informants were asked to refer to other potential interviewees.



1.2.7 Validation

A validation workshop was held in a hybrid/mixed mode on 04 November 2022 to evaluate, discuss, and validate the study's results on the integrated value chain analysis to validate findings from the desk study and field investigation and fill in any missing gaps through stakeholder engagement. The workshop had a blended format, allowing participants to attend the event physically at the Galle Face Hotel in Colombo, Sri Lanka, or via the zoom platform. The workshop provided a platform for the public and private sectors, and academia stakeholders, to exchange experiences.

The objective of the validation workshop

The objectives were to: encourage active engagement and instil a sense of ownership over the project design and their partnership in future implementation; validate key takeaways, recommendations, and project design; and address our blind spots to calibrate our project design.

A breakout session

The breakout session created a more personal feel that feeds off active engagement from the audience. A breakout session was organized to learn, discuss, brainstorm, confirm the findings, and formulate recommendations binding to the stakeholders; all the questions and topics revolved around the workshop's main theme. The forum was structured around two plenary sessions during the half a day event and

streamed online for open participation based on prior registration.

Discussion topics for select spices: Pepper, Cloves, and Nutmeg

Plenary Session 1 – VC Methodology & Key Takeaways:

- Main constraints to low production volume;
- Standards, quality assurance, and quality management system;
- Quality-based price differentiation and predictability;
- Cluster development and shortening the value chain;
- Marketing and market access barriers, and consumption patterns.

Plenary session 2 – Impact, related benefits, and expected contributions to the project implementation:

- Standards, product specifications, and related practices;
- Value chain coordination and cluster development;
- Backward integration of exporters and price stability;
- Capacity building and mainstreaming application quality schemes;
- Introduction of technology to reinforce quality compliance and to strengthen traceability/transparency along the value chain.



During the workshop, findings were presented and discussed, and different perspectives and positions were exchanged and compared. The findings were validated and revised in consultation with the stakeholders.

1.3 Global Demand

The global Spices and Seasonings market is projected to grow from USD 18.47 billion in 2022 to USD 25.42 billion by 2029, exhibiting a compound annual growth rate (CAGR) of 4.67% during the forecast period. (Spices and seasonings market size, industry share, growth rate, 2023). Increasing demand for authentic cuisines globally is one of the foremost factors driving the consumption of spices. The growing fondness for enjoying various flavours in foods and snacks will likely prompt manufacturers to produce high-quality, appealing, and reliable products that maintain consistent standards globally. Spices can alter the taste of specific cuisines and correlate with the flavours of various regions. For instance, the Middle East and Southeast Asia are likely to contribute to fusions, which is expected to gain presence in the market over the forecast period (Grand View Research, Inc., 2022).

Pepper accounted for more than 15% of the global revenue in 2019. Pepper is an aromatic spice derived from the fruit peppercorn and has been used for centuries. It includes black pepper, green pepper, and white pepper, available in whole or ground form (Grand View Research, Inc., 2022).

Powdered spices accounted for more than 50% of the global revenue in 2019. Growing consumer preference for whole spices to save time and attain authentic flavour is anticipated to propel their demand. These products are sold mainly in the form of various mixes. Powdered forms are used as marinades, rubs, snack mixes, and flavouring agents for curries (Grand View Research, Inc., 2022).

The whole spice segment is expected to register the fastest CAGR of 6.8% from 2020 to 2027. Whole spices are preferred owing to their contribution to fresh and vibrant flavours, which make them immensely important for foods. They have a longer shelf life than other counterparts. These work best for dishes that are simmered for a long time as it allows the full depth of their flavour to permeate the dish (Grand View Research, Inc., 2022).

The Asia-Pacific region is one of the leading producers and exporters of spices. This region held the largest market share of over 35% in 2019. It has the largest population in the world and has been witnessing impressive growth in the demand for spices. Most of the spices and herbs are grown in countries such as India, Vietnam, China, and Thailand, thus making the region the major exporter in the world (Grand View Research, Inc., 2022).

Consumption in the region also proliferates with the emergence of marketing and promotional activities, increasing consumer income, and the growth of domestic brands. Some known players in the market

are AJINOMOTO, Everest, Catch, Ariake Japan, and MDH. China is one of the largest consumers of spices in the Asia-Pacific. The demand is primarily driven by domestic consumption, followed by eatery outlets. The diversification in daily diet across China, owing to a rise in individual income amid economic growth, has led to various possibilities in catering to the demand for seasoning and spices (Grand View Research, Inc., 2022).

1.4 Sri Lankan Advantage and Opportunity

This study responds to the call by focusing on the minor export crops in Sri Lanka, such as the nutmeg, clove and pepper farms, due to their economic value creation. These crops have since become one of the emerging sectors in the country due to its highest foreign exchange earnings. According to the EDB's report on "Export performance indicators of Sri Lanka 2011-2020" the total value of spices, essential oils & oleoresins exports were USD 335.5 million in 2020 (EDB, 2021). Currently, Sri Lanka is the ninth most important exporter of spices (specifically cinnamon, pepper, cloves, cardamom and nutmeg) in the world and it is the largest producer and exporter of 'true cinnamon in the world' (Export Development Board, 2022). Because of the increasing demands for these spices by the food and medical industries, the government of Sri Lanka has set high export expectations for these crops.

Cinnamon, clove and pepper are some of the important agricultural export crops in Sri Lanka, accounting for approximately 10% of the total agricultural exports and 59.8% of the minor export earnings to the country. The importance of minor export crops as agricultural commodities is amplified because of their use in the production of spices, essential oils, extracts, seasonings, sauces, food products, fragrances, cosmetics, and medicines, among others. Thus, spices are always in high demand in the industrialised world. Developing countries, such as, Sri Lanka, can rely on these commodities to earn valuable foreign exchange by exporting the spices only if their competitiveness can be enhanced and sustained (Hirimuthugodagee et al., 2017).

In 2022, the export of the traditional crops Tea, Rubber and Coconut reached USD 2 billion in the first 8 months. Sri Lanka Tea Board Chairman, Niraj de Mel, mentioned that "even with a low crop the country has managed to earn USD 882 million from tea exports in the first 8 months of the year". He further mentioned that during the first 7 months, rubber, coconut and export

agriculture had reached USD 600 million, USD 590 million and Rs. 250 million, respectively. The chairman also highlighted the importance of increasing the production of better-quality BOP tea variety in the future. (History of Ceylon tea, 2022)

In Sri Lanka, about 1.65 million smallholder farmers operate on average less than 2 hectares and contribute 80% to the total annual food production (Agriculture Sector Modernization Project, 2022). The cultivation of minor export crops is carried out in Sri Lanka by small farm holders, giving room for scalability and efficiency improvement. Despite this, Sri Lanka can produce high-quality cloves, pepper, and nutmeg recognised and demanded in international markets. With the increase in demand, these small farmers are facing difficulties fulfilling orders to meet the international buyers' requirements. Therefore, opportunities are easily found in volume and efficiency of production, product quality, value addition, marketing, skill development, and access to finance.

1.5 Observations and Findings of Primary Research on the PCN Sector

The results of the research findings are based upon the information gathered from the methodology applied, which is stated below without any bias or interpretation and arranged in a logical sequence. The templates of the survey questionnaires are included in the annexure for reference.

District	Kandy	Kegalle	Matale	Total
Number of Survey Respondents	35	41	35	111

Table 1: Distribution of survey – Spice farmers district level
Source: UNIDO-SL VC Analysis of pepper, clove, and nutmeg

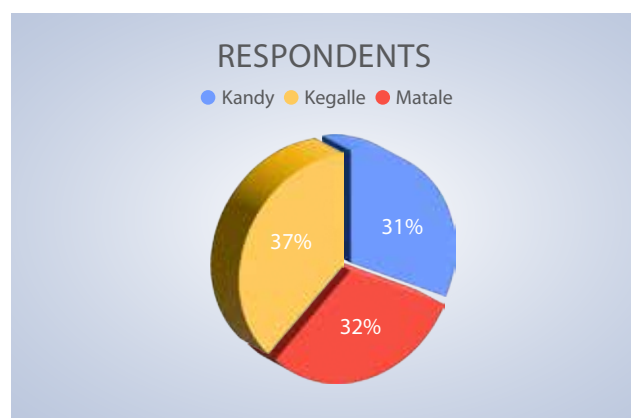


Figure 3: Distribution of farmer respondents as a percentage
Source: UNIDO-SL VC Analysis of pepper, clove, and nutmeg

District	Number of Survey Respondents
Kegalle	40
Kandy	10
Matale	10
Total	60

Table 2: Distribution of survey - Intermediaries
Source: UNIDO-SL VC Analysis of PCN

Stakeholder Group	Number of Survey Respondents
Private Associations	08
Government Institutions	06
Exporters	10
Total	24

Table 3: Distribution of survey – Stakeholder group
Source: UNIDO-SL VC Analysis of Pepper, Clove, and Nutmeg

1.5.1 Primary Research - Key Observations of Farmers

It was decided to choose a sample of a minimum of 30 farmers from each selected district. A complete enumeration of the three selected districts was done

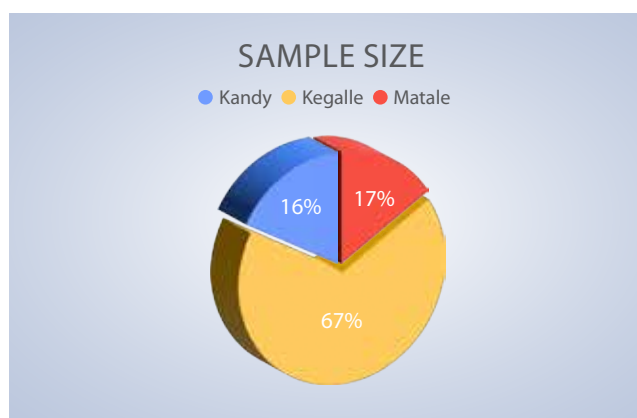


Figure 4: Distribution of district level responses of the intermediaries
Source: UNIDO-SL VC Analysis of Pepper, Clove, and Nutmeg

to categorise farmer holdings into less than 1 acre, 1 - 5 acres, 6 - 10 acres, and above 11 acres. The number of sampled farmers these holdings were: 18 farmers with less than 1 acre, 53 farmers with 1 - 5 acres, 16 farmers with 6 - 10 acres, and eight farmers above 11 acres. There are two cultivation seasons, Maha and Yala, synonymous with the two monsoons. Maha season falls during the "Northeast monsoon" from September to March in the

following year. The agricultural season of "Maha" was selected as the reference period for the data collection on the relevant parameters.

The information collected from the field confirms that farmers grow pepper alongside other crops such as cloves and nutmeg. A significant number of farmers surveyed for the study depended on pepper as their primary source of income. Smallholder farmers are mostly engaged in spice cultivation, besides a few large-scale producers and regional plantation companies. Most of these farmers grow spices in their small plots of

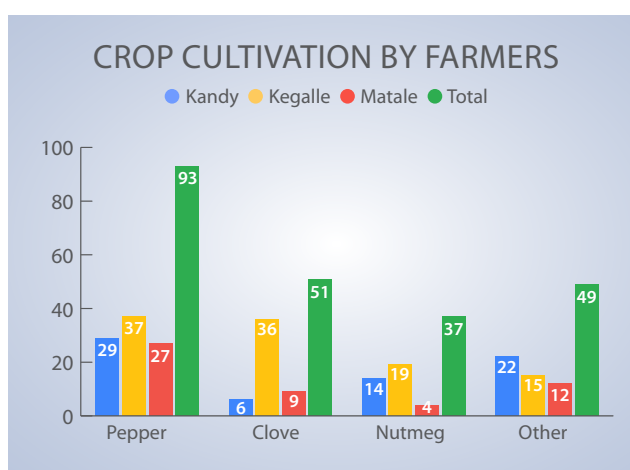


Figure 5: Number of farmers engaged in pepper, clove, and nutmeg cultivation in Kandy, Kegalle and Matale districts.
Source: UNIDO-SL VC Analysis of pepper, clove, and nutmeg

land (home gardens); according to the survey conducted amongst the farmers, the land size is about 1-5 acres or less than 1 acre.

Harvesting and value-adding activities such as drying and cleaning are also done by farmers themselves. The harvest is sold either after sun or machine drying or in the raw form. Some farmers are engaged in collecting spices from other farmers in the vicinity. While many farmers are involved in other livelihood activities, their primary source of income is derived from the cultivation of spices.

The marketing structure of spices in Sri Lanka is characterised by its traditional nature at the domestic level and a comparatively high degree of sophistication at the exporter level. The majority of farmers surveyed supplied their spices to shops, collectors, and wholesalers. Village and regional level shops, collectors, and wholesalers are intermediaries involved in the chain's collection stage; they are a crucial link between producers and exporters.



SPICE CULTIVATION - LAND EXTENT

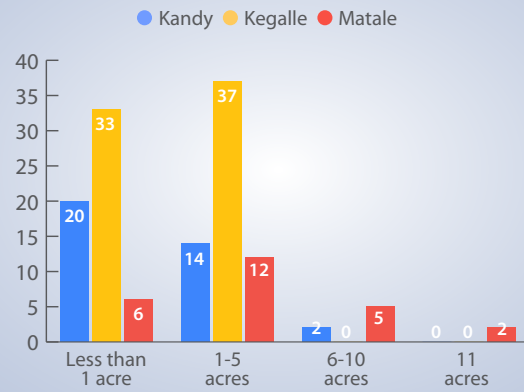


Figure 6: The size and number of farmers engaged in pepper, clove, and nutmeg cultivation in the districts of Kandy, Kegalle and Matale.
Source: UNIDO-SL VC Analysis of pepper, clove, and nutmeg

Farmers are sometimes rural entrepreneurs who purchase spices directly from other farmers. Farmers/spice collectors do not need licenses/permits to operate as a collector, so competition is fierce with few barriers to entry. Besides being involved in spice collection, they also clean, dry, store, pack and transport spices to their buyers. The regional wholesaler, the most critical intermediary in the spice value chain, collects the spices and products from the regional collectors and cultivators.

Information regarding standards is mainly provided by the DEA, certification agencies, buyers, as well as exporters. While such information on standards is valuable, most farmers surveyed stated that they would require assistance to improve the quality and safety standards.

Given that much of the spices from Sri Lanka are destined to developed countries, attention to quality and safety considerations was not always present.

ACTIVITIES PERFORMED BY THE FARMERS

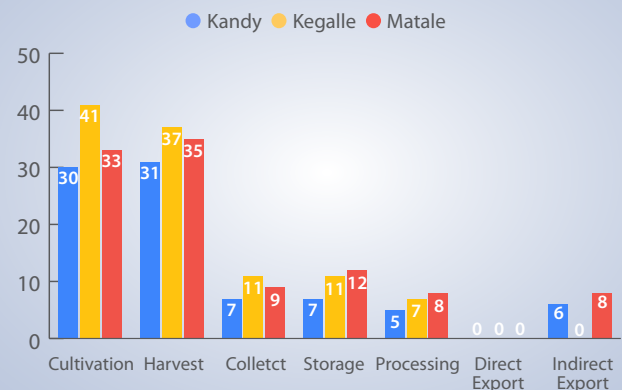


Figure 7: Activities performed by the farmers
Source: UNIDO-SL VC Analysis of pepper, clove, and nutmeg

BUYERS OF THE SELECTED SPICES

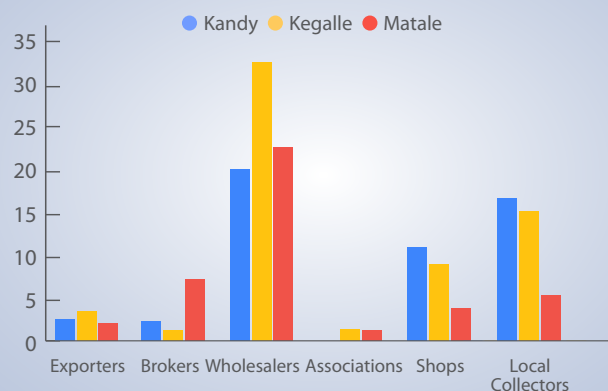


Figure 8: Buyer categories of the spices in the three districts.
Source: UNIDO-SL VC Analysis of pepper, clove, and nutmeg

Farmers who were interviewed recognised the significance of certifications. However, not many farmers are certified; those supplying certified spices belong to a farmer organisation through which certification was obtained.

In the upstream segment of the chain, the concern for quality and safety of the product was low compared to exporters, depending on the end-markets.

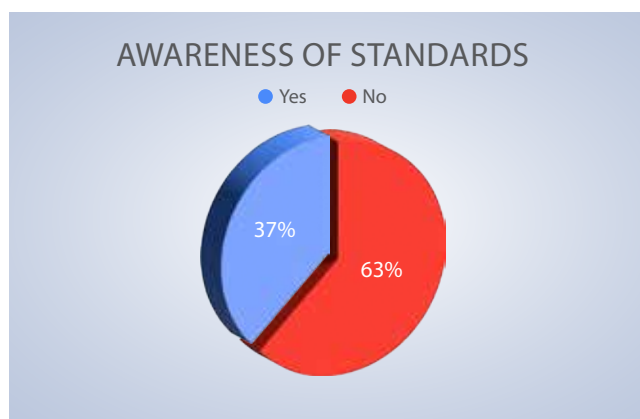


Figure 9: Awareness of the standards of farmers
Source: UNIDO-SL VC Analysis of pepper, clove, and nutmeg

Most farmers do not have any formal agreements or contracts with their buyers. Business was based on personal contacts with their buyers, which was built on trust or faith that the buyers had in the farmers. The buyers' preferences are communicated to the farmers verbally or through purchase orders. Contracts and agreements among buyers and farmers were observed largely in organic farming with the exporters, and not in the conventional spice value chain. These agreements ensure that inorganic inputs/agrochemicals (pesticides) have not been applied to the cultivation of spices. Sometimes, the buyers have contractual agreements with farmers who are their preferred suppliers. This arrangement ensures the production quality at the farm

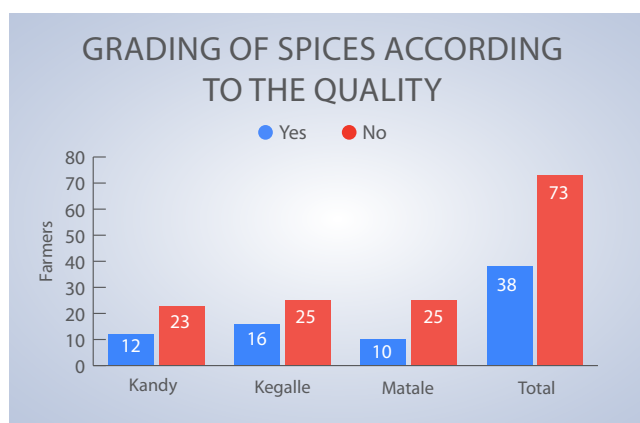


Figure 10: The extent of product grading based on the quality in three districts.
Source: UNIDO-SL VC Analysis of Pepper, Clove, and Nutmeg

gate level and provides the farmers with a competitive price. Collective actions and backward and forward integration to ensure quality and traceability as a response to the different process standards adopted at

the end market is rarely available.

Few farmers faced rejections or price reductions at the farm gate, showing that purchases occur at agreed or market prices despite the quality variations. Furthermore, most farmers have little stockholding capacity, resulting in the disposal of the finished produce at market prices with limited bargaining power.

1.5.2 Primary Research - Key Observations of Intermediaries

It is evident from the primary data that collection, storing and transport are the main activities performed by the intermediaries. Few Intermediaries are involved in backward integration, namely cultivation and harvesting, and very few process the goods for indirect or direct exports. The survey showed that the intermediaries are self-driven, and direct employment opportunities are very seldom.

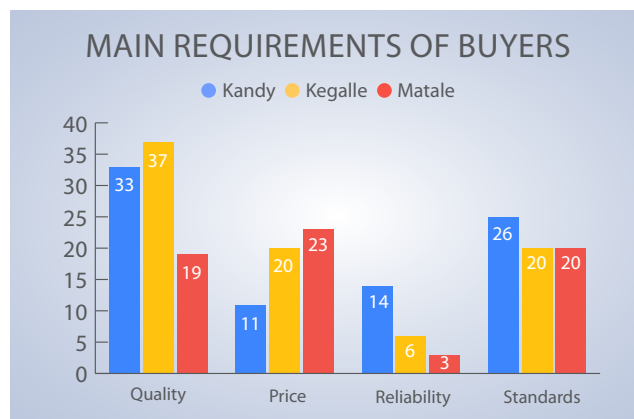


Figure 11: Buyer's main requirements
Source: UNIDO-SL VC Analysis of pepper, clove, and nutmeg

It was evident from the survey that the intermediaries predominantly trade in pepper and cloves, and the annual sales are in the range of 1-100 MT. Nutmeg and other spices are traded in small quantities due to their limited supply.

Out of the selected farmers from whom the intermediaries buy their products, 69% are neither certified under any system certifications nor aware of possible certifications. Only 26% of the farmers are certified under Organic, 12% are certified under Fairtrade, followed by 4.5% and GAP, and 2% under ISO norm certifications. Other certifications, such as GMP, were not represented within the selected farmer sample. While 50% of the intermediaries stated that standards will not affect their business, 25% indicated that Fairtrade and Organic certifications will affect their business, followed by 12% for ISO, GAP and GMP standards.

Intermediaries have indicated that 20% of the farmers they work with have quality issues, 5% do not follow any standards, and 22% do not have consistency in price. The 43% of intermediaries indicated that labour shortages, climate change, a lack of machineries and facilities, and lack of knowledge and expertise are also issues that farmers should overcome. The supply of quality products must be maintained to overcome most of the problems,

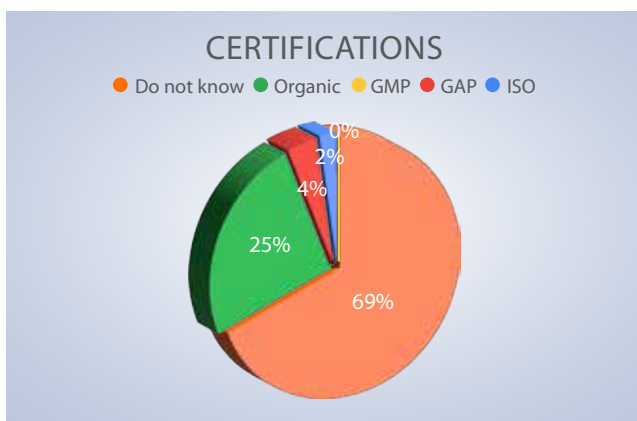


Figure 12: Product certifications by farmers
Source: UNIDO-SL VC Analysis of pepper, clove, and nutmeg

and over 98% of the intermediaries have reiterated to buyers that quality is the main requirement, followed by grading and chemical use.

The survey indicated that quality, standards, price, and reliability are the most demanded requirements of buyers, which are difficult to match with farmers because they need more quantities, and adherence to delivery dates also affects their business. Intermediary support

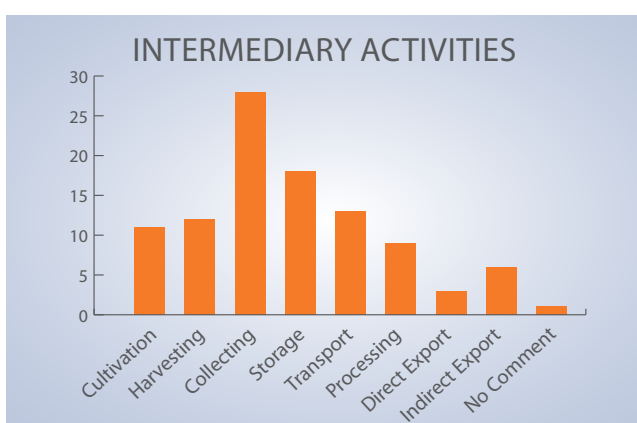


Figure 13: Intermediary activities
Source: UNIDO-SL VC Analysis of pepper, clove, and nutmeg

is mostly extended towards credit facilities, technical support and other inputs; seeds, plants and fertiliser are rarely supported. Of the intermediaries 93% stated that they do not have formal contractual agreements with farmers, and only 7% operate with contractual

agreements. Intermediaries have indicated that buyer support is mainly towards cash advances, inputs and technical assistance. Information on market trends, pricing, etc., is supported to a lesser extent, and there are no formal collaborations. The intermediary sales are primarily to wholesalers and exporters, followed by brokers.

1.5.3 Primary Research - Key Observations of Exporters

Most of the exporters had registered their company as a limited liability company. Moreover, most exporting businesses that participated in the survey appeared to be operating in the pepper industry and exporting pepper as their main spice. In addition, survey results show that most companies have been in the export industry for over ten years and possess considerable experience exporting spices to different countries worldwide. With regard to employment opportunities within companies, the majority have given equal employment opportunities to both genders.

Several respondents found that barriers to entry into the export business were moderate. Furthermore, over 80% of the survey respondents mentioned that they possess adequate knowledge and capabilities regarding product customization and packaging materials, to meet foreign market demands and preferences. Most respondents also indicated that they possess a website capable of handling international orders.

The survey respondents who had already implemented a traceability system suggested that they have adequate staffing and infrastructure to support a traceability process. Nevertheless, several exporters stated that they do not have sufficient financial resources and know-how to implement such a system. Moreover, the respondents had noted the importance of a traceability system since it is required to comply with government regulations, customer requirements, manage legal liability and risk, and gain a competitive advantage.

Upon analysing participants' feedback and comments, the responses indicated that many exporters have grave concerns about the unstable trade policies and foreign exchange rates. Respondents also highlighted that the government should be supportive and simplify export processing schemes. Moreover, they requested that the authorities remove any unnecessary policy decisions or red tape to facilitate smooth trade-related business operations.





Figure 14: Main global market channels for spices
Source: UNIDO-SL VC Analysis of pepper, clove, and nutmeg and pascale & Von Opijnen (2010)

2 International Market

The agricultural sector in Sri Lanka specialises in international trade, with multilateral and bilateral trade agreements and preference schemes with special chapters and provisions on agricultural products that define the conditions for exports and international trade. Evidently, a future strategy for PCN should consider the international market as a fundamental edge. Thus, the requirements of international buyers should be met, controlled, and demonstrated. This section presents the situation of the international markets, highlighting trends, top players, and other considerations.

2.1 Market Overview

Spices, including PCN, are mainly used for flavouring food, and the raw material is also used in processing industries, such as fragrances, cosmetics, and pharmaceuticals. Globally, there is an increasing demand for spices; however, prices tend to fall year-on-year because of increased and intensified production. A few exceptions such as cinnamon, coriander seeds, and vanilla can be found. The Asia-Pacific region accounted

importer, followed by the United Kingdom (UK). The leading spices consumed in the EU are pepper, paprika and all spice (pimento), while the leading herbs include parsley, thyme and oregano.

According to CBI Market Intelligence (The Netherlands Ministry of Foreign Affairs, 2022) the followings are important trends influencing the developed markets (e.g., EU market) for spices and herbs. Increased demand for convenience foods requires the food industry to add

the required flavours to various prepared foods, and this has led to an extensive range of ready-to-use spice mixes.

- The trend towards internationalisation and increasing consumption of ethnic foods has created a growing interest in spices

and various herbal products. As a result, a range of spices can be found in most consumer kitchens.

- European consumers have a strongly increased interest in a healthy lifestyle and, consequently, in the consumption of healthy foods (e.g., herbal teas). For example, specific spices and herbs are replacing sugars and salts, as well as artificial additives in prepared foods, restaurant dishes and home-prepared meals. Herbal teas are also becoming increasingly popular.
- The market for organic as well as Fairtrade food is increasing. However, the mainstream retail market for these certified herbs and spices is likely to remain relatively small until supermarket chains offer a full range of organic and Fairtrade herbs and spices.
- The growing sense that raw materials in this market are scarce makes importers interested in developing long-term partnerships directly with suppliers that can meet their needs for a controlled supply chain. This creates an opportunity for suitably equipped suppliers to set up direct (and more lucrative) relationships with end-users.

HS Code	Description	Ranking (2020)	Value exported by world in 2020 (USD thousands)
0904	Pepper of the genus Piper; dried or crushed or ground fruits of the genus Capsicum	1	4,761,761
0910	Ginger, saffron, turmeric "curcuma", thyme, bay leaves, curry and other spices	2	3,553,808
0908	Nutmeg, mace and cardamoms	3	1,902,607
0906	Cinnamon and cinnamon-tree flowers	4	1,365,855
0909	Seeds of anis, badian, fennel, coriander, cumin or caraway; juniper berries	5	1,262,434
0905	Vanilla	6	982,992
0907	Cloves, whole fruit, cloves and stems	7	515,545

Table 4: Global spice ranking with 4 digits HS codes and value of exports in 2020
Source: Trade statistics for international business development, 2022

for 35% of the global spice consumption in 2019 by volume (metric tons) and is projected to be the fastest-growing market in the upcoming years. The strong buyer base and easy availability of spices through wholesale and retail channels in China and India are expected to have a positive impact on industry growth (GlobeNewswire, Inc., 2022). Growth in the European Union and North American markets has gradually declined due to the market's maturity. International buyers also increasingly demand more quality, convenience, food safety and sustainability standards.

The global spice sector is a diverse collection of subsectors with a wide range of consumers and applications for herbs and spices, including culinary, medicinal and therapeutic applications, uses in the chemical industry and personal care, wellness and cosmetics applications.

Collectively, these spice products totalled USD 14.35 billion in export revenue.

The largest importers of spices globally are in the European Union (EU), Germany being the leading

- Large actors in the EU's herb and spice industry are working more closely with farmers and exporters in their respective countries of origin. They are facilitating contract packing for their retail operation (e.g., Tesco in the UK) or setting up/expanding their own packing facilities (e.g., Olam and Nedspice from the Netherlands). This creates opportunities for going into joint ventures with retailers or other buyers.

Identification of opportunities for future growth in the EU market requires an understanding of its market structure. The EU market is currently structured such

relegated to the role of suppliers of raw materials and sales in bulk markets instead of agro-based products with a higher level of value-addition. Furthermore, import regulations in high-income countries often impose strict requirements in terms of local food safety and sanitary control. Meeting these requirements demands special processing, packaging, testing, and certification that usually must be done in the importing country.

Furthermore, since European buyers are becoming more concerned with sustainability, the "Sustainable Spices

Initiative" was established in 2012, with members including most of the large spice traders and processors. This purpose of this initiative is to reach, or exceed, 25% sustainable sourcing in at least the top three product categories by 2025 (The Sustainable Trade Initiative, 2022). Members of the Sustainable Spice Initiative has invested in training farmers and exporters to comply with the Rainforest Alliance requirements and subsequent certification. Both food safety and sustainability certifications require conformity assessment services (e.g., testing) and transparent supply chain systems for traceability, which are a considerable additional cost for producers.



Figure 15: Export performance of the spices and allied products sector -2011 – 2021/ October
Source: <https://www.srilankabusiness.com/spices/about/export-performance.html>
(retrieved:2011-11-26)

that 15% of imports go to the food service sector, nearly 15% go to retail, and 70% are sold to the industrial sector (The Netherlands Ministry of Foreign Affairs, 2018). The spices are used for food and meal preparation in their current form, as delivered, or further processed to make derivatives, which are then added to the food. The UK, the Netherlands, Belgium and Germany are among the major importers and re-exporters, with Germany being the leading country for this practice. While the EU is the most important export destination market for spices, the US is the largest single-country importer of spices (The Netherlands Ministry of Foreign Affairs , 2022). Since 1970, agricultural export volumes have dramatically increased in developing countries. Nevertheless, the situation has shifted towards more industrialized countries when it comes to value addition. This trend clearly shows the challenge faced by developing countries in the struggle against being

Despite the difficulties, some producing countries, such as India, have adopted a different competitive strategy by moving into the value-added segment of the spice market, producing more of their herbs and spices in the form of powders, essential oils, oleoresins, extracts, and blends to take advantage of the growing and higher-priced markets for these products. In addition, India has established spice Agri-Export Zones while actively developing capabilities in quality and food safety, as well as improved packaging, technology innovation, and advances in production and processing.

Emerging markets, such as China and India, are experiencing significant growth in domestic demand for spices. As a result, this might lead to fewer exports from these countries while allowing other spice-producing countries more room to export. In consequence, countries such as Vietnam, Indonesia, and Guatemala are already seizing this opportunity.



2.2 Exports of Sri Lankan Spices

The spice sector plays a vital role in the Sri Lankan economy and export basket. The main spice crops cultivated in Sri Lanka are cinnamon, pepper, cloves, cardamoms, nutmeg and mace. Sri Lanka was known historically for producing exceptionally good spices. Sri Lanka's soil and climate are well suited to making good quality spices. Many exporters and stakeholders believe that Sri Lankan spices are intrinsically superior to those of other origins. In the past, the spice industry only played a minor role in the country's economy in terms of employment and income, except for cinnamon, which was traded as far back as the 15th century A.D. Over the last couple of decades, spices have become the leading cash-earning enterprise of many farmers in the significant spice-growing areas (Export Development Board, 2022).

Today's Sri Lankan spice and concentrate industry includes a wide range of products, from bulk spice products like cinnamon to value-added essential oils. Smallholders dominate the sector, and over 70% of the cultivated land are smallholdings and home gardens. Sri Lanka exports around 30,000 tons of various kinds of spices annually. Over 90% of the spice and allied products manufactured in Sri Lanka are consumed by the global food and beverage industry, the pharmaceutical industry, and the personal care product industry (Export Development Board, 2022).



was much higher, at USD 5316 /ton. India has seen a significant growth both in value and quantity during 2016-2020. Brazil and Vietnam's production also experienced a 10% growth in quantity during the same period, but both countries experienced a reduced export value.

Product	World export ranking	Share of world exports	Major destination markets
Pepper, dried crushed or ground	12th	1.1%	India (77%), Germany (9.6%), and USA (2.5%)
Cloves, whole fruit, cloves and stems	5th	3.3%	India (45.9%), USA (12.2%), Saudi Arabia (9.8%), and Germany (5.8%).
Nutmeg, mace and cardamoms	9th	0.9%	India (31.8%), Germany (14.4%), UAE (12.7), China (10.9%) and Bangladesh (8.1%)

Table 5: Sri Lankan exports of pepper, cloves and nutmeg in 2020
Source: Trade statistics for international business development, 2022

Further information on Sri Lankan exports of PCN in 2020 are given in Table 5, including the ranking and market share in the international market and the primary destination markets.

2.3 International Markets for PCN

2.3.1 Pepper – International Trade

In 2020, the top exporters of pepper were India (\$1.16B), Vietnam (\$653M), and China (\$572M), and the average price was USD 2624/ton. The reported value for Sri Lanka

The world statistics showed a negative 8% decline in value while having a positive 9% growth in quantity between 2016 and 2020, which, in other words, means a larger global production of pepper at lower prices.

In terms of imports, the six major importing countries are the USA, China, Thailand, Germany, Spain, and Malaysia. As the 2nd largest importing country, China has a positive trade balance, which indicates a strategy of importing pepper as raw material and processing and exporting it.

Spain shows a similar situation; nonetheless, the annual growth of China is outstanding, with a 21% increase in quantity and another 26% in value during 2016-2020. Other countries such as Japan, Canada, France and the UK show high import prices (USD/ton) with positive growth in quantity over the 2016-2020 period, which makes them a good potential market for high-quality pepper.

India and Germany are the predominant markets for Sri Lankan pepper. Europe and the USA are the largest importers of black pepper globally, together accounting for approximately one-third of global imports. Since

At the global level, the annual growth was 2% in value and 16% in terms of quantity between 2016 and 2020. This development can be identified as the growing demand for cloves due to competitive prices in the market.

The largest importers of cloves are India, the UAE, Singapore, Bangladesh, and the USA. Singapore has a positive trade balance, which indicates an import-process-export strategy. Remarkably, Indonesia has a very high trade balance, the highest among the top exporting countries, which is equivalent to the trade

Ranking	Exporters	Share in world exports (%)	Value exported in 2020 (USD thousand)	Trade balance in 2020 (USD thousand)	Quantity exported in 2020 (tons)	Unit value (USD/unit)	Annual growth in value: 2016-2020 (%)	Annual growth in quantity: 2016-2020 (%)
0	World	100	4761761	505353	1814572	2624	-8	9
1	India	24.5	1167241	1077079	530076	2202	7	10
2	Vietnam	13.7	653956	562096	265476	2463	-19	10
3	China	12	572198	119328	220329	2597	26	21
4	Spain	4.8	230921	82466	77578	2977	7	6
5	Brazil	4	189001	181115	91725	2061	-9	28
6	Indonesia	3.6	169852	100622	60505	2807	-21	4
7	Germany	2.3	108887	-73249	21340	5102	-13	-1
8	Peru	2	95710	92035	38091	2513	3	1
9	Mexico	1.6	75419	-9942	No data		1	
10	USA	1.3	60674	-587158	15083	4023	-6	-7
11	Netherlands	1.2	56353	-13061	12161	4634	-18	-6
12	Sri Lanka	1.1	54697	-40340	10290	5316	-7	5

Table 6: World Exports of pepper in 2020

Source: Trade statistics for international business development, 2022

2016, European imports of black pepper have increased by 5% annually, reaching 76.700 tonnes in 2020 (The Netherlands Ministry of Foreign Affairs, 2022).

2.3.2 Cloves – International Trade

Indonesia, Madagascar, Singapore and Brazil dominate the international clove trade followed by Sri Lanka, with Tanzania coming very close in the 2020 statistics. It is worth remarking that Sri Lankan cloves have the highest unit value (USD/ton) out of the top six countries, even above Singapore. Further down the list, Germany and the Netherlands stand out due to their high unit value. It is important to point out the impressive growth rate of Indonesian exports, with growth rates of 53% and 45% in value and quantity, respectively. Among the top 10, besides Indonesia, only Sri Lanka and Tanzania grew during the same period, both more in value (i.e., higher prices) than quantity.

deficit of India. Germany has a negative trade balance, which suggests that even if they re-export, the level of consumption of cloves in that country is high despite the expensive products. The Netherlands does have a positive trade balance, which indicates a re-export strategy.

Clove suppliers in Sri Lanka export products to the global market, including the most delicate clove buds and clove oil. The country is one of the top exporters of clove to the international markets. It provides nearly 8.5% of the worldwide demand for whole clove fruits, buds, and stems, mainly exporting to India, the USA, Saudi Arabia, UAE, and Germany (Export Development Board, 2022). Ceylon Clove is notably richer in oil than the clove varieties produced elsewhere in the world (Export Development Board, 2022).

Ranking	Exporters	Indicators						
		Share in world exports (%)	Value exported in 2020 (USD thousand)	Trade balance in 2020 (USD thousand)	Quantity exported in 2020 (tons)	Unit value (USD/unit)	Annual growth in value: 2016-2020 (%)	Annual growth in quantity: 2016-2020 (%)
0	World	100	515545	63568	124711	4134	2	16
1	Indonesia	34.2	176541	164198	47765	3696	53	45
2	Madagascar	12.3	63607	63330	14752	4312	-24	-13
3	Singapore	5	25714	7387	4350	5911	-31	-23
4	Brazil	3.7	18934	18599	4139	4575	-10	-2
5	Sri Lanka	3.3	16959	16959	2845	5961	6	11
6	Tanzania	3.3	16805	16800	3581	4693	11	29
7	Comoros	1.6	8255	8255	1975	4180	-19	-15
8	India	1.3	6554	-164152	949	6906	3	6
9	Germany	1	5353	-1320	536	9987	3	7
10	Netherlands	0.8	3946	952	494	7988	-12	-8

Table 7: World exports of cloves, whole fruit, cloves and stems
Source: Trade statistics for international business development, 2022

2.3.3 Nutmeg – International Trade

At the top of the exporters' list, Guatemala can be seen with 53.7% of the market share, followed by Indonesia, India, Nepal and the Netherlands. Guatemala's growth in nutmeg exports is remarkable with an annual rate of

but with much higher demand that has driven the prices up during the 2016-2020 period.

Sri Lanka serves around 5% of the global demand for nutmeg, exporting mainly to India, UAE, the USA, Germany, and Pakistan. The country also serves about 7% of the worldwide market for mace, exporting mostly to India, Germany, and the UK (Export Development

Ranking	Exporters	Indicators						
		Share in world exports (%)	Value exported in 2020 (USD thousand)	Trade balance in 2020 (USD thousand)	Quantity exported in 2020 (tons)	Unit value (USD/unit)	Annual growth in value: 2016-2020 (%)	Annual growth in quantity: 2016-2020 (%)
0	World	100	1902607	415176	155839	12209	26	11
1	Guatemala	53.7	1021524	1019094	58448	17477	43	11
2	Indonesia	11.7	222895	221134	28950	7699	22	7
3	India	7.8	148923	57513	9895	15050	1	-7
4	Nepal	2.5	47935	44079	7026	6823	2	17
5	Netherlands	2.2	42108	-1795	2545	16545	9	-3
6	Singapore	1.3	24279	-1489	1340	18119	30	6
7	Viet Nam	1.1	21230	5475	2004	10594	16	22
8	Germany	1	18117	-24773	960	18872	14	5
9	Sri Lanka	0.9	17585	17377	2216	7935	-2	-3
10	Myanmar	0.6	11207	9711	3077	3642	5	1

Table 8: World exports of nutmeg
Source: Trade statistics for international business development, 2022

43% in value and 11% in quantity over the 2016-2020 period. Other countries with significant growth during the same period were Indonesia, Singapore, Vietnam and Germany.

On a global scale, the annual growth in value was impressively high at 26%, while the annual growth in quantity was 11%. This translates into higher production,

Board, 2022). Many food processors based in Western Europe use nutmeg to produce sausages for domestic consumption or export to other European markets. European exporters add significant value to imported products; thus, there are opportunities for exporters from developing countries with experience in supplying European countries (The Netherlands Ministry of Foreign Affairs, 2022).

3 Pepper Value Chain Analysis

3.1 Overview of the Pepper Sector

Black pepper (*Piper nigrum*), also called pepper, is a perennial climbing vine of the family Piperaceae and the hotly pungent spice is made from its fruits. Black pepper is native to the Malabar Coast of India and is one of the earliest spices known. Widely used as a spice around the world, pepper has limited usage as a carminative (to relieve flatulence) and as a stimulant of gastric secretions. In early historic times, pepper was widely cultivated in the tropics of Southeast Asia, where it became highly regarded as a condiment (Encyclopædia Britannica, Inc., 2022). Black pepper is the earliest spice known to humankind; it is a pungent berry whose main flavour comes from piperine. It contains

Opportunities for new developing country suppliers can be found in large consumer markets such as Germany, the United Kingdom, France, Poland, the Netherlands and Italy. Emerging black pepper suppliers can gain a competitive advantage by offering high-quality, safe and sustainable products. New suppliers must be able to compete with offers from Vietnam, Brazil, Indonesia and India, by offering either low export prices or unique and high-quality products.
Source: cbi.eu

essential oils (e.g., terpenes) and alkaloids (e.g., chavicine and piperidine) that contribute to the aroma and taste. During the last part of the 20th century, pepper production increased as plantations grew in Thailand, Vietnam, China and Sri Lanka. Pepper is native to South Asia, and it is the most widely used spice in the world and known as the “King of the Spices”. Peppercorns are a much-prized trade good often referred to as “black gold”. Pepper is mainly used as a spice and flavouring agent in the food industry, and it also has industrial uses in the perfumery and pharmaceutical industries (Department of Export Agriculture, 2022).

Pepper appears in several well-known or not-so-well-known spice mixtures. Indian cuisine uses pepper abundantly. The Anglo-Indian curry powder contains black pepper as well as Northern Indian garam masala and South Indian sambar podi. Pepper is believed to have positive effects, and black pepper is used in Ayurvedic medicine to treat fever and digestive disorders, stimulate appetite and aid in relieving nausea. The uses of pepper extend from treating paralysis to toothache, stimulating the activity of the heart and kidneys. It is also an effective insecticide, even used for rituals in Sri Lanka to chase away demons (Takeda et al., 2008).



The quality and production of Sri Lankan black pepper are largely inconsistent due to fragmented production, lack of proper sorting, and absence of standards implementation across the pepper value chain. Quality characteristics in pepper include the appearance of the grain, maturity, bulk density, moisture content and absence of extraneous matter (dust, stones, leaves) in the product. Unlike other sectors (e.g., Ceylon Tea), the government has no compulsory control system for quality. As a result, exporters are driven by the requirements of importers, who usually request certification from inspection bodies to certify the quality of the pepper (PressReader Inc., 2017).

3.1.1 Market Trends

Sri Lankan pepper has higher piperine content, which gives it a superior quality and pungency. It is said that the piperine content in Sri Lankan black pepper is 2-6 times higher than that in other countries (Department of Export Agriculture, 2022). However, sub-standard export products pose a risk to the reputation of Sri Lanka in the international market as a supplier of high-quality spices. Similarly, high quality can be an asset to reach more developed markets willing to pay a premium for an excellent product. Most of the black pepper exports from Sri Lanka go to the low end of the market (e.g., India). Sri Lanka could compete well in high-end markets elsewhere (for example, the United States and the European Union), which are yet to be fully exploited.

Nonetheless, strict food safety standards and quality requirements in developed countries create the need to implement control systems and better practices for the country to enter those markets successfully. Currently, about 60% of pepper production in the country is exported, while the remainder is consumed domestically, according to government sources. India buys 62% of pepper exports from Sri Lanka, followed by Germany, Pakistan, Egypt, USA, UAE, UK, Vietnam, Saudi Arabia and Spain. Together, these top ten countries take 91% of the total pepper exports from Sri Lanka (Export Development Board, 2022).

3.2 Pepper Value Chain Map

In Sri Lanka, pepper is the second most important spice grown in the country, after cinnamon, and is cultivated in the wet and intermediate agro-ecological zones. It is cultivated up to an elevation of 800 metres above sea level in the mid and low country regions, mostly by smallholders. Most smallholders grow pepper in their own small plots of land (home gardens).

There are very few pepper plantations that are larger than 20 acres (8.1 hectares, approximately). Farmers also harvest pepper with the help of hired labour; some farmers utilise the sun or machines for drying their harvest and selling it. Most farmers sell their produce to village collectors or shops in the town, which are important intermediaries in the pepper value chain (Wijayasiri, 2017).

Local collectors are sometimes farmers or rural entrepreneurs who purchase pepper directly from farmers. Other than being involved in the spice wholesale trade, operating from stores based in towns bordering spice-growing areas, traders also purchase pepper from collectors, farmers, estates, and lessees, after which they clean, dry, store, pack and transport the pepper to buyers, mostly in Colombo.

Buyers include spice exporters, low-cost local spice manufacturers, marketeers, Pettah buyers, hotels, restaurants, and households (Wijayasiri, 2017).



3.2.1 Value Chain Activities and Actors

The Pepper Value Chain involves a larger number of primary producers, collectors, traders and processors at the village level. The pepper value chain analysis found that many farmers do not follow the best agricultural practices. Additionally, due to financial constraints, they

Input suppliers: They supply planting material, fertilisers, machinery, equipment, packaging material, and pesticides; provided to the farmers by the government agencies and the private sector. DEA provide some training for farmers to achieve better yield and quality of pepper. The training introduces Good Agriculture Practices (GAP) for the farmers who can apply these practices from the early stages of cultivation.

Schematic illustration of pepper value chain

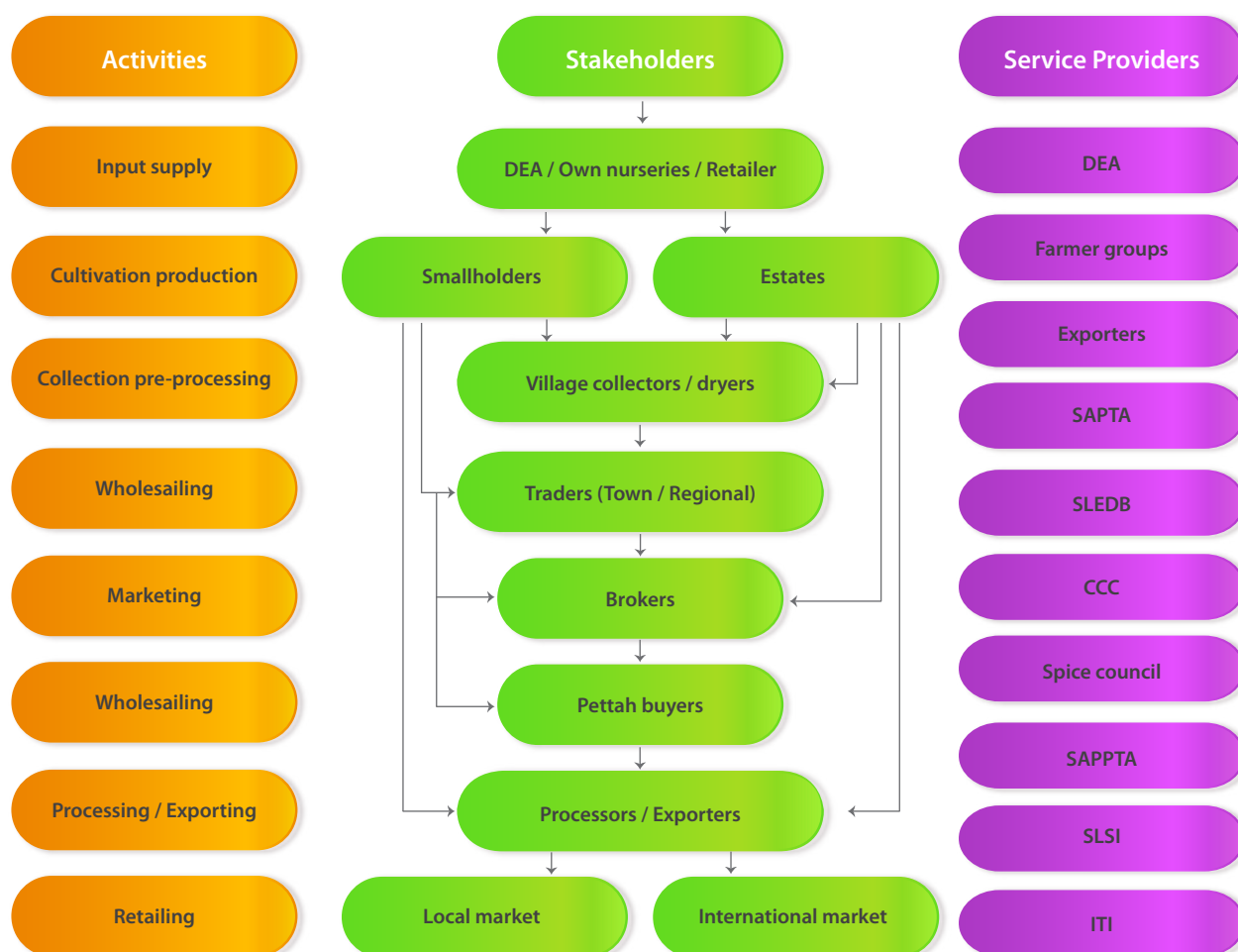


Figure 16: Schematic illustration of pepper value chain in Sri Lanka
Source: UNIDO-SL VC Analysis of pepper, clove, and nutmeg

tend to harvest light berries and are not concerned about improving the quality of the product. Pepper farmers do not have market price incentives to produce quality products.

Studies and examples from other countries show that farmers who adopt the best agricultural practices increase their existing yields. By improving quality, farmers are better positioned to command competitive pricing in the export market as exporters are willing to pay premium prices for quality improved pepper that meets international standards.

Farmers: Primary producers are divided into smallholder farmers and plantation owners. Smallholder farmers produce the highest yield of pepper production where pepper plants are cultivated or maintained within home gardens or as an inter-crop alongside other plantation crops like coconut and tea. Based on the method of cultivation used, smallholder farmers may be categorised as organic or inorganic producers. Most pepper plants are cultivated by smallholder farmers who still use traditional processing methods. Farmer activities are planting, caring, harvesting, and post-harvest handling.

Village collector traders: Village collector traders collect pepper from those farmers who want to sell the fresh pepper without processing them or as dried pepper. Then, the collectors will continue the process of hand sorting and drying. Collectors operate from the village where the pepper is produced or from a nearby town. In addition, some organic pepper exporters have appointed agents to collect organic pepper from the villages.

Wholesalers: Farmers and village collector traders sell their dry peppers to wholesalers located in the city. The wholesalers sort the pepper by appearance and classify them into quality grades. Wholesalers play an essential role in the pepper value chain in Sri Lanka because they have market access to buyers from outside the village. Moreover, they have access to information such as price, demand, and quality needed for export markets. More importantly, wholesalers at the province level partner with the exporters.

Post-harvest processors: According to the market requirements, post-harvest processors are engaged in organic market-oriented processing, value-added product-oriented processing, and post-harvest-oriented processing. Some processors are involved in additional post-harvest processing of pepper powder, oil extraction and pickling.

Exporters: Exporters are engaged in exporting black pepper, immature pepper or white pepper (light berries), organic pepper, pepper oil and oleoresins. Most of the value addition takes place at the exporter's level. Before shipping the products, the exporters must complete all the necessary documents relating to the regulatory requirements in importing countries. Before they are exported to the European Union or other countries, several laboratory tests for the products must be done. According to the World Customs Organization, exported pepper products have different HS (Harmonisation) codes.

Consumers: Little information about how pepper is processed for final consumers in importer countries is available. In the domestic market, pepper products reach consumers through local shops and supermarkets. White pepper, black pepper, oleoresins, and powder are further processed in the food and pharmaceutical industries before they go to customers. However, little information is available on pepper processing by the importing countries.

Supporting actors: The success of strengthening the pepper commodity value chain is determined by access to information, knowledge, technology, finance, and other supporting services.



3.3 Pepper Production

In Sri Lanka, Pepper is mainly cultivated in the low and mid-country wet, and intermediate agro-climatic zones. The total extent of pepper in Sri Lanka is approximately 42,989 ha, and Matale, Kandy, Kegalle, Badulla, Ratnapura, Monaragala, and Kurunegala are the major districts (Department of Export Agriculture, 2022). Pepper is harvested after 7-8 months of maturity, and peppercorns are threshed manually or using a mechanical thresher to separate berries; pepper berries can be directly dried under the sun or in artificial dryers (Department of Export Agriculture, 2022). Most of the smallholders grow pepper in their own small plots

vine should be high-yielding, healthy, with vigorous growth, produce lateral branches with short internodal distances, long spikes, complete spike coverage with berries, bold berries, and be pest and disease free. As pepper is grown in different climatic zones, the selected line should be tolerant to the climatic conditions of the area. Cuttings are planted in 250-gauge 20 x 13 cm poly bags filled with a mixture of equal parts of topsoil, cow dung, sand, and coir dust. Planted poly bags should be kept in a propagator for 4 weeks. Then it is partially opened for watering and weeding. The polythene should be removed gradually within the next 2 to 3 weeks. After the removal of the propagator, nursery plants should be kept in the shade house, and hardening should be done

in the last 3 to 4 weeks. Overall, 4-6 months of the nursery period should be maintained (Department of Export Agriculture, 2022).

Spacing for both mono-crop and intercrop with coconut: 2.4m x 2.4m spacing is recommended (1700 plants/ha). After land preparation, planting pits of 60 cm x 60 cm x 60 cm are made and filled with a mixture of topsoil, cow dung, or compost. Pepper vines are trained on live or dead supports. In Sri Lanka, live supports are used, and the

most commonly used support tree is *Gliricidia sepium*, though some may use *Erythrina indica* (Dadap) or *Grevillea robusta*. *Gliricidia* sticks of 3-5 cm in diameter and 2.5 m in length should be planted to a 20 cm depth at the corner of the planting pit. Supports should be planted at least 6 months before the planting of peppers to provide adequate shade. Field planting of pepper is done with the onset of monsoon rains. About 4-6 months old, potted, healthy and vigorously growing plants with 5-8 leaves are planted in the pits 15-20 cm away from the support. Immediately after planting, temporary shade should be provided to protect the cuttings from direct sunlight, and a suitable mulch should be applied to the base to conserve soil moisture. Pepper is usually intercropped with other spices, coffee, cocoa, rubber and coconuts (Department of Export Agriculture, 2022).

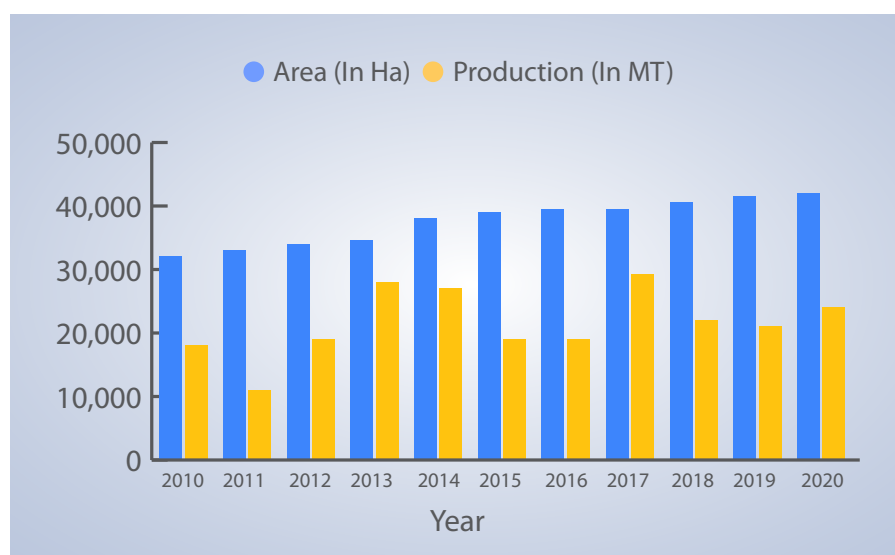


Figure 17: Pepper production in Sri Lanka
Source: UNIDO-SL VC Analysis of PCN (* 2020 Provisional)

of land (home gardens). There are very few pepper plantations that are larger than 20 acres (8.1 hectares, approximately). Pepper plants are perennials; however, they have been grown annually in most places outside their native habitat. Cultivation has the potential to expand into dry zones (Department of Export Agriculture, 2022).

Commercial varieties grown in Sri Lanka are: Panniyur-1", Kuchin, Dingi Rala, Kohukumbure Rala and Bootawe Rala, Kolonna (Department of Export Agriculture, 2022).

Pepper is usually propagated vegetatively using stem cuttings. For commercial cultivation, cuttings are selected from terminal stems or from ground runners. If cuttings are taken from the lateral branches, bush-type pepper plants can be produced. The chosen mother



3.4 Harvesting

Peppers are harvested after 7-8 months of maturity. To separate berries, peppercorns are threshed manually or by using a mechanical thresher. Pepper berries can be directly dried in the sun or with artificial dryers. Sun drying takes 4-6 days. To get a uniform black colour, blanching of raw pepper is done by immersing berries in boiling water for about 3 minutes. Blanching reduces drying time by 2-3 days and kills any microorganisms present. To produce white pepper, fully ripened berries are immersed in water for 5-6 days until the seed coat is rotten. Then the seed coat is removed by rubbing on a wire mesh or using a mechanical decorticator. The remaining pepper seeds are thoroughly washed and dried to produce white pepper. The peak harvesting season lasts from November to January, accounting for roughly 70% of the total harvest. However, farmers tend to prematurely harvest the pepper berries because of fear of crop theft while the berries are still on the vine. Another reason for premature harvest is the need for quick cash (Department of Export Agriculture, 2022).

White pepper is produced after the berries are allowed to ripen on the tree and completely removing the outer skin. Since black pepper has a ready market, farmers do not produce or sell white pepper. However, if the farmers are given an assured market for white pepper, they would have the incentive to produce, which will help in better price realisation. In certain farmer associations, farmers produce white pepper by soaking pepper in fermentation tanks for 4 to 5 days, removing the outer skin and later selling them in the market at higher prices.

3.5 Collection and Intermediaries

During the harvesting period, the farmers take the produce to the traders in the nearby town, where they get payments based on the quality of the peppers. The farmers, in this case, generally get a higher price for their products since they can add value to them by means of drying. Yet another mode of harvesting is practised among Sri Lankan pepper farmers wherein the traders approach farmers and negotiate the value of the crop while it is still on the vine. The traders then harvest the berries from the vine and transport the produce to a drying facility. The berries are then separated from the

HS Code	Description
090411	Pepper of the genus Piper, neither crushed nor ground
090412	Pepper of the genus Piper, crushed or ground

Table 9: HS code for pepper
Source: Sri Lanka Customs

Product	Remarks
Pepper oil	Pepper oil is extracted from pepper to cater to the flavour and fragrance industries.
Pepper oleoresin	The next stage of extracted pepper is used in the flavour and fragrance industries.
White pepper	Mature green peppers are used to make this pepper.
Crushed or ground pepper (Heavy berries)	Out of heavy berries, they are ground into various cuts to be used for dishes.
Seasoning blends pepper	A spice mix that can be used to improve the taste of a wide range of dishes and drinks. This unusual salt and pepper combination is ideal for rubbing into cuts of meat, enhancing seafood dishes, or even creating a salty rim for various margarita cocktails.

Table 10: Value addition opportunities for pepper
Source: UNIDO-SL VC Analysis of PCN

spikes with the help of threshers. In this case, the price of the pepper to the farmer is fixed, and the quality of the berries does not have an impact on the prices paid to the farmers. The produce from the farmers, raw with limited processing, dried and cleaned, is sold to the collectors, from where it is sold directly to exporters or processors based on the end use.

The collectors also carry out minimum post-harvest operations, such as cleaning, drying and grading and sell it to the local wholesaler for local consumption. In the case of processed pepper, such as pepper powder, white pepper and other value-added products such as oleoresins, the collectors/wholesalers sell the produce

to processors who, in turn, process the pepper as per market demand sell it to exporters or to the local markets. In some cases, exporters buy pepper directly from collectors or wholesalers, process it, and export it.

3.6 Processing and Exporting

Delays in the drying of black pepper after harvesting will cause mould growth on the berries and lower the food safety. The best moisture content of black pepper to prevent the growth of moulds during storage is found to be 12–14% dry basis (Codex Alimentarius Commission, 2017). Sun drying is the most commonly used method for drying crops in tropical countries.

- Dehydrated green pepper
- Pepper oil
- Green pepper in brine
- Oleoresins
- Freeze dried green pepper

3.6.2 Problems Faced by the Main Actors

The pepper chain is fragmented and consists of many stakeholders performing various functions. Cultivation



However, the method has several limitations, such as non-uniform sunlight during the day and problems during the rainy seasons. Therefore, the use of alternative drying techniques becomes essential. As black pepper significantly contributes to the Sri Lankan economy, research on the post-harvest drying of black pepper has been identified as a high-priority research area.

3.6.1.1 Value Added Products

- Whole black pepper
- Whole white pepper
- Crushed pepper ground pepper

and harvest are affected at the production level due to low yield, climatic changes, cost and availability of inputs, labour, pests/diseases, price fluctuations, theft, and inadequate support and assistance for cultivation. In the intermediary stage in the chain, supply is insufficient, and there is a lack of facilities for processing pepper and related labour issues. At the point of exports, the export companies face supply shortages, quality issues, inadequate facilities to undertake tests, and other issues (Wijayasiri, 2017). The prevailing climatic conditions on the island are suitable for the cultivation of spices, but unfortunately, they are also ideal for mould growth and, thus, contamination with mycotoxins.

3.7 Opportunities and Constraints in the Pepper Value Chain

Sri Lanka is called “Spice Island” and is a tropical nation in South Asia where several highly valued spices are produced. Like other spices from the island, Sri Lankan pepper is well-known for its superior inherent properties. Sri Lanka is home to several wild pepper types. Owing to the diverse varieties of pepper grown and the broad genetic variability of pepper found, and the presence of wild pepper relatives, it is believed that Sri Lanka is also a place of origin for pepper. Some commercial black pepper varieties have also been introduced to Sri Lanka since the commercial black pepper trade (Department of Export Agriculture, 2019). There is an opportunity for value addition by effectively using these wild pepper products to generate more income. Selling organic

international markets, product diversification and value addition, and to facilitate the marketing of pepper. It is an opportunity for producers to obtain a higher price for their quality products.

Pepper can be kept for long periods without any damage using a proper storage system. This gives an opportunity for producers to sell their products at a high price when the selling prices vary based on the season. Generally, off-season pepper prices increase noticeably. It is an opportunity for the producers to sell their stored produce at a better price.

Capitalising on high-quality Sri Lankan black pepper as a marketing/branding tool because Sri Lankan pepper has a higher piperine content, which gives it superior quality and pungency. Technology for extracting pepper oil and oleoresins is available, and there is a global demand



black pepper is also easy because pepper plants can be maintained using organic fertiliser, and pesticides and other chemicals are unnecessary. Therefore, the producers benefit from lower production costs, and Sri Lankan farmers use very few agrochemicals in pepper cultivation compared to competitors. Farmers can seek technical advice and training for cultivation and crop management from the DEA. The farmer organisations of pepper estates or large-scale pepper growers can seek assistance from the post-harvest advisory service unit (PHASU) of the DEA to upgrade the quality of pepper. The main objectives of this assistance scheme are to maintain the quality of the product to be competitive in

for spice oils and oleoresins. Exporters can use these opportunities to find niche markets with higher profit margins.

Changes in food habits are also a good opportunity. It causes to shift from artificial flavours toward natural foods such as spices, including pepper, resulting in increased income in new markets. There is an immense potential for value addition in the pepper industry (pepper oil, oleoresin, white pepper, etc.). Although Sri Lanka has quality raw materials, value-added products have a vast potential, which can help to generate high gains and profits.

VC Actor	Opportunities	Constraints
Producer	• Sri Lankan pepper has high levels of piperine and oil content; highlight the intrinsic properties to increase exports • Pepper industry receives attention and support from government and private institutions • Diverse varieties of pepper grown with resistance to pests and diseases • High farm gate prices due to growing international demand • Low application of agro-chemicals in pepper cultivation, providing opportunities to enter niche organic market and command higher prices • Promote organic villages and obtain group certification • Potential for expansion of cultivation into dry zones • Provision of free planting material by DEA for home gardens and subsidy for others. • High farm gate prices due to the limited supply of the product • Can be kept for an extended period	• Most pepper is grown in scattered small plots of land, under mixed and non-intensive cultivation with little inputs, and on live supports, which leads to low yields (the number of plants per area and per plant) • Climatic changes affecting amount and size of the crop • High labour cost and lack of labour • High cost of fertiliser • Pests and diseases • Lack of planting materials • Formation of moulds and aflatoxin, reducing the quality and safety of pepper • Price fluctuation • Theft • Inadequate extension services • Poor attitude among farmers to diversify land • Good agricultural practices of pepper cultivation • Poor infrastructure (roads) • Plant cannot tolerate frost and would not grow where the temperature drops below 12 °C • Plant requires heavy rainfall of about 2000 mm rain annually or irrigation
Intermediary	• Buy green pepper and process to buyer's requirement and standards • Engage in value addition • Increase in prices due to growing demand for black pepper • Engage in backward integration • Establish centralised processing centres • Training • Traceability • Quality segregation • Formalization of contracts • Support and guidance	• Inadequate supply of pepper due to cultivation of black pepper limited to some districts; seasonal variations in supply; poor response from the plantation sector for pepper cultivation; low productivity • Inadequate supply of quality black pepper due to high demand for light berries with attractive prices at farm gate • Willingness of farmers to sell light berries to earn "quick money" • Improper processing and storage and facilities • High labour cost for drying • The prevailing climatic conditions on the island are also ideal for mould and, thus, the produce can become contaminated with mycotoxins
Processor/Exporter	• Due to the pandemic, most people are concerned of foods that can boost their immunity • Buy green pepper directly from farmers and process it to their own standards and requirements • Adoption of product and process standards to access markets with stringent requirements • Marketing of organic black pepper; hardly any agrochemicals are used in pepper cultivation in the country compared to competitors • Capitalise on the high quality of Sri Lankan black pepper as a marketing and branding tool • Research published at the international level confirm Sri Lankan black pepper has the highest piperine content • Availability of technology for pepper oil and oleoresin extraction and demand for spice oils and oleoresins in the world • Change of food habits, increased income in new markets, and switch to natural foods such as spices, (including pepper) from artificial flavours • Potential for value addition in the pepper industry (pepper oil, oleoresin, white pepper, etc.) • Increasing pepper prices due to growing international demand • The Government of Sri Lanka has provided various incentives for cultivation, processing, and value addition • Explore niche and high-end markets in the USA and EU, which are yet to be fully exploited • Registration of pepper GI will facilitate exporters to penetrate international markets and prevent other competitors' misuse of Sri Lankan-origin GIs.	• Inadequate amount of supply of black pepper to meet the international demand • High market concentration (India 60%, Germany 6%, Pakistan 5%, USA 4%, Egypt 4%) and high competition from traditional pepper producers and exporters • Quota on pepper exports under ISFTA • Exporters have little or no direct involvement in cultivation • Inadequate supply of quality black pepper products are due to low standards of black pepper supplies • Quality standards of developed countries can act as a trade barrier • Low-cost production of Indian essential oils undercuts Sri Lankan oil extracts • Inadequate testing capabilities of local laboratories to meet emerging stringent requirements • Lack of market research at the international level • The export of sub-standard products can ruin the reputation of Sri Lanka • Contaminants • International competition • International prices

Table 11: Pepper value chain: Opportunities and constraints

Source: UNIDO-SL VC Analysis of pepper, clove, and nutmeg and (Hirimuthugodagee et al., 2017)



4 Clove Value Chain Analysis

4.1 Overview of the Clove Sector

Clove (*Syzygium aromaticum*), one of the most valuable spices that has been used for centuries as a food preservative and for many medicinal purposes, and one of the most priced and expensive spices from ancient times, is native to the Maluku Islands or the Moluccas in the Indonesian Archipelago. Although the time and manner of introducing cloves into Sri Lanka are unknown, the general belief is that the Arabs or merchants brought the crop to the island as Sri Lanka was a significant market for spices (Export Development Board, 2022). The clove plant produces dried, fully matured, unopened flower buds, and clove

The clove tree, farmed by small farmers in Indonesia, Madagascar, the Comoros, Tanzania and Sri Lanka, produces two major commodities: the clove and the eugenol-rich essential oil. World demand for cloves is driven by the Indonesian cigarette and spice markets. Essential oil and eugenol are in demand in the cosmetics, dentistry and food industries. But, today, economic and environmental threats weigh on these industries.

oil is extracted from these. Ceylon Clove is notably richer in oil than the clove varieties produced elsewhere in the world (Export Development Board, 2022). Ground clove is used for curry mixtures, and clove oil is used for flavouring foods and in the pharmaceutical and perfumery industry. Cloves are used either whole or ground to provide sweet and savoury flavours in pickling and producing sauces and kinds of ketchup. In medicine, it is valued as a carminative, aromatic and stimulant, and it is being used in the cigarette industry as a flavouring agent (Department of Export Agriculture, 2022). This plant represents one of the richest sources of phenolic



compounds, such as eugenol, eugenol acetate and gallic acid, and possesses great potential for pharmaceutical, cosmetic, food and agricultural applications. Clove's antioxidant and antimicrobial activity is higher than many fruits, vegetables, and other spices and should deserve special attention (Cortés-Rojas, 2022). Spices such as clove, oregano, mint, thyme, and cinnamon have been used for centuries as food preservatives and medicinal plants mainly due to their antioxidant and antimicrobial activities.

The tree grows primarily in Indonesia, India, Madagascar, Zanzibar, Pakistan, and Sri Lanka (Cortés-Rojas et al., 2014).

4.1.1 Market Trends

Cloves are widely used in some Asian (Indonesian and Chinese) cuisines. For example, the Indonesian community in the Netherlands is a relatively large consumer. Another example is the large Indian community in the United Kingdom that uses cloves for curry dishes. Asian cuisines are already popular in large parts of Europe and are gradually becoming more popular in Eastern European countries. This increased interest in ethnic foods will likely increase the long-term demand for cloves (The Netherlands Ministry of Foreign Affairs, 2022).

Combating microbiological contamination is becoming increasingly required by European buyers. It can earn a significant premium for suppliers, supplying cloves that have been steam sterilised at the source. However, investment in steam sterilisation equipment can be very costly (up to €1 million). An important downside of steam sterilisation is that it reduces the volatile oil content responsible for the flavour. European buyers would switch to other methods if they were equally safe, accepted by consumers, and inexpensive (The Netherlands Ministry of Foreign Affairs, 2022).

Sustainability sourcing is an important trend in Europe, especially in the United Kingdom, the Netherlands and Germany. Important issues in the supply chain are pesticide use, soil degradation, loss of biodiversity and fair payment for smallholders. Suppliers will be increasingly faced with sustainability requirements from the buyers. Although sustainable cloves are still a niche market, demand for products certified for compliance with sustainability standards is increasing. Organic and Fairtrade-certified cloves have been on the market for some time. A large challenge for the market for certified sustainable cloves is that they have to be sold at a higher price to cover some or all of the certification costs.

This has resulted in an ongoing debate in the sector concerning the best way forward to implement sustainability in the mainstream market. The option of third-party certification is still under debate. As mentioned above, self-verification could become more common in the mainstream market (The Netherlands Ministry of Foreign Affairs , 2022).

4.2 Clove Value Chain Map

The schematic presentation of the clove value chain map in Figure 18 provides an overview of the clove value chain as it moves from production to the final consumer, passing through different stages and processes. The linkages between other value chain actors are shown vertically from top to bottom. Various activities of these actors and the supporting institutes and service providers catering to the different stages are listed on either side of the map. The activities, in this case, include local production, collection and pre-processing, wholesaling, marketing, processing, exporting and retailing. A summary of the critical functions, actors performing these functions and their transactional relationships are presented.

Figure 18 shows the benefit distribution of different actors along the various channels in the clove value chain map. It is clear from the analysis that the producer could receive a significant share of benefits even in the traditional smallholder supply channel. Also, a margin is kept by each intermediary in the value chain. Producers' shares could be increased if intermediaries could be reduced by introducing a centralized collection and processing facility.

4.2.1 Value Chain Activities and Actors

The small clove grower in Sri Lanka is the point of origin for a value chain to sectors and trading circuits that distribute clove products to the market for various applications, some high-tech, often with added value. The producers will have no more control tomorrow than they did today or yesterday over the evolution in international market demand or the product prices. At present, a certain number of adverse developments, such as climate change, and labour-intensive harvesting, could disrupt the future of the clove supply chain and, therefore, the living standard of small farmers.

Input suppliers: Inputs such as seeds, fertilisers and pesticides are provided to the farmers by the government agencies and the private sector. There is also training for farmers to achieve better yield and quality

of cloves by the DEA. The training introduces Good Agriculture Practices (GMP) for the farmers who can apply these practices from the early stage of cultivation.

Farmers: Most clove plants are cultivated by smallholder farmers who still use traditional methods. Clove farmers carry out activities on cultivated land (on the farm), from planting and maintaining to harvesting. Female family members usually collect the harvest under the tree while helping to separate (remove) the clove flowers from the stems, and clove threshing continues with the help of other relatives. Farmers whose plantations are located far away and need money urgently sell their harvested raw cloves directly to collectors in the village who visit the farmers' gardens.

Village collector traders: Collectors at the village level buy clove flowers from farmers still on the tree or knock them down in the form of wet or dried flowers. Traders usually hire workers to do the picking and threshing to purchase clove flowers that are still on the tree. Then, the collectors will continue the process of hand sorting and drying and then sell to prominent collectors in the city.

Wholesalers: Large traders and wholesalers in the city buy cloves from farmers and collectors in the village; they clean and sort them by appearance and classify them by quality grade. Wholesalers play an essential role in the clove value chain in Sri Lanka because they have market access to buyers from outside the village. Also, they have access to information such as price, demand, and quality needed for export markets. More importantly, wholesalers at the province level partner with the exporters.

Exporters: Before shipping the products, the exporters must complete all the necessary documents relating to the regulatory requirements in importing countries. Several laboratory tests for the products must be done before they are exported to the European Union and other international markets. According to the customs, exported clove products have a different HS (Harmonisation) code.

Consumers: Little information is available on how clove is processed to final consumers in importer countries. In the domestic market, clove products reach consumers through local shops and supermarkets. Clove oil and powder are further processed in the food and pharmaceutical industries before they go to customers.

Supporting actors: The success of strengthening the clove commodity value chain is determined by access to information, knowledge, technology and finance, and other supporting services.



Schematic illustration of clove value chain

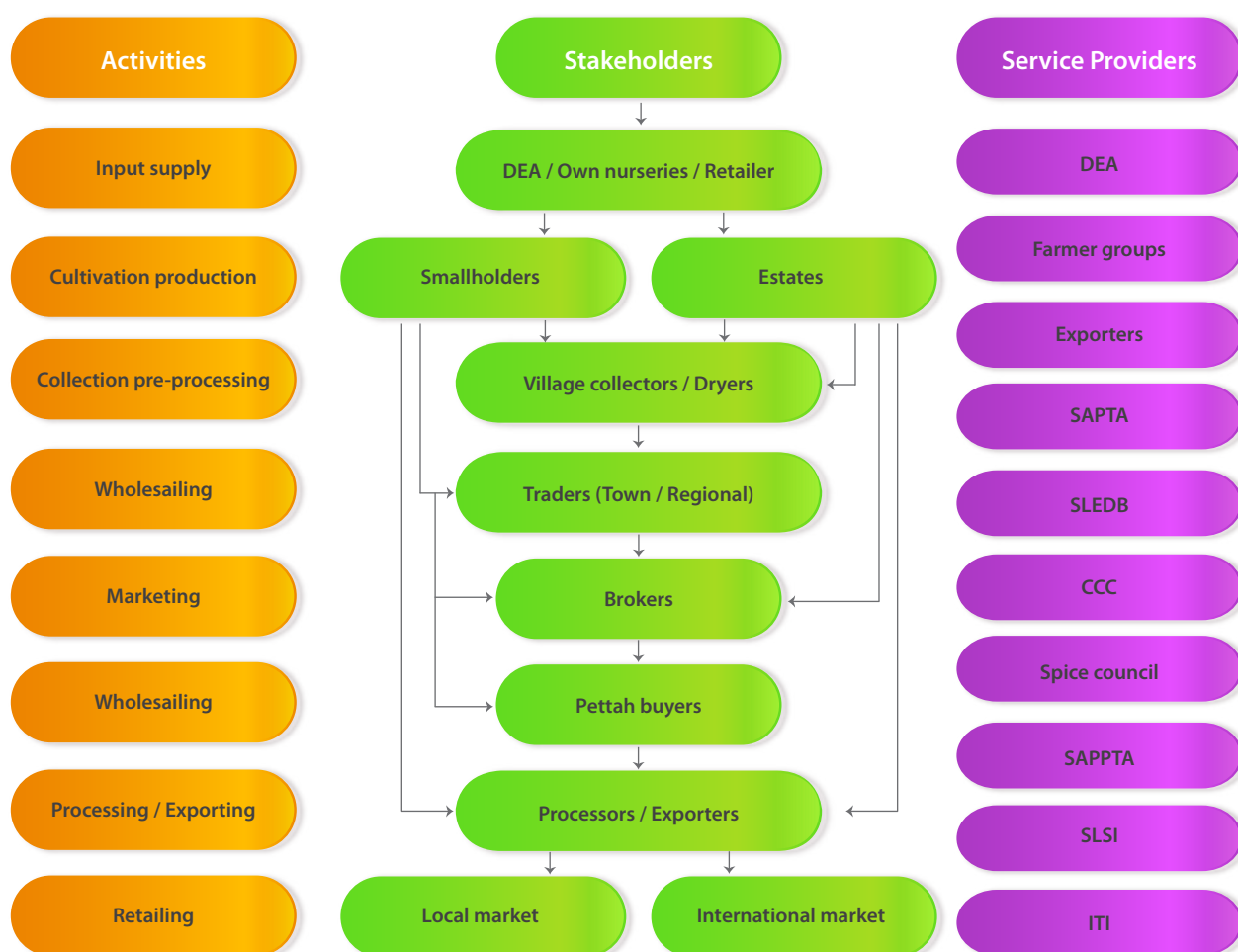


Figure 18: Schematic illustration of clove value chain
Source: UNIDO-SL VC Analysis of pepper, clove, and nutmeg

4.3 Clove Production

Commercial varieties grown in Sri Lanka: Bothal Karabu (Department of Export Agriculture, 2022)

In Sri Lanka, cloves are not essentially cultivated on a commercial scale yet farmed by families of smallholders for whom it represents a significant source of income. The area under cloves in Sri Lanka extends to 7,618 hectares in the wet zone mid-country, where clove trees can be frequently seen in home gardens in the Kandy, Kegalle and Matale districts (Department of Export Agriculture, 2022). These home gardens are known as Kandyan Forest Gardens (KFG), where cloves are grown along with many other spices such as pepper, nutmeg and cinnamon. No specific varieties have been identified; however, some trees produce bigger clove buds called “Bothal Karabu”. Clove thrives well in various soils: deep and rich loams with high humus content are best suited for the crop. It also grows satisfactorily on laterite soils, and pure sandy soil is unsuitable. Clove does not tolerate waterlogging, and therefore land selected for this crop should be well-drained. Clove grows well in a humid tropical climate from sea level up to 1000 m elevation (Department of Export Agriculture, 2022).

Average rainfall of 1750- 2500 mm per annum is sufficient; it is, however, necessary that dry periods alternate with moist ones for good flowering. The annual average temperature should be 20 °C – 28 °C without much seasonal and diurnal variation. Persistent strong winds are harmful to clove trees, and shade is essential during the first two or three years of growth; after that full exposure to light is beneficial. Clove is propagated through seeds; tree ripe fruits should be sown immediately since the viability of seeds is rapidly lost within 48 hours of collection. Seeds are obtained by removing the outer pulp by soaking them in water, showing early and uniform sprouting (Department of Export Agriculture, 2022).

The clove tree is an evergreen that grows to a height ranging from 8 to 12 m, having large leaves and sanguine flowers in numerous groups of terminal clusters. The flower buds are at first a pale colour and gradually become green, after which they develop into a bright red when they are ready for collecting. Cloves are harvested when they are 1.5–2 cm long and consist of a long calyx, terminating in four spreading sepals and four unopened petals that form a small ball in the centre. The chemical composition of clove essential oil varies among the different locations the plant has been cultivated, and the method used to extract the essential oil, among other factors (Devkota & Devkota , 2020).

The production of flower buds, which is the commercialized part of this tree, starts after four years of planting. Flower buds are collected in the maturation phase before flowering. The collection could be done manually or chemically mediated using a natural phytohormone, which liberates ethylene in the vegetal tissue, producing precocious maturation (Rojas et al., 2022). The timing of harvest of the clove buds is critical. The buds should be harvested before the purple or crimson flowers start to develop. The correct time of harvest is when the outer green leaves (the calyx) of the flower bud change from olive green to yellow pink and before the petals fall to expose the stamens (Kerala Agricultural University, 2022).





For centuries the trade of clove and the search of this valuable spice stimulated the economic development of this Asiatic region. The clove tree is frequently cultivated in coastal areas at maximum altitudes of 200 m above the sea level. The major producer countries of cloves are Indonesia, India, Malaysia, Sri Lanka, Madagascar, and Tanzania, especially the Zanzibar Island. (Rojas, 2014).

4.4 Harvesting

The right stage of harvesting clove buds is when flower petals change their colour from olive green to yellow pink. Clusters of flowers are harvested together with the stalks. The harvesting season is from December to April, and the average yield of dry cloves in Sri Lanka is about 250kg/ha; under good management conditions, a yield of about 850kg/ha can be obtained (Department of Export Agriculture, 2022).

For the collection of buds, harvesters climb the trees or place ladders and pick the buds with the stalk. Mobile platforms are also used for collection.

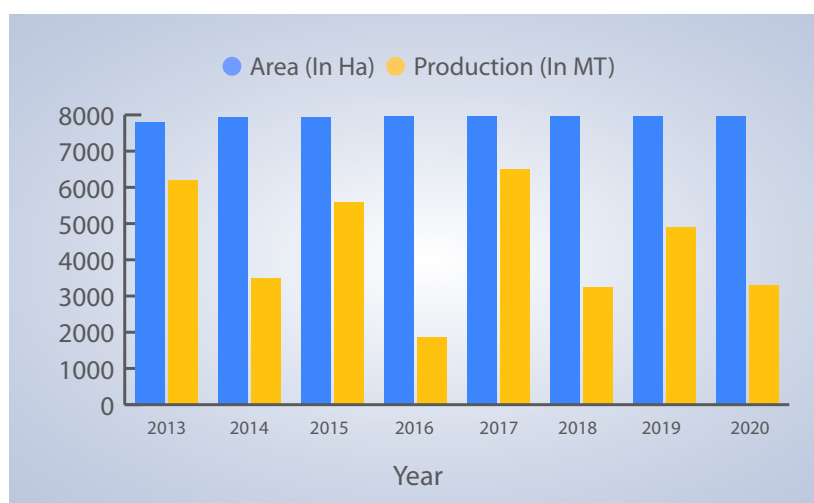


Figure 19: Clove production in Sri Lanka
Source: UNIDO-SL VC Analysis of pepper, clove, and nutmeg (* 2020 Provisional)

Trees are also beaten using bamboo sticks; clove buds fall on the ground and are collected. After collection, the flower buds should be detached from the stalks, and both buds and stalks are dried in the sun or artificial drier until they become dark brown and hard, and the stems can be used for oil distillation. Well-dried good, quality cloves are golden brown, and badly dried cloves are soft and pale brown with a whitish mealy appearance known as “khuker” cloves. Green clove buds of the right stage give about 30% dry cloves. Well-dried cloves (8-10% moisture) can be stored in gunny bags without damage by fungus and insects for 1 or 2 years (Department of Export Agriculture, 2022).

The buds must be dried quickly, or they will begin to ferment. They are usually dried in the sun by spreading on clean mats. The cloves should be raked and turned frequently to ensure they develop an even brown colour. The bud’s colour changes from pale russet to a darker brown as the clove dries, and the drying process takes four to five days. The drying process cannot be speeded up because, the cloves will become dry, brittle and withered rather than plump. The final moisture content

of the dried cloves should be 8-10%. Experienced clove driers will know when the cloves are dehydrated as the buds will snap easily. Cloves should be dried during the rainy season using a mechanical drier such as a tray drier (Kerala Agricultural University, 2022). The dried buds are winnowed using a traditional winnowing basket to remove dust and other foreign matter. Small cleaning machines use a blower to remove dirt and dust (Kerala Agricultural University, 2022).

4.5 Collection and Intermediaries

The traditional supply chain of cloves in Sri Lanka is characterized by a large number of intermediaries with no essential function, decentralized purchasing, and low-quality product purchases and sales. Intermediaries in the clove value chain usually consist of village collectors, regional traders, brokers and Colombo traders.

Village collectors, who are usually cultivators, play a vital role in remote areas with poor transport infrastructure and a lack of storage and drying facilities. Sometimes, they provide cultivators with technical and financial assistance, and maintain a dominant role in transactions. Due to the low-price differentiation for quality, cultivators are not interested in upgrading the production quality. Significant costs incurred by village collectors include costs of cleaning, drying, grading, packing in gunny bags, and transferring to regional traders. Neither the collectors nor the producers have any contractual agreement in selling cloves. Hence, they can sell cloves to any collector. Producers will sell cloves to any collector who offers them the highest price. Collectors determine the price according to the grades and the quality of the cloves. At the point of sales, producers are price takers, and collectors are price makers. Instability of prices for clove products is one of the main challenges that the producers are facing. Collectors assist suppliers by providing credit as well as technical assistance whenever possible. They do not hesitate to give credit on cash. They maintain a good relationship with the suppliers. But they do not provide any inputs like fertilizers, plants or seeds.

The regional trader is the most crucial intermediary in the clove value chain who collects the products from the regional collector and the cultivators. There could be 5–6 traders who often handle many different spices such as cardamom, pepper, nutmeg, and cinnamon. They are primarily specialized in buying and wholesaling. In addition, they perform some primary processing and value addition activities such as drying and grading

products. Sometimes, these traders provide regular buyers with quality and price information, and financial assistance. Regional traders are more concerned about the quality of the product they buy. Prices are decided based on several quality parameters such as moisture level, dryness, colour, and appearance. They usually maintain a similar price among fellow traders in the region. Low production volume and low quality have been the major threats at the intermediary level of the value chain. Regional traders sell their cloves to the processors, exporters, and Colombo wholesalers.

Due to the lack of focus on the quality of the product at the producers' stage, there is a considerable amount of cleaning, pre-processing and grading carried out at the intermediary level throughout the value chain. Collective actions and backward and forward integration to ensure quality and traceability, in response to the different process standards adopted at the end market, are rarely available.

There are no international or national standards and regulations governing spice collection. Collectors pay attention to the cleanliness of the cloves, and they should be well-sorted and the collectors are well-experienced enough to determine the quality of the cloves according to the grades.

4.6 Processing and Exporting

The processor/exporter is the final link in the clove value chain. There are few vertically integrated companies who are engaged in the various activities in the value chain that include cultivation, processing and exporting. Sometimes, especially in the case of organic production, these processors/exporters have contractual arrangements with a set of preferred suppliers. Those processors/exporters serve both the domestic market and the export market after value addition through different levels of processing, packaging and labelling.

Grinding can be a method of adding value to a product; however, it is not advisable to grind spices since after grinding, spices are more vulnerable to spoilage. The flavour and aroma compounds are unstable and quickly disappear from the ground products. The storage life of ground spices is much less than for the whole spices. It is challenging for the consumer to judge the quality of ground spice, and it is also straightforward for unscrupulous processors to contaminate the ground spice by adding other materials. Therefore, most consumers prefer to buy whole spices (Kerala Agricultural University, 2022).

Cloves can be packaged in polythene bags of various sizes according to the market demand, and the bags should be sealed to prevent moisture. Attractive labels should be applied to the products, and the label must contain all relevant product and legal information (Kerala Agricultural University, 2022). Dried cloves must be stored in moisture-proof containers away from direct sunlight. The cloves must be dehydrated before they are stored, and any moisture within the bags will cause the cloves to rot. The stored cloves should be inspected regularly for signs of spoilage or moisture. If they have absorbed moisture, they should be re-dried to a moisture content of 10%. The storage room should be clean, dry, cool and free from pests. Mosquito netting should be fitted on the windows to prevent pests and insects from entering the room. Smelling solid foods, detergents and paints should not be stored in the same room as they will spoil the aroma and flavour of the cloves (Kerala Agricultural University, 2022).

Sri Lankan clove is mainly exported to India, the USA, Saudi Arabia, UAE, and Germany (Export Development Board, 2022). This is the most sophisticated stage of the value chain where the process standards such as SLS standards, ISO standards, Fairtrade, GMP, ASTA (American Standard Test certificate), and US (European standards) are also applied depending on the buyers'

HS Code	Description
090710	Cloves, whole fruit, cloves and stems, neither crushed nor ground
090720	Cloves, whole fruit, cloves and stems, crushed or ground

Table 12: HS code for Clove
Source: Sri Lanka Customs

requirements. Before exporting, the products need to be tested and certification obtained either from the SLSI or private laboratories. The Industrial Technology Institute in Sri Lanka plays a vital role for the factories to obtain this certification.

The strong, unique taste with intense fragrance and aroma of Sri Lankan clove attract high-end export demand and better prices in the international market. While the world demand for clove value additions has been consistently increasing, low production volume in the country and low quality of the products have been critical issues of concern in dealing with clove value addition and exports. High labour wages, low availability of skilled labourers for value addition and high capital for sophisticated equipment have been the major threats for the exporters in expanding the export volume and value additions.

4.6.1 Producing Clove Oil

Clove oil can be extracted from the plant leaves, stems, and buds of the tree, through steam distillation. Generally, clove oil is obtained by the distillation of flower buds, inflorescence parts, and leaves. Clove oil obtained from the bud is colourless, while oil manufactured from the stem is a slightly yellowish liquid, which gets darker with age and exposure to light. Meanwhile, clove leaf oil, a dark brown liquid obtained by the distillation of the dry leaves, is the main traded oil widely used to produce eugenol (Export Development Board, 2022).



The essential oil extracted from the dried flower buds of cloves is used as a topical pain reliever to promote healing. Traditionally, clove treats intestinal parasites, skin infections, digestive upsets, and tooth aches. It also finds use in the fragrance and flavoring industries (Devkota & Devkota, 2020).

4.6.2 Value Added Products

- Whole
- Clove-stem oil
- Ground
- Clove-leaf oil
- Clove oil
- Clove-root oil
- Pharmaceutical
- Perfumery
- Pickling
- Sauces
- Ketchup
- Cigarette industry
- Flavouring agent
- Oleoresins

4.7 Opportunities and Constraints in Clove Value Chain

Clove yield fluctuations caused by variations in climate change affect their hormones and gene expression. In addition to climate factors, especially temperature and rainfall, crop maintenance patterns significantly affect crop yields. Because cloves are traditionally grown without special care, farmers are not accustomed to using fertilizer or watering their trees. The flower buds must be harvested when fully mature but before opening, which is a labour-intensive, high-risk, and expensive task (Hirimuthugodagee, 2017).

The market for cloves is relatively small and has been stable over the past five years. Madagascar and Sri Lanka are the most prominent suppliers for the European market, although supplies from developing countries have decreased on average. Suppliers operating according to food safety principles have an important competitive advantage in the European market (The Netherlands Ministry of Foreign Affairs , 2022).

European imports of cloves from developing countries mainly consist of whole cloves (93% in 2017). Opportunities for suppliers from developing countries to supply processed (crushed or ground) cloves are limited, and cloves are often sold and consumed in the whole form. The food processing industry does buy processed cloves in significant amounts but relies mainly on local processors or those from inside Europe for processing. This is reflected by the fact that 26% of intra-European trade in this sector consists of processed cloves. Intra-European imports of processed cloves are growing at a faster rate (+11%) than those from developing countries (+1%) (The Netherlands Ministry of Foreign Affairs , 2022).

Per capita consumption is high in Western Europe due to the wide use of cloves in sweet foods and the interest in international (particularly Asian) food. Moreover, many food processors that produce both for the domestic and other European markets are based in Western Europe (The Netherlands Ministry of Foreign Affairs , 2022).



VC Actor	Opportunities	Constraints
Producer	• Availability of conducive climatic and soil conditions • Availability of dedicated government and private support structure catering to the sector (DEA, Spice Council, SAPPTA) • Availability of subsidies and grants provided by the DEA and other agencies for entrepreneurs for cultivation and value addition • Provision of free planting material by DEA for home-gardens; subsidy for others • Availability of research facilities (DEA, ITI and Agriculture Faculties) • High demand from both the local and export markets • High price in both local and international markets • Adaptability to organic cultivations under forests and intercropping with perennial crops • Availability of price premium and increasing demand for organically certified products • Women can also participate in processing	• Information on the selling price of cloves in the market is limited • Market needs (quantity and quality) are also unknown to farmers • Low productivity • Small holder orientation with low investments in crop management/poor crop management • Lack of high yielding varieties • Low quality of the products • Immature harvesting and low-quality drying • Poor storage and handling • Unskilled labour • Insufficient extension services • High cost of production • Lack of research on low-cost technologies • Lack of bargaining power and fair, stable price • Weak linkage among value chain actors • Poor infrastructure (road transport, electricity) and support services in clove growing areas • Lack of recognition and social cast stigma • Low attraction to youth • Unstable price in the market • Lack of proper production infrastructure and technology • Climate change
Intermediary	• High demand from local and international markets • Ability to engage in value addition in terms of pre-processing and drying • High price in both local and international markets (third highest price among all spices) • Different grant and subsidy schemes to promote cultivation and value addition • Availability of grants and financial assistance for the entrepreneurs for value addition	• Low and inconsistent quality of products - poor practices by producers • Low-quality traditional drying • Poor storage and handling • Low supply volume: • Limited number of scattered farmers • Weak linkages with the exporters
Processor/Exporter	• High price in both local and international markets • Backward integration vertically to buy directly from preferred suppliers to ensure traceability and product quality • Availability of dedicated government and private support structure catering to the sector (SLEDB, Spice Council) • Different grant and subsidy schemes to promote value addition • Availability of grants and assistance provided by the DEA to entrepreneurs for value addition • Increased use of cloves in pharmaceutical, cosmetic, food and agricultural applications. • High possibilities to explore new markets such as Japan, European markets and value addition • Research published at international level confirming the importance of Sri Lankan cloves and its high medicinal values • Opportunities to explore organic cloves • High world market demand for cloves • World market is already established for Ceylon cloves • Creation of brand names • Ability to buy products directly from farmers and processing to own standards to ensure traceability • Adoption of product and process standards to access new markets	• Major markets limited to the USA and Europe • Insufficient promotional activities in the international market • Lack of research undertaken to measure end-market requirements • Traditional methods which are highly labour intensive • High cost in obtaining and maintaining standards and certificates

Table 13: Clove value chain: Opportunities and constraints

Source: UNIDO-SL VC Analysis of pepper, clove, and nutmeg and (Hirimuthugodagee et al., 2017)



5 Nutmeg Value Chain Analysis

5.1 Overview of the Nutmeg Sector

The nutmeg tree (*Myristica fragrans* Houtt.) is endemic to Indonesia and other countries in the South Pacific. It is also grown commercially on several Caribbean Islands, in India, Sri Lanka and Malaysia. The nutmeg tree bears fruits containing egg-shaped seeds wrapped in a red cover (aril) all year round. The red cover, called mace, is another spice with a similar, but slightly more delicate flavour (The Netherlands Ministry of Foreign Affairs, 2022). Nutmeg is the inner brown kernel of the fruit of the nutmeg tree.

Nutmeg is a perennial evergreen spice tree native to Molluccas, East Indonesia. Nutmeg was reportedly introduced to Sri Lanka at the beginning of the 19th century. There is evidence that the crop was brought

Germany and Italy offer opportunities for developing country exporters, as their share of nutmeg imported directly from developing countries is relatively high, at 60% and 82%, respectively. The European average share from developing countries is 62%. Supplies not imported from developing countries are usually re-exports

here even before that by merchants travelling on the Silk Road (Department of Export Agriculture, 2022). Sri Lankan nutmeg and mace suppliers export the whole nutmeg, nutmeg essential oil, ground nutmeg, and mace to global markets. Similar to Ceylon Tea and other spices, nutmeg, introduced in Sri Lanka, has developed an intricate chemical composition and a flavour complex based on the country's unique terrain and agroclimatic conditions.

Nutmeg is one of the more important spices that has found application in many culinary, food and beverage applications and the medicinal products industry. The plant is grown for two spices derived from the fruit: nutmeg, which comes from the seed, and mace, which is derived from the seed covering. The seed is also a source of nutmeg essential oil and nutmeg butter, both of which have applications in the food industry, personal care, and medicinal products. What is generally known as nutmeg is the whole dried kernel of the seed or the powder derived from the ground dried kernel. While the whole fruit is known as "nutmeg", the pericarp is used mainly in the countries where the fruit is grown for culinary purposes, while the kernels ("the nut-meg") and the mace are mainly processed and packed for export. Once the fruit is mature, it is harvested, the pericarp removed,

and the mace covering the seed is removed. The seed is then dried, shrinking the nutmeg kernel within the seed until they rattle when shaken. The shell is then cracked open to harvest the kernel, using various methods, including traditional methods. The nutmeg kernel and the mace can then be packaged for retail sale, packaged in bulk or distributed for local use. Both nutmeg and mace have distinctive fragrances and unique flavours, making them the spice of choice in traditional recipes in their home countries and regions, as well as in cuisines around the world.

Some evidence suggests that Roman priests may have burned nutmeg as a form of incense. It is also known to have been used as a prized and costly spice in medieval cuisine, used as flavourings, medicines, and preserving agents and was highly valued then in the European markets.

5.1.1 Market Trends

Nutmeg and mace are the two main products. Oils are extracted from both nutmeg and mace. Powdered nutmeg and mace are used in curry powders. Nutmeg and mace are used primarily to flavour curries and other food products, such as confectionery and bakery. It is also used in the preparation of beverages and drinks. Nutmeg is used as an ingredient in Ayurvedic and Chinese medicine.

Nutmeg oil is extracted from seeds, while nutmeg husk can be used to produce jam, jelly and marmalade and can be preserved in sugar or salted and dried as a condiment.

It appears in delicately flavoured meat dishes, the Northern Indian spice mixture garam masala, and in Sri Lanka, India, and Bangladesh the usage and consumption is in small quantities. Nutmeg acts on the stomach to improve appetite and digestion. It has been used with advantage in mild diarrhoea, flatulent colic, and certain forms of dyspepsia. Nutmeg oil is sometimes used to dispel flatulence. It helps prevent gas and fermentation in the intestinal tract. Both nutmeg and mace are used for flatulence, to correct nausea arising from other drugs, and allay nausea and vomiting. Nutmeg is an excellent drink addition for convalescents (De Silva et al., 2008).

For nutmegs, Indonesia is by far the most significant exporter globally. Sri Lanka serves around 5% of the global demand for nutmeg, exporting mainly to India, the UAE, the USA, Germany, and Pakistan. The country also serves around 7% of the global demand for mace, exporting it mainly to India, Germany, and the UK (Export Development Board, 2022).

5.2 Nutmeg Value Chain Map

In Sri Lanka, nutmeg cultivation is primarily restricted to mixed home gardens. There is a lack of interest in replanting many old and senile trees due to low returns and the high cost of cultivation. According to a survey conducted by the Department of Census and Statistics in 2014, the total number of operators engaged in the entire nutmeg cultivation value chain is around 84,672 (IFEAT Socio-Economic Committee, 2021).

5.2.1 Value Chain Activities and Actors

The small nutmeg grower in Sri Lanka is the point of origin for a value chain to sectors and trading circuits that distribute nutmeg products to the market, often with added value.

The value chain for nutmeg consists of several main actors and also a range of supporting actors who are indirectly involved in the value chain. Nutmeg reaches customers through several channels depending on the targeted market. Nutmeg consumption for the domestic market is not as large as for the export market, so that the actors involved in exporting are more complex compared to selling to domestic consumers.

Input suppliers: Some inputs such as seeds, fertilisers and pesticides are provided to the farmers by the government agencies and the private sector. There is also training for farmers to achieve better yield and quality of nutmeg by the DEA. The training introduces Good Agriculture Practices (GAP) for the farmers who can apply these practices from the early stages of cultivation.

Farmers: Most nutmeg plants are cultivated by smallholder farmers who still use traditional processing methods. Farmer's activities begin with planting, caring, harvesting, and post-harvest handling.

Home Industry: The flesh or meat of the nutmeg is used in local food industries on a small scale. Initially, the flesh was thrown out by the farmers as waste. More recently, through training by the government, local communities have started to produce different kinds of products from the flesh, such as jams, juices, candies, and dried fruits. This shift positively impacts rural development as the local communities can earn more household income.

Village collector traders: They collect nutmeg fruits from those farmers who want to sell fresh nutmegs without processing them. The collectors will continue the processing by cutting, splitting, and drying the fruits.

Wholesalers: Farmers and village collector traders sell their dry nutmeg and mace to wholesalers in the city. The wholesalers sort the nutmegs by appearance and classify them by quality grades. If the nutmegs are broken, the price will be lower than for whole nutmegs. Wholesalers play an essential role in the nutmeg value chain in Sri Lanka because they have market access to buyers from outside the village. They also have access to information such as price, demand, and quality needed for export markets. More importantly, wholesalers at the province level partner with the exporters.

Dry nutmeg and mace are sold to wholesalers in the city by the farmers and collector traders. They divide the nutmeg by appearance and the level of quality. The cost of nutmegs will vary depending on whether they are broken or kept as a whole. Wholesalers play an important role in Sri Lanka's nutmeg value chain as they have access to the consumers outside the village. As a result, the provincial level wholesalers partner with the exporters with their know-how on export level price, demand and quality.



Schematic illustration of nutmeg value chain

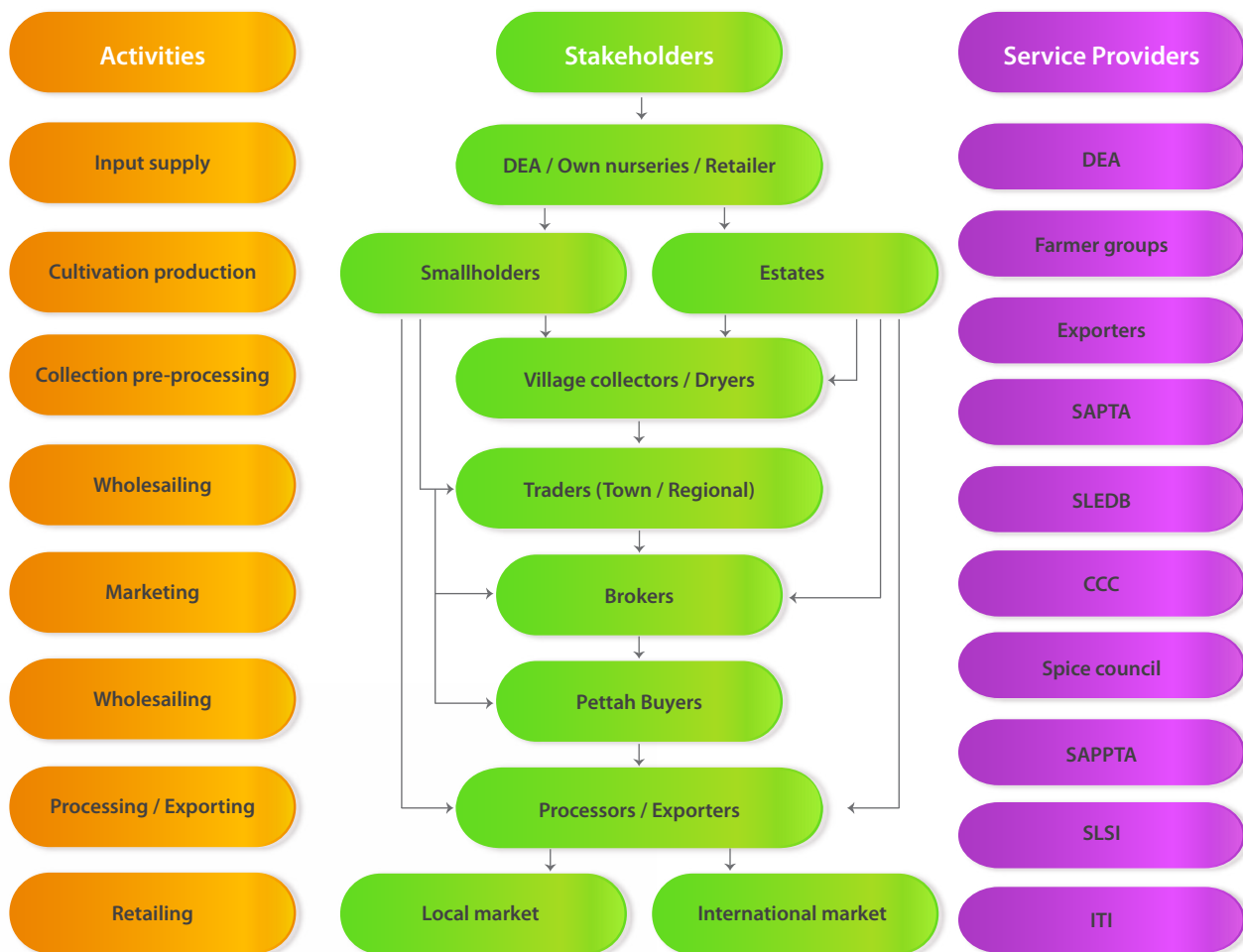


Figure 20: Schematic illustration of the nutmeg VC
Source: UNIDO-SL VC Analysis of pepper, clove, and nutmeg



Exporters: Before shipping the products (dry nutmeg, ground nutmeg, dried mace, and ground mace), the exporters must complete all the necessary documents relating to the regulatory requirements in importing countries. Several laboratory tests for the products must be done before they are exported to the European Union and international markets. According to the World Trade Organisation, nutmegs are shipped only in the four primary form types, each having a different HS (Harmonisation) code.

Consumers: Little information is available on how nutmeg is processed for final consumers in importer countries. In the domestic market, nutmeg products made from flesh, such as jam, candies, and syrup, reach consumers through local shops and supermarkets. Nutmeg oil and nutmeg powder are further processed in the food and pharmaceutical industries before they go to customers.

Supporting actors: The success of strengthening the nutmeg commodity value chain is determined by access to information, knowledge, technology and finance, and other supporting services.

5.3 Nutmeg Production

Commercial Varieties Growing in Sri Lanka: no specific varieties have been identified. The country currently has a nutmeg production of about 5,000 MT, and the average production in Sri Lanka is about 190 kgs/ha (IFEAT Socio-Economic Committee, 2021).

Nutmeg prefers cool climates; hence the mid-country areas of Sri Lanka are ideal for the growth of nutmeg. The total extent of nutmeg in Sri Lanka is 2788 ha, of which 80% is in the Kandy district; other major growing areas are Kegalle and Matale districts (Export Development Board, 2022). Nutmeg requires a climate without a pronounced dry season, with an annual rainfall of 150 cm or more. Areas with clay loam, sandy loam and red laterite soils are ideal for its growth. The female nutmeg tree starts bearing fruit from the fifth or sixth year but may take up to eight years. It takes 15 to 20 years to reach full production, depending on favourable climatic

conditions. A fully grown nutmeg tree produces 2,000 to 3,000 fruits per year. Once ripened, the fruit splits open naturally, revealing the mace, indicating that it is due for

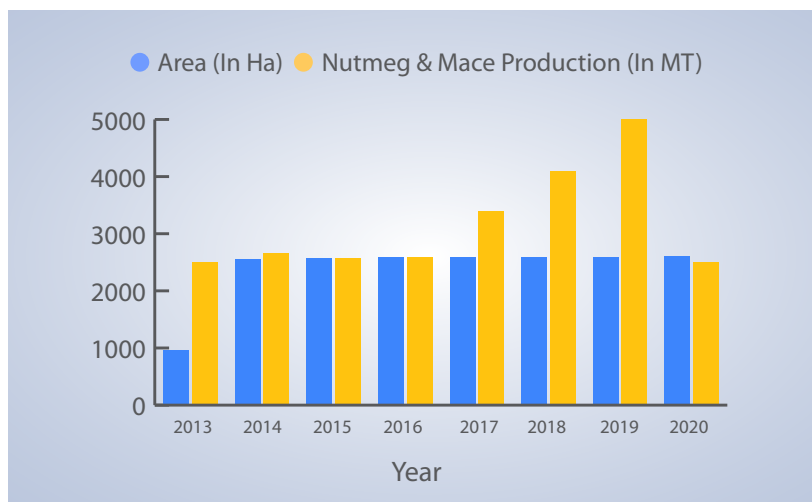


Figure 21: Nutmeg production in Sri Lanka
Source: Department of the Census & Statistics and DEA database

harvesting and drying. The nutmeg fruit is either plucked from the tree or allowed to drop on the ground and is handpicked. Tender nutmeg for distillation purposes is harvested within five months, while spice-grade nutmeg is harvested after seven to eight months. Depending on rain patterns and when the fruits are ready for collection, harvesting is done in different areas at different times of the year; thus, nutmeg oil is available all year round (Department of Export Agriculture, 2022).

5.4 Harvesting

If well managed, nutmeg starts to bear in the 7th year, and harvest increases with time. The productive age of nutmeg is uncertain as it can give a good crop for more than a hundred years. However, peak harvest comes after 20 years of age. The yield of nutmeg varies from tree to tree, from several nuts to 8000-10000 nuts per tree. The average yield is 1500 dry nutmeg/tree/year and 1-1.5 kg dry mace/tree/year. As soon as fruits split or are about to split, they are hand-picked from the trees. Fruits are opened by hand, and the mace, which is attached to the base of the nut, is removed from the nut by cutting with a small pointed knife. The nuts are dried until the kernel rattles in the shell. Dried nutmeg can be sold as it is, or it can be shelled and only the kernel sold. The mace is flattened by hand and dried slowly under the sun until a bright orange-yellow fragrant product is obtained (Department of Export Agriculture, 2022).



5.5 Collection and Intermediaries

Like other spices, the traditional supply chain of nutmeg in Sri Lanka comprises intermediaries with no essential function and decentralised purchasing. Intermediaries in the nutmeg value chain usually consist of village collectors, regional collectors, brokers, and Colombo traders.

The village collectors, usually cultivators, play a vital role in remote areas with poor transport infrastructure and a lack of storage and drying facilities. Sometimes they provide the cultivators with technical and financial assistance and maintain a dominant position in transactions. Due to the low-price differentiation for the quality, cultivators are not interested in upgrading the production quality. Significant costs incurred by village collectors include costs for cleaning, drying, grading, packing in gunny bags and transferring to regional traders. Neither the collectors nor the producers have any contractual agreement to sell the nutmegs. Hence, they can sell nutmegs to any collector. Producers will sell nutmeg to any collector who offers them the highest price, and the collectors determine the price according to the grades and the quality of the nutmeg. Producers are price takers at the point of sale, and collectors are price makers. The instability of prices for nutmeg products is one of the main challenges faced by the producers.

The regional trader is the most crucial intermediary in the nutmeg value chain, who receives the products from the regional collector and the cultivators. A few traders handle many different spices, such as cloves, cardamom, pepper, nutmeg, and cinnamon; they primarily specialise in buying and wholesaling. In addition, they perform some primary processing and value addition activities such as drying and grading products; these traders provide regular buyers with quality and price information, and financial assistance. They usually maintain a similar price among fellow regional traders and sell their nutmegs to processors, exporters, and Colombo wholesalers.

5.6 Processing and Exporting

Once the fruits are harvested, the pericarp is depleted, the mace from the nutmeg is separated, and the nut and mace are dried separately. The mace is flattened by hand and spread out to dry in the sun. Exposure is limited to a few hours per day depending on the weather and ranges between two to three days to a fortnight. When the drying is completed, the original

brilliant red colour gradually becomes yellowish red or orange. Meanwhile, the seeds undergo a two-step drying process: first, they are dried in the sun or in drying ovens; when drying is complete the seed rattles within the shell; second, the shell is removed by breaking it using wooden mallets, the kernels are taken out, and shade-dried. These processes occur as soon as the fruits are plucked and are mostly done at the farm level by the farmers and their family members.

Even though nutmeg is an easy crop to grow and harvest, the post-harvest processes are labour intensive. Most processors, such as plucking/picking the fruit,

HS Code	Description
09081100	Nutmeg, neither crushed nor ground
09081200	Nutmeg, crushed or ground
09082100	Mace, neither crushed nor ground
09082200	Mace, crushed or ground

Table 14: HS codes for nutmeg
Source: Sri Lanka Customs

Year	Quantity Kg	Value
2015	1,575,626	11,113,658.74
2016	1,509,716	11,018,225.23
2017	1,691,713	10,226,587.67
2018	1,657,586	10,216,528.85
2019	2,657,978	14,455,657.87
2020	1,774,059	11,209,682.70

Table 15: Nutmeg exports from Sri Lanka (value/LKR)
Source: Sri Lanka Customs

removal of the mace, cracking of the shell, drying etc., are done manually. After drying, they are crushed and steam distilled together to produce nutmeg oil. Yields can vary between 12–15%, depending upon the maturity of the nutmeg. Nutmeg oil yields lighter oil, which floats above the water, and the heavier oil sinks to the bottom (since the volatile components of nutmeg oil have varying densities). Both oils must be collected and blended to obtain the desired quality of nutmeg oil (IFEAT Socio-Economic Committee, 2021).

Yield processing is carried out by the family members: splitting the nutmegs, removing mace from nutmeg seeds, and drying the mace and seeds. According to the farmers, machine drying is better with the method of origin because the temperature of the heat can be regulated, rather than with sunlight which can make the nutmeg seeds become contaminated with aflatoxins (Rohmah, 2019).

Dried nutmeg seeds have a shelf life of up to six months if they continue to be dried. The marketed nutmeg seeds are in the form of skin seeds, flesh seeds (numbers 1, 2 and 3) and dried mace (Rohmah, 2019).

The products produced are diverse, ranging from well-preserved nutmegs, dried-candied nutmegs, syrups, juice, and candies. Home industries make soy sauce from nutmeg (Rohmah, 2019).



5.6.1 Value Added Products

- Oleoresin
- Broken
- Ayurvedic medicine
- Jam
- Marmalade
- Butter
- Essential oil
- Personal care
- Whole
- Ground
- Chinese medicine
- Jelly
- Condiment
- Beverages
- Mace
- Cosmetic industry

5.7 Opportunities and Constraints in Nutmeg Value Chain

There are several issues for nutmeg production in Sri Lanka – the high cost of production due to labour scarcity, increased land cost due to competition for land from other commercial crops, and low yield. In Sri Lanka, nutmeg cultivation is primarily restricted to mixed home gardens. There is a lack of interest in replanting many old and senile trees due to low returns and the high cost of cultivation (IFEAT Socio-Economic Committee, 2021).

The natural climatic conditions prevailing in Sri Lanka are favourable and supportive for producing high-quality nutmeg. Therefore, Sri Lanka has important assets,

making it an additional source of income for farmers; nutmeg meat is processed into sweets, syrups, fruit juices, and soy sauce. Productivity in nutmeg cultivation in Sri Lanka is relatively low compared to other Asian countries. This low productivity and the predominant smallholder structure make sourcing significant quantities a major challenge. The lack of new technology, trained personnel, and poor logistics causes the quality of products to deteriorate before it reaches the processor and exporter. Farm work conditions for Sri Lanka's nutmeg cultivation are not conducive to growth and productivity gains.

Research and development activities constitute a significant gap in the institutional setting of the nutmeg industry in Sri Lanka. R & D in Sri Lanka is mostly done at Universities and Research institutions which do not conduct sufficient research activities for the nutmeg sector. Research is too academically focused and has very little interest in solving the needs of the private sector.

External agents in bulk nutmeg exporting countries like Indonesia and Vietnam set the trends for price competition in the market. To cater to the more profitable and growth-promising high-end market, relevant and adequate information has to be gathered through market research.



such as natural advantages for producing high-quality nutmeg and a long tradition of openness towards world markets, which enable the country to face the challenges that arise from the trends in the global markets.

The growth of the home industries that process nutmeg meat today results in nutmeg farmers selling fruit meat,

One challenge of nutmeg is that the price of nutmeg oil is highly dependent on the price of nutmeg as a spice. When the price of nutmeg as a spice increases drastically, farmers tend to hold back the harvest expecting better realisation as a spice and collecting more mature nutmeg. This creates a challenge for the supply of nutmeg oil. Another challenge is that the demand for

cola beverages that use nutmeg oil in their formulation has stagnated or reduced in developed countries. Hence the annual demand for nutmeg oil has stagnated over the past few years.

In many ways, the nutmeg crop is similar to cloves: it has been around for centuries as it serves as a good

income stream for farmers, distillers, and traders alike and has diversified uses in food, beverages, and pharma. However, demand has been stagnant for a while, and any drastic change would depend on innovation, new product development and customer trends (IFEAT Socio-Economic Committee, 2021).

VC Actor	Opportunities	Constraints
Producer	• Availability of conducive climatic and soil conditions • Additional income by selling nutmeg fruit meat • Availability of government and private support structure catering to the sector (DEA, Spice Council, SAPPTA) • Availability of subsidies and grants provided by the DEA and other agencies for entrepreneurs for cultivation and value addition • Provision of free planting material by DEA for home gardens; subsidy for others. • Availability of research facilities (DEA, ITI and Agriculture Faculties) • High demand from both the local and export markets • High price in local and international markets • Adaptability to organic cultivations under forests and intercropping with perennial crops • Availability of price premium and increasing demand for organically certified products • Women can also participate in processing	• Lack of interest in replanting old and senile trees • Low productivity • Small holder orientation with low investments in crop management and poor crop management • Lack of high-yielding varieties • Low quality of the products • Immature harvesting and low-quality drying • Poor storage and handling • Unskilled labour • Insufficient extension services • High cost of production • Lack of research on low-cost technologies • Lack of bargaining power and fair, stable price • Weak linkage among value chain actors • Poor infrastructure (road transport, electricity) and support services in growing areas • Lack of recognition and social cast stigma • Low attraction to youth • Unstable price in the market • Lack of proper production infrastructure and technology • Climate change
Intermediary	• High demand from local and international markets • Ability to engage in value addition in terms of pre-processing and drying • High price in both local and international markets • Different grant and subsidy schemes to promote cultivation and value addition • Availability of financial assistance for value addition	• Low and inconsistent quality of products - poor practices by producers • Low quality • Traditional and inefficient drying • Poor storage and handling • Low supply volume • Limited number of scattered farmers • Weak linkages with the exporters
Processor/Exporter	• High prices in local and international markets • Backward integration vertically to buy directly from preferred suppliers to ensure traceability and product quality • Availability of dedicated government and private support structure catering to the sector (SLEDB, Spice Council) • Different grant and subsidy schemes to promote value addition • Availability of grants and assistance provided by the DEA to entrepreneurs for value addition • Increased use of pharmaceutical, cosmetic, food and agricultural applications. • High possibilities to explore new markets such as European markets and value addition • Opportunities to explore organic nutmeg • High world market demand for nutmeg • World market is already established for Ceylon nutmeg • Creation of brand names • Ability to buy products directly from farmers and processing to own standards to ensure traceability • Adoption of product and process standards to access new markets	• Low and inconsistent quality of products • Low supply volume, scattered and a limited number of farmers • Lack of research on value addition and modern technology and poor dissemination of output • Poor linkage between export companies and state research institutions • High capital cost for value additions, i.e., sophisticated machines, laboratory equipment and skilled labour • Increasingly stringent quality standards by the high-end markets • Poor access to land • Less direct involvement in cultivation by most of the producers • Lack of promotional activities in high-end markets • Insufficient promotional activities in the international market • Lack of research undertaken to measure end market requirements • Traditional methods which are highly labour intensive • High cost in obtaining and maintaining standards certificates

Table 16: Nutmeg VC opportunities and constraints

Source: UNIDO-SL VC Analysis of pepper, clove, and nutmeg and (Hirimuthugodagee et al., 2017)



6 Standards

The main objective of food safety is to protect consumers of food products from foodborne diseases or injuries related to food consumption. Foodborne illnesses are a significant threat to food businesses and affect everyone all over the world as a result of inadequate food safety.

A standard is a document that provides requirements, specifications, guidelines or characteristics that can be used consistently to ensure that materials, products, processes and services are fit for their intended purposes. Standards can be classified as product and process standards. Product standards as opposed to process standards, specify the characteristics of the final product. Process standards specify the characteristics of the production process, that is, the way a product is made (Caswell, 2009). Process standards can be further categorized as management system standards and performance standards. Management system standards focus on management procedures including documentation, monitoring and evaluation, without specifying what happens during the process. Performance standards, are requirements that can be verified in the field, such as pest management, non-use of certain chemicals, etc.

Setting international standards for agricultural practices is a difficult exercise due to differences in climate, soils, ecosystems and culture. Therefore, the international environmental and social standards are often generic or guidelines giving a framework for local standardization bodies to draft specific criteria.

This section will provide an overview of the relevant

The formal definition from the International Organization for Standardization (ISO) and its sister organization, the International Electrotechnical Commission (IEC), is a document established by consensus and approved by a recognized body that provides, for common and repeated use, rules, guidelines or characteristics for activities or their results, aimed at the achievement of the optimum degree of order in a given context. (International Organization Standardization, 2022)

product and process standards, both local and international, public and private, affecting pepper, clove, and nutmeg trade in Sri Lanka.

As this report intends to find gaps and potential

opportunities of PCN towards the export market, we present, from the demand side, the preferences of importers and authorities according to customer trends and market differentiation.

We start from the mandatory side, which are requisites executed by authorities to safeguard the life and health of the population and the living organism, and to avoid fraud or actions that mislead the consumer.

We then present the characteristics, which are preferred by customers that can differentiate the quality of a product, like flavour, smell, appearance, but that goes much further with certifications, the presentation of the product, the convenience, the usage, and the trend to market the product.

As consumers are becoming more aware of the impact of production on our planet, the efforts and conditions

Two of the best opportunities for adding value to spices and herbs are in food safety and sustainability. If you can meet or exceed the ever-stricter safety requirements in Europe, you have a privileged position in the market: Freek Jan Koekoek, Consultant, Food Ingredients at Mercadero. Source: CBI, 2018

of labour, and the influence on communities, the environmental aspect and the social perspective also play a very important role in competitiveness, acceptance and preference by international consumers.

Food safety hazards such as biological, chemical and physical hazards that cause adverse health consequences are addressed in mandatory requirements. Microorganisms are present in a wide range of locations in food processing environments, including the air, processing tools, work surfaces, skin, hair, hands, and clothing of food handlers, because they are invisible to the naked eye and extremely common. The harmful pathogenic microorganisms produce toxins, which cause illness in human bodies. There are more than 100 toxins reported as produced by fungi, which grow readily on grains, oilseeds and spices that are not adequately dried. Among them, *Aspergillus flavus*, produces the carcinogenic toxin called Aflatoxin (AFT).

Aflatoxin contamination can occur during pre- and post-harvest seasons and at different stages of production including drying, packing, transport and storage if adequate moisture is present in food. More than 18 types of AFTs have been identified so far. *Aspergillus parasiticus* and *Aspergillus nomius* produce Aflatoxin G1 and G2 (Kalim & Nazir, 2019).

AFTs contaminate various kinds of food commodities and spices such as red chili and black pepper, oilseeds, corn, pulses, cereals, groundnuts, milk, cheese and other dairy products, particularly under humid conditions, high temperature, and heavy rainfall that favour the growth of toxigenic moulds producing aflatoxins. Pepper and other spices contaminated with aflatoxins have been rejected by European countries on several occasions.

The mycotoxins permissible limit in food are specified by the European Union. The EU food law proposed the maximum residue limit for all aflatoxins in food as 5-10

needs specific approaches to successfully eliminate the contamination problem (Gordon, 2020).

Developing the right approach towards the development of the food sector, focusing on food safety and quality (FSQ), issues will bring significant benefits to developing countries as there is an ongoing increase in the demand for spices. These products have the potential to become a much more significant and profitable source of culinary, personal care, wellness, cosmetics, medicinal and related exports, with benefits extending to all steps of the value chain, particularly primary producers (Gordon, 2020).



$\mu\text{g/kg}$ (European Commission, 2022). According to the FDA & FAO the aflatoxin limit in food commodities is $20 \mu\text{g/kg}$. For the quantitative determination of AFTs in food commodities, a number of techniques have been developed including Thin-layer Chromatography (TLC), High-performance Liquid Chromatography (HPLC), spectrometry, fluorescence, biosensors and enzyme linked immunosorbent assay (ELISA) (Kalim & Nazir, 2019).

Food contamination with *Salmonella spp.* have led to the European Food Safety Authority (EFSA) imposing strict scrutiny on curry imports into the EU and the US Food & Drug Administration (US FDA) doing likewise. In fact, the US FDA has imposed an import alert on all curry powder and related spices coming into the US. This situation

The traditional practices used in growing, harvesting, handling and other aspects of the production, precedent to final processing are still followed, although increasing involvement and backwards linkages of major buyers into primary production has brought changes to these practices. The sector has been positively impacted by meeting buyer requirements for compliance with traceability, wholesomeness, and other food safety and quality systems and standards, as well as the requirements for authenticity, product differentiation, and product diversification (Gordon, 2020).

However, special attention is required to comply to the increasing stringent regulations governing the international trade in herbs, spices and their derivatives

used for culinary and other purposes to benefit from the opportunities in the spice sector. Producers who do not comply will eventually lose their share of the market to those who fully comply. For example, EU importers have increasingly been insisting that aflatoxin limits must be adhered to in order to accept shipments of nutmegs coming from Indonesia and Grenada, a move that has caused losses for producers from these countries (Gordon, 2020).

In addition to food safety and quality systems certification requirements, other technical considerations that influence the trade of spice sub-sector include:

5. Documentation of production practices compliant with Fairtrade and other requirements;
6. Proof of “green” production and extraction practices (Gordon, 2020).

6.1 ISO Standards

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested



1. Requirements for proof of “authenticity”;
2. Demands for greater information on the composition of essential oils, extracts and tinctures;
3. Information on:
 - a. Mycotoxins (e.g., aflatoxin)
 - b. Natural constituents/potential toxicants such as myristicin in nutmeg and mace and coumarin in cinnamon
 - c. Heavy metal content;
4. Information on proof of the effectiveness of herbal products;

in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

ISO’s food safety management standards help organizations identify and control food safety hazards, while working together with other ISO management standards, such as ISO 9001. Applicable to all types of producers, ISO 22000 provides a layer of reassurance within the global food supply chain, helping products cross borders and bringing people food that they can trust (International Organization for Standardization, 2022).

ISO Number	Product
ISO 5564:1982	Black pepper and white pepper, whole or ground
ISO 959-1:1998	Pepper (<i>Piper nigrum</i> L.), whole or ground - Part 1: Black pepper
ISO 959-2:1998	Pepper (<i>Piper nigrum</i> L.), whole or ground - Part 2: White pepper
ISO 11162:2001	Peppercorns (<i>Piper nigrum</i> L.) in brine

Table 17: ISO Classification for commercial grades of pepper
Source: International Organization for Standardization

ISO Number	Product
ISO 2254:2004	Cloves, whole and ground (powdered)
ISO 3142:1997	Oil of clove buds (<i>Syzygium aromaticum</i>)
ISO 3143:1997	Oil of clove stems (<i>Syzygium aromaticum</i>)
ISO 3141:1997	Oil of clove leaves (<i>Syzygium aromaticum</i>)

Table 18: ISO classification for commercial grades of cloves
Source: International Organization for Standardization

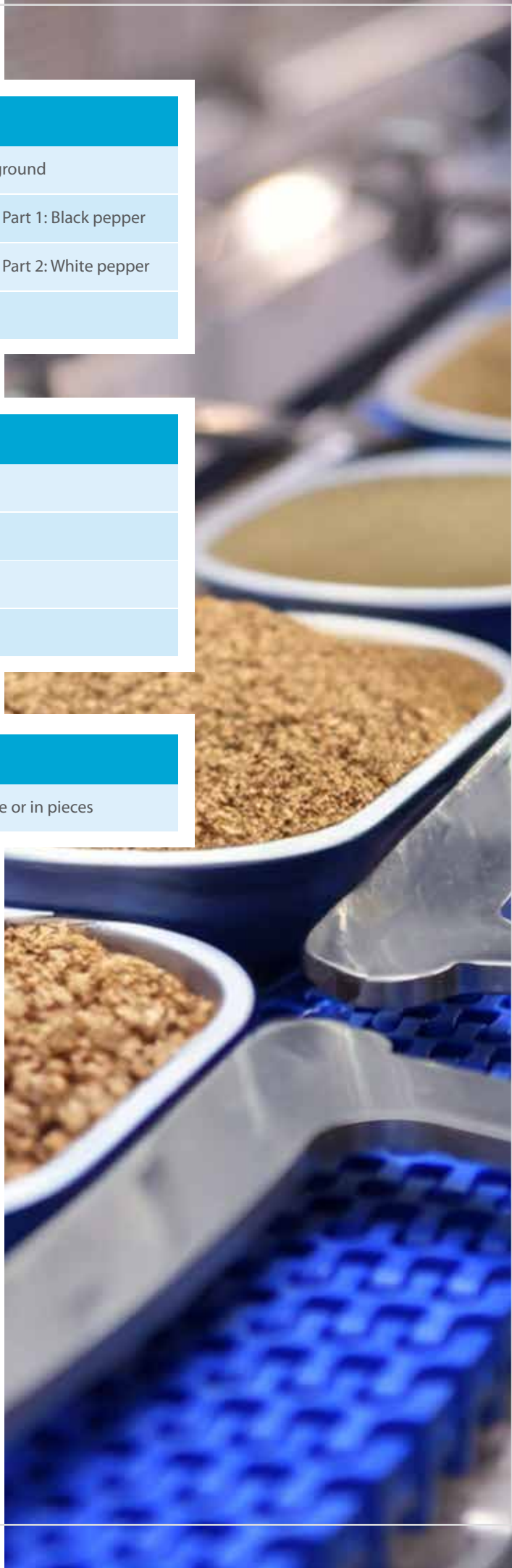
ISO Number	Product
ISO 6577:2002	Nutmeg, whole or broken, and mace, whole or in pieces

Table 19: ISO Classification for commercial grades of nutmeg
Source: International Organization for Standardization

6.2 SLSI Standards

SLSI (Sri Lanka Standards Institute) is the National Standards Body of Sri Lanka, established under the Bureau of Ceylon Standards Act No.38 of 1964. This Act was repealed and replaced by the Sri Lanka Standards Institution Act No. 6 of 1984. The Institution functions under a government ministry and is governed by the Minister in terms of the above Act, i.e, it belongs to the public sector.

SLSI by virtue of being the National Standards Body in Sri Lanka is a member of the International Organization for Standardization (ISO) based in Geneva. As members of the ISO, National Standards Bodies exchange on a reciprocal basis copy of their national standards and are responsible for disseminating information on standards, technical regulations and standards related activities to the community at national level (Sri Lanka Standards Institute, 2022).



In keeping with the present industrial development and economic growth of the country, the corporate mission of SLSI is to undertake, promote and facilitate Standardization, Measurement, Quality Assurance and related activities in all sectors of the national economy in order to:

- increase productivity and maximize the utilization of resources;
- facilitate internal and external trade;
- achieve socio-economic development;
- enhance international competitiveness of products and services;
- safeguard the interest of consumers, whilst improving the quality of working life for employees of the institution (International Organization for Standardization, 2022).

ISO Number	Product
SLS 1372	Black pepper and white pepper, ground
SLS 387	Oil of pepper
SLS 186 Part 10	Methods of test for spices and condiments - determination of piperine content of pepper and pepper oleoresins - high-performance liquid chromatographic method
SLS 186 Part 9	Methods of test for spices and condiments Part 9 – determination of piperine content of black pepper and white pepper spectrophotometric method (second revision)
SLS 105 Part 2	Whole pepper - white pepper
SLS 105 Part 1	Whole pepper - black pepper

Table 20: SLSI standards for pepper
Source: Sri Lanka Standards Institute

ISO Number	Product
SLS 1523-part 4	Requirements for Good Agricultural Practices (GAP) Part 4: Cocoa, Nutmeg and Clove
SLS 248	Oil of clove stem
SLS 247	Oil of clove bud
SLS 241	Clove, whole or ground

Table 21: SLSI standards for cloves
Source: Sri Lanka Standards Institute

ISO Number	Product
SLS 388	Oil of nutmeg, Sri Lanka (Ceylon)
SLS 113	Nutmeg and mace, whole, pieces or ground

Table 22: SLSI standards for nutmeg
Source: Sri Lanka Standards Institute

6.3 Food Safety: Traceability, Hygiene and Control

The General Food Law is the legislative framework regulation for food safety in the European Union, according to which food safety is a key issue in European food legislation. Applying the principles of Food Safety Management System and implementing Hazard analysis and critical control points (HACCP) will reduce the risk of contamination and ensure that appropriate actions are taken to remove risks of unsafe food throughout the value chain. The delivery system must give access for official controls to give or deny access of food products to Europe based on the findings. Some spices and herbs are subject to increased controls but cloves are currently not on the relevant list (The Netherlands Ministry of Foreign Affairs, 2022).

6.3.1 Pesticides

The European Union has set maximum residue levels (MRLs) for pesticides in and on food products. Products failing to meet the limits will be withdrawn from the European market. Although eugenol (an essential oil of clove) acts as an antibacterial agent against possible pests, insecticides and fungicides are still sometimes used in the cultivation of cloves. Therefore, food safety systems must ensure compliance to pesticides residue limits through the traceability system in place (The Netherlands Ministry of Foreign Affairs, 2022).

6.3.2 Microbiology

European legislation does not lay down specific requirements for microbiological contamination for cloves as it does for other products. However, as per Article 11 of the General Food Law, all food products placed on the European market must be safe. Therefore, it follows that if *Salmonella* or other forms of microbiological contamination are found on cloves, they would be banned. Although eugenol (an essential oil of clove) acts as an antibacterial agent, microbiological contamination is still a risk and a possible hazard. Microbiological contamination can be controlled by steam sterilisation, especially for cloves, which are destined for the retail market. Providing this service is also important because buyers choose to prefer steam sterilized products (The Netherlands Ministry of Foreign Affairs, 2022).

6.3.3 Food Additives and Adulteration

Legislation for food additives (such as colours, flavours and thickeners) lists which E-numbers and substances are allowed to be used. On many occasions, undeclared, unauthorised or excessive amounts of extraneous materials have been detected in spices and herbs resulting in rejection by custom authorities or buyers. Spices and spice blends may not contain added colours. However, cloves, whether whole or crushed/ground, are often intentionally adulterated with materials such as exhausted cloves, mother cloves, brown cloves or stems (The Netherlands Ministry of Foreign Affairs, 2022).

Additional requirements of buyers: Many European buyers additionally require certification of food safety management systems and traceability based on HACCP principles to ensure compliance. Food safety management systems recognized in Europe are British Retail Consortium (BRC), IFS, FSSC 22000 and SQF, all recognised by the Global Food Safety Initiative (GFSI) and, therefore, by major retailers. (The Netherlands Ministry of Foreign Affairs, 2022).

6.3.4 Sustainable Product Certification

The market for product certification with well-known consumer logos on packaging is growing. Organic product certification ensures chemical free soil and fertilizer products. Fairtrade focuses on ensuring that the living conditions of smallholders in developing countries are improving by paying them a premium. The Rainforest Alliance (RA), a mainstream sustainability scheme with a focus on both social and environmental issues, has recently developed a standard for several spices and herbs, including cloves. The certification process using this standard can be coordinated by processors and exporters by coordinating the activities of the smallholders. Traders can extend the certification to their process by applying specific certification available for traders such as Fairtrade's Trade Standard or RA's Chain of Custody standard to demonstrate the chain of custody (The Netherlands Ministry of Foreign Affairs, 2022).

6.3.5 Traceability

Food safety requirements, hygienic practices, aflatoxin and pesticide issues are challenges for PCN spice exporters to satisfy the conditions of importers, consumers, and markets. Spices travel long distances to reach our kitchens, and it is necessary to understand



the food mileage of all spices, and the spice value chain has several players and processes and many challenges.

Traceability in the spice value chain is a solution to increase consumer satisfaction and enhance the sustainable growth of the spice sector. Digital platforms capturing the chain from farmer to consumer will bring visibility and transparency to PCN value chains. Tracking the product journey from source to end consumption can help address challenges of identifying contamination due to pesticides and toxins and facilitate easy product recall during safety breaches.

Traceability can create improved value-chain visibility to deliver food production transparency to consumers, reduce fraud, improve food safety, increase supply-chain efficiency and reduce food loss. Traceability could also improve producer revenue, market access, and opportunities for affordable access to capital.

6.4 Spice Grades

Different spices have unique physical attributes, and with every spice having stringent quality norms, exporters should ensure which spice is export worthy. Every spice undergoes the three-stage system of cleansing, grading, and sorting, making it important that a spice be cleaned, sorted, and graded before export. This approach provides value to the spice and makes it marketable.

Characteristics	Grade 1	Grade 2	Grade 3
Bulk Density (g/l), min	550	500	450
Light Berries/Corns(m/m)%, max	2.0	5.0	10.0
Moisture (m/m) %, max	12.0	12.5	13.0
Piperine content, % (m/m), min	4.0	3.5	3.0
Escherichia coli (MPN/g), max	<3	<3	<3
Salmonella (detection / 25g)	Negative	Negative	Negative

Table 23: Physical, chemical, and microbiological requirements for whole black pepper
Source: IPC standard specifications for black/ white pepper, 2015

Characteristics	Grade 1	Grade 2	Grade 3
Bulk Density (g/l), min	600	600	550
Light Berries/Corns(m/m)%, max	1.0	2.0	2.0
Moisture (m/m) %, max	12.0	13.0	14.0
Piperine content, % (m/m), min	4.0	3.5	3.0
Escherichia coli (MPN/g), max	<3	<3	<3
Salmonella (detection / 25g)	Negative	Negative	Negative

Table 24: Physical, chemical, and microbiological requirements for whole white pepper
Source: IPC standard specifications for black/ white pepper, 2015

Characteristics	Requirement
Special quality - Headless cloves, %m/m, max.	2.0
Standard quality - Headless cloves, %m/m, max	5.0
Moisture (m/m) %, max	12.0
Volatile oil, % ml/100g on dry basis, min. for special and standard quality grade	17.0
Volatile oil, % ml/100g on dry basis, min. for distillation quality	15.0

Table 25: Physical and chemical requirements for whole cloves
Source: Cloves specification, 2017



Characteristics	Grade 1	Grade 2
Colour	-	-
Shape	With shell	Without shell
Internal Mouldiness	10% max	10% max
Internal Insect Damage	Practically free	10% max
Mouldiness and Insect Damage	Practically free	Practically free
Extraneous Matter	1% max	1% max
Nutmeg Shells and Dust	0% max	0% max

Table 26: Physical, chemical, microbiological requirements for nutmeg
Source: Nutmeg Cultivation in Sri Lanka

The spice sector needs to harmonize its practices with international standards, and technical regulations, according to market requirements to mitigate the trade-restrictive effects of SPS-related non-compliances; this would increase productive capacities, diversify product range, and facilitate product differentiation. By addressing the aforementioned enterprise-level supply-side constraints, particularly SPS non-compliances and by investing in human capital, the overall supply chain would

be strengthened, and the produce would have greater access to high-end markets, including those that are conscious of SPS and quality.

It is well known that the contribution of traceability to SPS compliance leads to greater integration into global production networks resulting in socioeconomic development. Sri Lankan spices are still being exported in negligible quantities despite their export potential. Its smallholders are unable to comply nor demonstrate compliance to capture additional earnings due to quality-related differentiation, of which food safety is non-negotiable.

Inter-professional associations can play an important function in (1) upskilling/equipping smallholders to leverage the latest techniques and technology to bring out the best of a product while maintaining terroir-specific or generational know-how and practices; (2) mobilizing supply chain actors to define product specifications, which, by default, would include SPS requirements; and (3) facilitating the adoption of food safety management system-based practices (e.g., GAP, good hygienic practices (GHP), good manufacturing practices (GMP), and Hazard Analysis Critical Control Point (HACCP)) to implement a traceability system. To respond to the demands of regulators, export-oriented food business operators (FBOs) will need to invest in upgrading premises/equipment, upskilling staff, and strengthening food safety control systems with embedded traceability measures. Further, key markets demand compliance with voluntary standards, of which traceability is inherent or implied. Private food

6.5 International Process Standards Applicable to Pepper, Clove and Nutmeg

Sri Lanka exports a wide range of renowned spice products, of which the most promising, after the acclaimed Ceylon Cinnamon, are pepper, cloves, and nutmeg (PCN). As with Ceylon Cinnamon, the respective PCN sub-sectors are also characterized by low productivity, small holdings, lack of incentives, poor business management and marketing, lack of investment, low-value addition (e.g., exporting in unprocessed form), and most prevalently, shortage of skilled labour and poor adherence to SPS and quality control and assurance measures. Export rejections are seen mostly on account of mycotoxin and microbiological contamination. From 2016 – 2018, almost three-quarters of rejections were due to mycotoxins (e.g., aflatoxin and ochratoxin), followed by a quarter due to microbiological contamination (e.g., *Salmonella* and *E. coli*) reported by the EU's Rapid Alert System for Food and Feed Safety alerts in the herbs and spices category. Pesticide and lead contamination have been detected due to inconsistent application of Good Agricultural Practices (GAP). Spices that fetch a high value and price owing to their unique organoleptic characteristics are contaminated by mixing with low-value produce. This deteriorates the quality and, ultimately, the reputational equity of the brand equity as consumer confidence in the product's authenticity and the accuracy of the information provided become questionable.

certifications are becoming, de facto, mandatory due to the market power of importers. Thus, traceability is no longer just a matter of SPS compliance but of competitiveness that results in losing or gaining market access and share.

Implementing international standards and best practices in FBOs, common at the production level, will impact the export through the domestic supply chain. This helps to alleviate poverty and encourage inclusive economic diversification as large numbers of workers in the informal sector, particularly women and youth, could be absorbed into productive jobs in the formal sector and stimulate employment through positive spill-overs from intersectoral linkages, such as in food, fisheries, cosmetics, pharmaceuticals, and tourism.

Spices and condiments such as cloves, nutmeg, cinnamon, black pepper, cumin, ginger, and garlic containing natural bacteriocins are frequently associated with traditional food preparations, which control the growth of food-grown pathogens or absorb toxic material. E.g., Acidification using natural agents such as tamarind (tartaric acid) and garcinia (hydro citric acid) controls the growth of microorganisms; curry leaves/pandan leaves absorb toxicity; and cooking rice in excess water, pressure cooking, and the use of clay pots are identified as effective strategies to reduce the level of aflatoxin in rice grains (Liyanaage, 2020).



In Sri Lanka, Food Act No. 26 of 1980 (amendment No. 20 of 1991 and amendment No. 29 of 2011) is the apex national regulation governing food safety in Sri Lanka with the primary purpose of regulating and controlling the manufacture, importation, sale, and distribution of food within the country (Parliament of the Democratic Socialist Republic of Sri Lanka, Food Act, No. 26 of 1980). Some other supportive Acts, such as the Food Supplies Ordinance Act 30 of 1957, The Consumer Affairs Authority Act, 2003, and Food Production (Estates) Act No. 40 of 1954, assist in the governance of overall food quality and safety. Although there are no special provisions for traditional and ethnic foods under the existing regulations, the generic principles of food preparation, storage, handling, serving, and distribution are applicable.

Large scale industrial producers frequently use certification schemes and standardizations such as good manufacturing practices (GMP) and hazard analysis and critical control point (HACCP), ISO 22000. They also test their end products for quality and food safety to demonstrate compliance with standard requirements. However, several small-scale entrepreneurs produce traditional food products such as pickles, snacks, and confectioneries in the household and distribute them to consumers in the same area. These products are not subjected to any laboratory test or certification process raising food safety concerns. The nonavailability or inadequacy of standards for assuring the quality and safety of locally produced spices and condiments is perhaps one of the key issues when using such raw materials for traditional food preparations.

Products	Ash % W/W ¹ Max	AIA (Acid-insoluble ash) % W/W MAX	H2O (moisture) % W/W MAX	V/O (volatile oil) % V/W MIN
Pepper – Black	7	1.5	12	2
Pepper – White	3.5	0.3	12	1.5
Cloves	7	0.5	12	14
Nutmeg	3	0.5	12	6.5

Table 27: European Spice Association specifications
Source: European Spice Association, 2023

Spices	Whole insects dead by count	Excreta Mammalian by mg/lb	Excreta, Other by mg/lb	Mould % by wgt.	Insect Defiled/ Infested % by wgt.
Black Pepper	2	1	5.0	SF (6)	SF (6)
White Pepper	2	1	1.0	SF (7)	SF (7)
Cloves	4	5	8.0	1.00	1.00
Nutmeg (Broken)	4	5	1.0	SF (4)	SF (4)
Nutmeg (Whole)	4	0	0.0	SF (5)	SF (5)

Table 28: American Spice Trade Association's (ASTA) cleanliness specifications
Source: Cleanliness specifications, 2022





6.6 Packaging and Labelling

Spices, specifically in powder form, pick up moisture from the atmosphere resulting in sogginess and lumping of the powder. The absorption of moisture also results in the loss of the free-flowing nature of the spice powder. Spices contain volatile oils, which impart a characteristic aroma to the product. Loss in the volatile oil content or oxidation of some aromatic compounds results in aroma and flavour loss. Light can affect the pigments resulting in loss or fading of colour and deterioration. Spices are prone to spoilage due to insect infestation, which can be further accelerated due to high humidity, heat and oxygen. In high humidity conditions of 65% and above, moisture absorption occurs, and spoilage due to microbial growth sets in beyond a certain level of moisture content.

To maintain the quality of the spices during handling, transportation, storage and distribution, the packaging material to be used is to be selected carefully, keeping in mind the functional and marketing requirements. The packaging requirements for spices, in general, are to protect the product from spillage and spoilage and provide protection against atmospheric factors such as light, heat, humidity and oxygen. The selected packaging materials should have high water vapour and oxygen barriers. The packaging material should have a high barrier

property to prevent aroma and flavour losses and the ingress of external odour. The volatile oil in the spice product tends to react with the inner contact layer of the packaging material, at times leading to a greasy and messy package with smudging of the printed matter. The packaging material should therefore be oil and grease resistant and compatible with the product. Besides, the packaging material should have good machinability and printability and be easily available and disposable.

Packaging helps the preservation of spices for a long period, retaining their original taste, flavour, colours and other quality characteristics, and suitable packaging can slow the deterioration rate and extend product shelf life.

All prepacked food requires a food label that displays certain mandatory information. All food is subject to general food labelling requirements, and any labelling provided must be accurate and not misleading.

Labelling is regulated to protect consumers, who should have the correct information to make confident and informed food choices based on diet, allergies, personal taste or cost. Food authenticity is when food matches its description, and everyone has the right to know that the food they have bought matches the description given on the label. The labelling rules enable consumers to get comprehensive information about the content and composition of food products. Labelling helps consumers make an informed choice while purchasing their foodstuffs.

Incorrect labelling is a major source of frustration for European buyers. The labelling of bulk products should include the following information:

- The name of the product
- Details of the manufacturer (name and address)
- Batch number
- Date of manufacture
- Product grade
- Producing country
- Harvest date (month-year)
- Net weight
- Any information that exporting and importing countries may require: bar, producer and or packager code, any extra information that can be used to trace the product back to its origin (The Netherlands Ministry of Foreign Affairs, 2022).



7 Enabling Environment for the Spice Sector

7.1 Institutional and Regulatory Framework

Spices constitute an important sub-sector of the Sri Lankan economy. Therefore, a number of public and private institutions support the spice sector in Sri Lanka. Within the public sector, there is the Department of Export Agriculture (DEA), the Department of Agriculture (DOA), National Plant Quarantine Service (NPQS), the Industrial Technology Institute (ITI), and the Export Development Board (SLEDB). Apart from these, the Sri Lanka Standards Institution (SLSI) stands as a semi-government organisation, while the Spice Council and SAPPTA (The Spices and Allied Products Producers' and Traders' Association) are private associations that contribute significantly to the betterment of the spice industry.

This section will examine these institutions based on their relevance to the industry alongside their main objectives, activities and functions, and relationships with stakeholders, and challenges facing them.

7.2 Department of Export Agriculture (DEA)

The DEA is a government institution established under the purview of the Ministry of Minor Export Crops Promotion. The Department of Minor Export Crops was established under the Ministry of Plantation Industries by a cabinet paper in 1972. The department's primary objectives were to increase export earnings from minor export crops and to increase the economic viability of traditional tea, rubber and coconut lands through diversification and interplanting. By 1975 the Department of Minor Export Crops, created under the Plantation Industries, was transferred to the Ministry of Agriculture. However, by 1992 the export quantities and values of Minor Export Crops increased by several folds, mainly due to departmental interference; hence the requirement of a strong public entity to develop the sector was timely. The Ministry of Agriculture was renamed in 1992 as the Department of Export Agriculture and strengthened under Parliamentary Act No 46 dated 22nd September 1992 (Department of Export Agriculture, 2018). DEA mainly deals with spices such as cinnamon, pepper, cardamom, clove, turmeric, ginger, coffee, cocoa, goraka, betel, vanilla, areca nut,

citronella and lemon grass (Department of Export Agriculture, 2022).

The primary objective of the DEA is to increase foreign earnings by enhancing the quality and quantity of export agricultural crop production. DEA mainly undertakes activities for the benefit of smallholders. It has three major objectives:

- Increase export earnings from minor export crops,
- Increase farmer income, and
- Increase the productivity of existing cultivations.

DEA functions are carried out through the two main divisions of development and research. Its development activities and services division are focused on the wet and intermediate zones of Sri Lanka, covering 17 districts viz. Kandy, Matale, Nuwara Eliya, Kurunegala, Colombo, Kalutara, Gampaha, Galle, Matara, Hambantota, Kegalle, Ratnapura, Badulla, Monaragala, Ampara, Polonnaruwa and Anuradhapura. At the district level, awareness and training programs are implemented by extension officers (Department of Export Agriculture, 2022).

The research division of the DEA was established at Wariyapolawatta in the Matale district, with the department's commencement in 1972. Today it has developed into a robust research wing with six commodity and discipline-based research stations, Economics Research Division and the Plant Protection unit. Commodity and discipline-based research is carried out at the Main Research Station, Matale and six substations, namely the Cinnamon Research station at Pallolpitiya in Matara district, Intercropping and Betel Research Station at Narammala in Kurunegala district, Tissue Culture and Plant Propagation Centre at Walpita in Gampaha district, Kundasale, Nillambe and mid-country Research Station in Kandy district (Department of Export Agriculture, 2022).

To improve productivity and achieve its organisational goals, the DEA carries out the following activities:

- Economic and market research;
- Administer assistance schemes such as a new planting assistance scheme;
- Productivity improvement program and post-harvest assistance scheme;
- Training and awareness programs for farmers (such as in-service training);
- Farmer training and cinnamon peeler training programs.

In addition, the DEA is involved in crop protection activities, assists in organising and arranging marketing activities and disseminating information in various aspects (Department of Export Agriculture, 2022).

7.3 Department of Agriculture DOA

The Department of Agriculture (DOA) functions under the Ministry of Agriculture and is one of the largest government departments with a high-profile community of agricultural scientists and a network of institutions covering different agroecological regions island-wide. The primary objective of the DOA is to maintain and increase the productivity and production of the food crop sector to enhance the income and living conditions of the farmer and make food available at affordable prices to the consumer. The main functions of the DOA are in agricultural research, technology dissemination, seed and planting material production, distribution, and regulatory services. The institutions and centres functioning under DOA are:

1. Rice Research and Development Institute (RRDI);
2. Field Crop Research and Development Institute (FCRDI);
3. The Horticultural Crop Research and Development Institute (HORDI);
4. Fruit Research and Development Institute (FRDI);
5. Natural Resources Management Centre (NRMCI);
6. Socio-Economics and Planning Centre (SEPC);
7. Extension and Training Centre (ETC);
8. National Agriculture Information and Communication Centre (NAICC);
9. Seed and Planting Material Development Centre (SPMDC);
10. Seed Certification and Plant Protection Centre (SCPPC) (Department of Agriculture, 2022).

7.3.1 National Plant Quarantine Service (NPQS)

In 1869, the rust disease *Hemileia vastatrix* wiped out the coffee plantations in Ceylon (now Sri Lanka). Subsequently, Indonesia passed legislation banning coffee imports, including sacks used for packing coffee from Sri Lanka, and it was the first plant quarantine law in the Asian region. In Sri Lanka, British scientists of the Department of Agriculture at Peradeniya commenced plant quarantine activities in the 1880s. This was necessitated because Sri Lanka became a centre for identifying pests affecting crop plants. Regional countries have sent their samples here for scientific studies. After establishing the Central Agricultural Research Institute (CARI) at Gannoruwa, Peradeniya. All plant quarantine activities were carried out





jointly in the divisions of Entomology and Plant Pathology of the same Institute. In the early 1980s, with the help of the Australian government, a separate unit for plant quarantine activities was established in Gannoruwa within the premises of CARI. A Chief Plant Quarantine officer was appointed, assigning all the responsibilities of plant quarantine in Sri Lanka. In 1994, the present National Plant Quarantine Service complex was established at Katunayake with financial assistance from the Japanese Government. This service is responsible for enforcing and implementing Plant Protection Act No.35 of 1999 and the regulations made thereunder regarding plant quarantine activities. It also conducts research and development activities in plant quarantine aspects (Department of Agriculture, 2022).

7.3.2 The Main Objectives of the institute

- Prevention of introduction, establishment and spread of dangerous alien pests within the country;
- Involvement in domestic pest control programmes;
- Development of treatment technologies to eradicate pests of quarantine importance;
- Promotion of export of healthy plants and plant products.

7.3.3 Plant Protection Laws in Sri Lanka

The Plant Protection Act No. 35 of 1999 was passed by the Parliament in July 1999. Since new regulations are not yet enacted, those made under the Plant Protection Ordinance are still in operation. The regulations made by the Minister of Agriculture and notified in the gazette of 1981.11.12 include 19 regulations covering almost all aspects related to the importation of plants (Department of Agriculture, 2022).

7.4 Export Development Board (SLEDB)

The Sri Lanka Export Development Board (SLEDB) is Sri Lanka's premier organisation for the development and promotion of exports, established in 1979 under the Sri Lanka Export Development Act No. 40, under the influence and guidance of the International Trade Centre (ITC) and the United Nations Conference on Development of Trade & Tariffs (UNCTAD).

They are established as the executive body of the Export Development Council of Ministers, headed by the President of Sri Lanka; the Export Development Council of Ministers shall be responsible for the formulation and

implementation of national export development policies and programmes subject to any general or particular directions given by the Cabinet of Ministers. SLEDB is the organisation responsible for the development and promotion of exports of Sri Lanka, playing the role of a Policy Adviser - advising the government on national export development policies to create a conducive environment for exports; Monitor - monitoring the performance and function of the export sector; Promoter - implementing product, design, market, and other development programmes to promote Sri Lanka's products and services; Facilitator - serving as the focal point of export development; Facilitating and co-coordinating export development activities with all stakeholders; Knowledge Provider - providing advisory services and information about all aspects of the export business and advisory assistance to the exporters (Export Development Board, 2022).

7.5 Industrial Technology Institute (ITI)

Industrial Technology Institute (ITI) is a statutory board incorporated on the 1st of April 1998 under the Science and Technology Development Act No. 11 of 1994. The Industrial Technology Institute (ITI) is the successor to the Ceylon Institute of Scientific and Industrial Research (CISIR) and the pioneer scientific research & development organisation in Sri Lanka. ITI now comes under the purview of the Ministry of Industries. ITI aims to be a regional centre of excellence in scientific and industrial research for national development. ITI has conducted innovative research and development, and provides internationally competitive technical services to accelerate industrial development for the benefit of Sri Lanka.

True to the vision, the institute has grown steadily over the past sixty years from a humble beginning in 1955 (as CISIR) and has expanded continuously to boast skills and expertise from various scientific disciplines.

The main objective of the ITI is to support the industry by undertaking testing, investigation and research; improving product quality, technical processes and methods used in the industry; discovering new processes and methods to be used in the industry; providing technical services and consultancies; and engaging in activities connected with technology transfers, the adaptation of technologies and the development of new technologies. It also conducts research to accelerate industrial technology development. The ITI conducts client-sponsored research

and development for government agencies, commercial businesses, and other organisations.

ITI laboratories are accredited per ISO/IEC 17025:2017 and conform to ISO 9001:2015 Quality Management Standards (Industrial Technology Institute, 2020).



7.6 Sri Lanka Standards Institution (SLSI)

Sri Lanka Standards Institution (SLSI), the National Standards Body of Sri Lanka, was established under the Bureau of Ceylon Standards Act No. 38 of 1964. The Institution functioned under the name of Bureau of Ceylon Standards until the Act was repealed and replaced by the Sri Lanka Standards Institution Act

No. 6 of 1984, paving the way for the establishment of the SLSI with the primary responsibility of promoting standardisation and quality management practices in Sri Lanka (Sri Lanka Standards Institute, 2022). The Institution now functions under the Ministry of Science,

regulations and standards-related activities to the community at the national level.

Stakeholders of SLSI include the government, local and foreign organisations registered with SLSI,



Technology and Research and is governed by a Council appointed by the Minister in terms of the above Act.

SLSI is the premier national organisation that promotes standardisation and quality in Sri Lanka and is a member of the International Organisation for Standardisation (ISO) based in Geneva. As members of the ISO, National Standards Bodies exchange on a reciprocal basis copy of their national standards and are responsible for disseminating information on standards, technical

scientific institutions, and consumers. Functions of the SLSI include: formulation, revision, amendments of national standards, product certification (including SLS specification for cinnamon- SLS 81, SLS specification for pepper- SLS 105, SLS specification for cardamom- SLS 166), system certification (ISO 9001, ISO 22000, HACCP, GMP, ISO 14001, OHSAS 18001 and SA 8000), laboratory testing services, industrial metrology and instrument (Sri Lanka Standards Institute, 2022).

7.7 The Spice Council (TSC)

The Spice Council (TSC) is a joint initiative of the spice industry's public and private sector stakeholders. It is the result of a recommendation of the Task Force for Spices and Allied Products Sector.

Its mission is to facilitate and implement strategies to achieve the industry vision of propelling "Sri Lanka to be within the top five branded and value-added spices and allied products marketers globally. The Spice Council acts as the apex body for the spice industry and provides a unifying front to meet the aspirations of its stakeholders to further the industry's development. It serves as a joint forum by bringing together producers, exporters, processors, dealers, and other industry stakeholders and promoting high standards of business conduct. Moreover, it works with the Government to ensure that industry interests are represented and considered in policy making. TSC has worked with the SLSI committee to develop standards for the country. They have designed GMPs for the cinnamon and pepper industries, while the GMP for cardamom is currently under development.

The Council also encourages scientific research related to the spices and allied products industry and conducts training and development programs aimed at the industry.

policy making. Spice Council consists of producers, dealers, brokers, processors and exporters, represented by eight personnel from the private sector and four from the government sector (Wijayasiri, 2017).

7.8 Cinnamon Training Academy (CTA)

Cinnamon Training Academy (CTA) is a limited liability company duly incorporated in Sri Lanka under the Companies Act. No.07 of 2007 (Company Registration No. N(PBS) 1332) and having its registered office at Goodshed Road, Kosgoda. CTA is responsible for bringing the Sri Lankan Cinnamon Industry to a competitive status through conducting export market-focused, high quality, innovative capacity-building interventions, especially the training and consultations aiming at the sector workforce and all other respective clients.

CTA has set its vision to be the Centre of Excellence in providing training and to become the global knowledge hub for cinnamon and its mission to develop the technical and managerial competencies of all the key participants in the Cinnamon Value Chain and thereby deliver an exceptional value to all the key stakeholders.

Some barriers have caused a decrease in the



Moreover, it works with the government to ensure that industry interests are represented and considered in

development of the cinnamon industry. Quality degradation of the end product, lack of awareness, labour shortage, low number of innovations and value

additions, lack of research and development, low level of marketing strategies, and huge market competition were identified as major issues. An acute shortage of cinnamon processors is hampering the effort to harvest crops. Cinnamon can be harvested (peeled) twice a year. Approximately 25% of the 33,000 hectares planted are harvested twice a year, and 65% is harvested only once a year. The balance 10% is not harvested on yearly basis.

To overcome the above issues and enhance the Ceylon cinnamon industry, the management is committed to building CTA as the Centre of Excellence for the Cinnamon Industry in Sri Lanka and aims to achieve the following objectives:

- Train operators and enterprises at all stages of the cinnamon value chain to increase the production capacity and enhance quality and standards compliance;
- Improve social outlook and maintain the status of the cinnamon industry;
- Promote and certify quality and standards conformity in the cinnamon trade;
- Provide R&D services and transfer new technology know-how;
- Disseminate pertinent information and support advocacy.

The strategic goals of the CTA focus on the overall growth and sustainability of the industry through improving the sector workforce competencies, increase national income through advancements in stakeholder

and innovations related to training and education, developing CTA as an International Role Model and centre of excellence, and service provider in capacity building for market-based Value Chain development. The CTA initiatives have been planned through public-private-community partnerships, committed to protecting and further developing the industry through preserving traditional knowledge and technologies and creating new knowledge and technologies as a global responsibility.

7.8.1 Training Programs

At present, the Cinnamon Training Academy offers three types of training programs relevant to the cinnamon industry:

- 1. Competency-Based Training Programme (CBT);
- 2. Recognized Prior Learning program (RPL);
- 3. Foundation Training for Processors Programme (FTP).

Being a key training and education service provider, which holds national interests and priorities to develop the Cinnamon Sector of Sri Lanka, CTA wishes to carry out its operations in a market-based, value chain-focused, entrepreneurial and innovative approach and is a valued partner for like-minded organisations (such as Department of Export Agriculture & Cinnamon Research & Training Institute) instead of being a competitor. Its ultimate impact would be to contribute to a highly competent and competitive sector workforce with entrepreneurial and leadership skills.

7.9 Spices and Allied Products Producers' and Traders' Association (SAPPTA)

SAPPTA is the official body representing the spice trade in Sri Lanka; it covers the entire spectrum of spices, including cinnamon, pepper, cloves, cardamoms, nutmeg, mace and vanilla, and other crops and derivatives such as cashew, areca nut, cocoa, coffee, essential oils, oleoresins, herbal products and organic products. The association's activities are managed by an executive committee of 20 members of annually elected representatives from the exporter, producer, processor, dealer and service sectors. The Colombo Brokers' Association is invited to nominate a representative to serve on the committee. The association promotes regular dialogue with the state agencies and other policy-making bodies. The association has an excellent rapport with the DEA, SLEDB, the Department of Customs, the Department of Commerce, the Ministry of Agriculture, the Ministry of Trade, the Ministry of Finance, and foreign agencies.



capabilities, and making the sector more attractive and competitive. Also, focus on the sector's transformation through strategic market-based modernizations



Originally SAPPTA was formed in 1984 as the Spices and Allied Traders Association, with the disbanding of the Cardamom Traders Association and Sri Lanka Association of Producers and Exporters of Spice and other products. In 1997, this association changed its name to SAPPTA, intending to enlarge the scope of business coming under its purview. It is the official body representing the spice trade in Sri Lanka. SAPPTA covers the entire spectrum of spices, including cinnamon, pepper, cloves, cardamoms, nutmeg, mace and vanilla, and other agricultural crops and derivatives such as cashew, areca nut, cocoa, coffee, essential oils, oleoresins, herbal products and organic products. The association promotes regular dialogue with the state agencies and all other policy-making bodies. SAPPTA has played a vital role in assisting the plantation sector to diversify its crops into large-scale spice cultivation successfully.

As a premier institution in the spice industry, SAPPTA identifies problems of each commodity, difficulties in

exporting and benefits of government regulations. SAPPTA organises seminars to educate producers to upgrade the quality and encourages exporters to organise and participate in international trade fairs. SAPPTA monitors its members and intervenes in legal issues, publishes weekly prices in local newspapers and sets the auction prices, and lobbies the government on behalf of the industry.

SAPPTA has played a vital role in assisting the plantation sector to diversify its crops into large-scale spice cultivation. SAPPTA has already initiated dialogue with the government and the relevant institutions to bring them to a common platform with the plantation sector to encourage the expansion of spice cultivation in Sri Lanka (Spices and Allied Products Traders' Association, 2022).



7.10 Chambers

7.10.1 The Ceylon Chamber of Commerce

The Ceylon Chamber of Commerce (CCC) is the oldest and one of the leading business chambers in Sri Lanka. It is a confederation of trade associations, regional and sectoral chambers of commerce and industry, business councils and employer organisations.

It has a wide-reaching network of members, partners and stakeholders; CCC provides several business promotions services for the business community in Sri Lanka. Through an extensive programme of inbound and outbound business promotion missions, training courses, seminars and business interactions, CCC helps target the most likely to achieve results. CCC helps reach new markets and increase potential profits and revenue, whether already exporting or planning first overseas ventures.

The Ceylon Chamber of Commerce established the Business Information Division in 1974 to assist businesses in growing import and export opportunities and understand potential markets better to penetrate the latest value-added information, products and online data sources. This division meets the global growth challenges with the help of its team attached to the Business Information Division. It provides access to international and local networks to help grow business opportunities.

In addition, CCC's business promotion missions provide an excellent opportunity for Sri Lankan businesses to explore international business opportunities. The members will be introduced to key business contacts, distributors, agents, partners, buyers and sellers, and attend briefings by government officials and business support organisations. CCC's annual programme changes with market demands and trends and caters to most businesses in every sector (The Ceylon Chamber of Commerce, 2022).

7.10.1.1 Services of CCC

- Economic Research
- Business Information and Promotion
- Registration of Commercial Documents
- Global Standard 1 (GS1)
- Secretarial Services
- Commodity

7.10.1.2 Business Information and Promotion Services

With a wide-reaching network of members, partners and stakeholders, CCC provide several business promotion services for the business community in Sri Lanka. Through the extensive programme of inbound and outbound business promotion missions, training courses, seminars and business interactions, CCC helps target the most likely to achieve results for exporters and potential exporters, mainly to reach new markets and increase potential profits and revenue.

In addition, CCC business promotion missions provide an excellent opportunity for Sri Lankan businesses to explore international business opportunities and introduce them to key business contacts, distributors, agents, partners, buyers and sellers (The Ceylon Chamber of Commerce, 2022).

7.10.2 National Chamber of Exporters of Sri Lanka (NCE)

In 1986 the National Exporters Association (NEA) was established to support the exporters of Sri Lanka. In 1994 it was incorporated as the National Chamber of Exporters of Sri Lanka (NCE), becoming the only trade Chamber in Sri Lanka serving the export sector exclusively. The membership of the Chamber is open to all exporters of products and services and suppliers of products and services to the export industry.

The NCE is governed by ten guiding principles to safeguard the traders, members, employees, and environment, and it creates opportunities for Sri Lankan enterprises to be successful in the international market while maintaining transparency and accountability in all their activities.

The membership of the Chamber represents leading exporters of all product and service sectors in Sri Lanka. They range from different scales, large to small

export-oriented enterprises. The Chamber services primarily focus on its members to promote and sustain international market share and be global brand leaders. Due to the commitment and working towards achieving the goals of the membership, the Chamber is nationally identified as the 'VOICE OF THE EXPORTER' (National Chamber of Exporters of Sri Lanka, 2022)

7.11 Conformity Assessment Services (CAS)

Conformity assessment is the collective term for the services necessary to provide evidence that a supplier, product or service meets the requirements of a standard or technical regulation. Testing, Inspection, Certification, Calibration, and Proficiency Testing are considered Conformity assessment services.



In the Sri Lankan context, Conformity Assessment Bodies (CABs) are found in public and private sector institutions. The CABs need to be accredited by the Sri Lanka Accreditation Board to meet the expectations of the industry and global trade requirements.

There are over 300 CABs available for providing CAS out of which only a little over one-third are accredited to provide chemical, biological, mechanical, electrical, residue and packaging material testing, calibration, inspection and proficiency testing, and certification services.

The industry faces many challenges in obtaining CAS, starting from the timeliness of delivery, cost,

accreditation to do residue testing required by importing countries, service capabilities to meet all the buyers' requirements etc.

Similarly, CABs too face challenges due to many reasons: no centralised system to provide services, disposal of the laboratory waste, inconsistent demand for testing, no centralised information system on market demand, recruitment and retention of qualified and experienced staff, cost of chemicals, availability of reference materials, proficiency testing service providers, import restrictions, delays in the process, lack of after-sales services of equipment suppliers etc.

The Association of Testing Laboratories, bringing all the CABs together, providing testing and calibration

appointed in terms of the SLAB Act. No. 32 of 2005. The Director is the Chief Executive of the Accreditation Board.

SLAB, as the National Accreditation Authority in Sri Lanka, has the responsibility to promote accreditation activities and provide the necessary accreditation services to facilitate conformity assessments in the provision of goods and services for domestic and export markets. Accreditation of Testing and Calibration Laboratories, Medical and Clinical Laboratories, Bodies Certifying Management Systems, Products and Persons, Inspection Bodies, Proficiency Testing Providers, Bodies providing GHG Validation and Verification, Bodies Operating Good Laboratory Practices, Bodies conducting conformity assessments on products, services or processes of national interest to the Industry, the



services, could be a means by which the CABs can work together to address their problems to serve the industry efficiently.

7.12 Sri Lanka Accreditation Board

The Sri Lanka Accreditation Board (SLAB) is the National Accreditation Authority of Sri Lanka established under the Sri Lanka Accreditation Board for Conformity Assessment Act. No. 32 of 2005. The board functions under the purview of the Ministry of Trade and is governed by a Council of thirteen (13) members

business community, the government and the consumer public, are carried out by SLAB.

In delivering the above accreditation services, SLAB works closely with governmental organizations and professional bodies, of which members represent different committees and perform activities that could compromise confidentiality and impartiality of accreditation. However, suitable steps are always taken to minimize or eliminate potential conflicts of interest. While ensuring impartiality and confidentiality for accreditation as the need arises, the SLAB may also participate in different forums organized by external organizations.



8 Sustainability

The spice farmers often face poverty and food insecurity, poor agricultural practices, uncontrolled agrochemical use, poor wastewater management, poor labour conditions, and the lack of safe processing facilities.

These have caused an increased concern around spice production, especially in terms of responsible supply, biodiversity, food safety and traceability. By following sustainable practices, farmers can significantly reduce the negative impacts on the environment. This means that the sustainable production of spices becomes an important element in a diversified farmer livelihood strategy; strengthening smallholder farmers' economic resilience and ensuring sustainable growth is a huge responsibility for all actors in the spice value chain.

The pillars of sustainability can be identified as Human and Social, Economic, and Environmental. Human sustainability focuses on maintaining and improving the human capital in society. Investments in the health and education systems, access to services, nutrition, knowledge, and skills are all elements that come under human sustainability; social sustainability focuses on preserving social capital by investing and creating services that constitute the framework of society. This element focuses on a larger view of the world about communities, cultures and globalisation that emphasises preserving future generations. Social sustainability focuses on improving social equality, economic sustainability aims to enhance the standard of living, and environmental sustainability focuses on improving the human welfare through the protection of natural capital (RMIT University, 2017).

8.1 Human and Social Sustainability

The predominant value chains in Sri Lanka's agribusiness are characterised by traditional relations between small-scale and primary producers, intermediaries, processors, and exporters. The shortcomings of these linkages concerning social inclusiveness are evident. They are related to power and information asymmetries and the absence of learning and upgrading possibilities. Due to the highly scattered production structure and the lack of producers' organisations, smallholders depend on intermediaries to take their produce to the markets. Farmers' position in market-based value chains is that the flow of information to the lower end of the chains is less when exporters receive valuable information about market trends regarding consumer preferences, new

legal requirements, and price trends. There is no regular feedback about the acceptance of delivered produce at the lower end of the chain. This prevents farmers from systematically learning and upgrading processes that might improve their position within the value chain (Stamm, et al., 2006).

The development of relational chains is key to having the highest potential for social inclusiveness as it links small-scale producers with stronger agents based on mutual interest. The most common approach to organising sourcing from smallholders is out-grower schemes and these schemes have many advantages. The most important advantage is having increased security regarding the income received during the harvest periods. This lowers the vulnerability of poor farmers' households considerably and improve their standard of living. The farmers will have access to agricultural inputs, products required for post-harvest treatment, know-how and up-to-date information regarding products and processes. Certification costs are lower through collective bargaining. This is especially important in organic agriculture, where all production sites have to be certified. The number of farmers that can be reached through out-grower schemes is significant (Stamm, et al., 2006).

Spices are always in demand in the industrialized world. As such, developing countries such as Sri Lanka can rely on these commodities to earn valuable foreign exchange by exporting the spices only if their competitiveness can be enhanced and sustained. According to the Spice Council of Sri Lanka, issues facing the minor export crop sector range from high production cost, low volumes of production, product quality, skill development, and lack of financing facilities.

Labour is a major demand function, and the unavailability of professional labour becomes one of the main constraints for the competitiveness of agribusiness (Dlamini, Kirsten, & Masuku, 2014). The main cause of labour shortages is a lack of social recognition in the agriculture sector. The younger generation, especially women, tend to seek employment outside the country with the intention of earning higher salaries. But women contribute considerably to the household income through farming and non-farming activities as well as by taking employment overseas, most often in the services sector. The number of women in the workforce as well as the female participation rate in the labour force, has gradually increased in Sri Lanka over the past years. According to the Chairman of the Spice Council, farmers can earn more than USD300 per month, which is more than those who earn USD150 a month by working

as housemaids overseas. This kind of assurance needs to be communicated to farmers, especially those of younger generations. In addition, extensive consultation with farmers will aid in increasing production volumes and quality. Farmers should cooperate with relevant institutions and the government to enhance the competitiveness of the sector as well as to enrich their living standards. Also, agribusiness has a significant impact on developing countries due to its abilities to reach out to diverse sections of the rural population.

The minor export crop sector shows a very attractive picture of the Sri Lankan economy with high prices for its products, especially cinnamon, pepper, and cloves, from the global market. The government, institutions, and farmers have the responsibility to enhance the competitiveness of the minor export crop sector. The government needs to come up with a different approach to providing financing facilities at a reasonable cost of capital and low-interest rates (Kata & Zajac, 2011) to enhance the performance of smallholding minor agricultural firms. The attention of the government of Sri Lanka could be focused on the issues relating to training, production, extension, production-based research, as well as establishing and implementing good agronomic practices.

Researchers with a purely economic approach emphasise the potential benefits that are brought forward for the reduction of poverty through increasing trade in agricultural products. Researchers with a political economy perspective are much more sceptical. They focus on the risks of small farmers being marginalized or completely substituted by commercial farms or plantations (Stamm, et al., 2006). With this, proper analysis of the economic benefits and possible social costs of agribusiness becomes a need in Sri Lanka's agribusiness sector.

8.2 Economic Sustainability

Agribusiness is a key driver for rural development, and well-functioning agricultural systems are important for growth and structural changes in low and middle-income countries such as Sri Lanka. Many developing countries' governments are increasingly building upon agribusiness in their poverty reduction strategies. The links between agribusiness and upgrading, diversification, employment, rural income, and urbanization should be introduced in order to have sustainable business linkages (Lamb, 2003).

In many developing countries, agribusiness continues to grow as one of the major contributors to export earnings,

industrial production, GDP, and employment. The share of agribusinesses GDP and employment rise as countries develop economically, while the share of agriculture declines. Countries such as Taiwan have impressively shown that agribusiness can serve as a boosting platform for other industrial developments: agribusiness can contribute to important increases in both investing surpluses and income in rural areas. Moreover, it can create inter-industry demand and other agglomeration effects. Agribusiness can lead to upgrading since producers can move up the chain of production, producing or growing more sophisticated products. Of course, this is based on the assumption that technology and knowledge transfer are rendered possible through farmer linkages with more technologically advanced enterprises.

Agribusiness can promote a diversification, that is, on the one hand, product-oriented, while on the other hand, source-oriented. In other words, farmers can grow a wider variety of products to meet the broader demand created by further processing while also being able to fall back on a more diversified resource base.

Possible factors to consider:

- Prices and income;
- Profit distribution by district;
- Credit and debt amongst farmers;
- Reasons for engaging in the business and poverty among spice producing households (World Bank Group, 2017).

Agritourism, farm tourism, or agricultural tourism, is the process of attracting visitors and travellers to agricultural areas, generally for educational and recreational purposes (Lamb, 2008). Many important factors regarding agritourism development were identified with the help of the SWOT analysis. When it comes to the strong aspects, some farmers have farm land and other prerequisites for farming on their own. These farms have area-specific crops, trees, and livestock species, contributing to a unique agricultural landscape for the area. Beautiful natural landscapes consisting of forests, mountains, and grasslands provide high value to the environment. Farmers in these areas have a good knowledge of farming activities. These young farmers can work hard throughout the year since there are no seasonal differences in the country. The availability of family labour at a significant level is also a positive point for agritourism. Farmers practice both traditional farming activities and new farming techniques. Currently, there is a trend towards organic farming. Moreover, these areas

are rich in traditional (cultural) activities such as pottery making, cane weaving, art and craft industries as well as Sri Lankan cuisine with various spices. These rural areas also have clean environments and relatively low pollution due to the absence of industrial emissions.

8.3.1.2 Precipitation

Unlike in the case of temperature, no clear pattern or trend has been observed in precipitation. Some researchers, comparing the mean annual precipitation



While agents in market segments with low barriers-to-entry face intense competition and are often engaged in a “race to the bottom”, agents in segments with high barriers-to-entry are able to limit competitive pressure and to sustain income growth. In other words, the higher the barriers-to-entry, the higher the levels of profitability.

8.3 Environmental Sustainability

8.3.1 Climate Change and the Environment

Global warming is leaving its mark in many parts of the world, including Sri Lanka, causing serious concern in recent years. According to the “National Adaptation Plan of Sri Lanka” in 2016, it was observed and projected that the climate of Sri Lanka is undergoing three major types of changes:

1. Gradual increase in ambient air temperature;
2. Changes in distribution pattern of rainfall;
3. Increase in frequency and severity of extreme weather events.

8.3.1.1 Temperature

Analysis of past data indicates that atmospheric temperatures are gradually increasing almost everywhere in the country (Chandrapala, 2007a; De Costa, 2008; Eriyagama et al., 2010; Nissanka et al., 2011; Sathischandra et al., 2014). Furthermore, annual mean air temperature anomalies have shown significant increasing trends at all weather stations in the recent decades (Basnayake, 2007).

of recent and earlier periods, suggest that average rainfall is showing a decreasing trend (Basnayake, 2007; Chandrapala, 2007b; De Costa 2008; Jayatillake et al., 2005). However, there is no consensus on this fact among researchers, and opposing trends can be observed in different locations. Punyawardena et al. (2013a) observed that heavy rainfall events have become more frequent in the central highlands during the recent period. However, many researchers seem to agree that the variability of rainfall has increased over time, especially in the Yala season (Chandrapala, 2007; Eriyagama et al. 2010; Punyawardena et al., 2013).

8.3.1.3 Extreme Events

The intensity and frequency of extreme events such as floods and droughts have increased during recent times (Imbulana et al., 2006; Ratnayake & Herath, 2005; Premalal & Punyawardena, 2013; Punyawadana & Premalal, 2013). Areas of high rainfall intensities and the locations of landslides show a strong correlation (Ratnayake & Herath, 2005). In addition to the above changes in the atmosphere, there are associated changes in the oceanic environment too, especially sea level rise, that seem to have significant impacts on Sri Lanka because sea level rise of 1-3 mm/year is observed in the Asian region and is marginally higher than the global averages (Cruz et al., 2007). An accelerated level of sea level rise has been observed during the period of 1993-2001 (3.1 mm/year) for the Asian region. However, specific levels of sea level rise in areas around Sri Lanka are yet to be assessed.



9 Key Areas for Action for Sustainable, Inclusive and Resilient Growth and Economic Recovery

9.1 Policy and Business Environment

Exports have become more critical than ever with the multiple challenges faced by the country today. Export earnings and employment in direct and supportive

faceted and more complex than ever.

From January to October 2021, merchandise exports increased by 21.2% to USD 10,059.4 million compared to the corresponding period of 2020, following increased exports of almost all the major product sectors, namely Apparel & Textiles, Tea, Rubber-based products, Coconut based products, Electronics & Electronic Components, Spices and Concentrates, Food & Beverages, Seafood and Ornamental fish etc.

Export earnings from spices and essential oils increased by 36.3% to USD 365.7 million from January to October 2021 compared to the year 2020 due to the better performance in all the sub-categories; cinnamon (13.8%), pepper (132.2%), cloves (152.6%), nutmeg & mace (15.4) and oleoresins (66.1%), etc.

Values in USD Mns

Exports of goods	Jan-Oct 2019	Jan-Oct 2020	Jan-Oct 2021	% Growth (20-21)	Oct 2020	Oct 2021	% Growth (20-21)
Apparel & textile	4,612.6	3,630.4	4,388.5	20.9	356.5	509.0	42.8
Tea	1,139.1	1,031.8	1,096.1	6.2	112.2	109.5	-2.4
Rubber-based	753.7	667.13	896.89	34.4	80.3	91.91	14.5
Coconut-based	520.9	550.7	684.6	24.3	62.2	77.7	24.9
Diamond, gem & jewelry	263.0	126.9	211.7	66.8	7.9	25.4	219.9
Electronics & electronic components	323.8	226.7	348.0	30.5	20.5	38.4	87.3
Spices and concentrates	268.0	268.3	365.7	36.3	33.8	44.9	32.8
Processed food & beverages	304.7	300.6	339.8	13.1	24.7	63.0	154.8
Seafood	219.6	165.0	212.5	28.8	15.6	24.5	57.0
Ornamental fish	12.8	11.3	15.5	37.8	1.5	1.7	10.6
Vegetables	26.7	21.8	21.4	-2.2	2.1	2.7	24.8
Fruits	36.0	30.5	31.8	4.1	2.8	3.2	13.8
Other export crops	30.0	63.8	55.8	-12.6	3.0	7.4	145.7
Flowers & foliage	15.7	11.1	13.1	18.1	1.3	1.8	44.4
Boat building	65.2	2.0	36.6	1,703.9	0.0	33.7	112,200.0
Petroleum products	288.7	267.3	180.6	-32.4	10.1	16.7	65.4
Others	1,079.9	883.9	1,160.8	31.3	119.8	109.1	-8.9
Total merchandise exports	9,960.4	8,299.2	10,059.4	21.2	854.3	1,160.6	35.9

Table 29: Merchandise export performance
Source: www.srilankabusiness.com

sectors are expected to play a significant role in the recovery, resilience and sustainability of Sri Lanka's economy. The unprecedented changes due to the COVID-19 pandemic on the global economy have severely impacted the economies of many developing countries like Sri Lanka. The challenges at hand are multi-

In the past, Sri Lanka's economy transitioned from a rural agricultural economy to a more urbanised economy driven by the service sector. The agriculture sector continues to be the backbone of the Sri Lankan economy because of its engagement in providing livelihoods, particularly to the rural community.

The main policy direction of the agriculture sector is to drive the sector towards commercialization with due consideration for ecological sustainability, to ensure the food and nutrition security of people and to increase the competitiveness of agriculture and agro-based products in the international market.

The DEA is the lead agency responsible for local activities for export agriculture products, which include pepper, cloves and nutmeg. The DEA is coordinating, supporting and developing all activities on supply development and should take the lead and initiate a public-private dialogue between the spice industry and other related government agencies. The DEA should function more autonomously, especially at the local level. The agencies' activities should support the strategic initiatives and be guided by the marketing strategy of spice industry subsets. PCN sector should concentrate on producing more value-added products aiming at niche markets instead of basic product exports to achieve better profit margins. Public-private dialogue should help ensure that required Sri Lankan tariffs or taxes, quarantine, and customs procedures do not discourage the import of raw materials or specialized distillation equipment; it should encourage the government of Sri Lanka to resist efforts in select markets to erect obstacles to the import of spice derivatives, especially Eastern Europe, the United States, the EU, and Japan. The Export Development Board and the Department of Commerce could help promote a range of exports, especially non-traditional products, and provide Sri Lankan growers access to the criteria of quality used in the international market. Public-private dialogue should also focus on upgrading the industry through another public-private partnership in the research and development of products made from Sri Lankan spices, particularly for untapped markets.

9.2 Enhancing Institutional Support

9.2.1 Improving Infrastructure and Access to Quality and Testing Services

Improving the infrastructure helps efficient, effective and accessible quality services for the industry to access new markets, improve productivity and ensure the health and safety of populations. It relies on metrology, standardization, accreditation, and conformity assessment.

The National Quality Infrastructure (NQI) that provides quality and testing services has evolved over 70

years based on national needs and demands with no consideration for coordination within the NQI framework. It has not effectively met the needs and expectations of stakeholders in certain areas and has failed to deliver expected quality related services consistently.

Industries seeking to enter niche markets and integrate into global value chains face challenges in obtaining relevant inspection, test reports and certifications, to demonstrate product compliance.

Therefore, availability and access to such services are important considerations. It is paramount to identify the type and volume of CAS required and develop such services based on demand.

Further, providing centralized information on services available is an important component in facilitating trade. Such information gives details on what regulation is in place, how they can demonstrate compliance, what testing facilities are available, and the accreditation status must be accurate and easily accessible to the industry and trade.

9.2.2 Compliance with Safety, Health, Quality and Environmental Requirements

Conformity assessment services test, inspect and audit to issue certificates of compliance to industry based on safety, quality and environmental standard requirements, which can be either mandatory or voluntary. However, voluntary standards are also very crucial because satisfying the requirements which are demanded by retailers and consumers give access to markets which are otherwise not possible to enter.

Environmental standards are drafted to create an environment-friendly society by preventing pollution, managing and reducing waste, procuring materials from sustainable sources, reusing and recycling materials whenever possible, conserving and responsible use of energy etc.

9.3 Value Chain Development

9.3.1 Network Development

Nearly 80% of Sri Lanka's total population resides in rural areas (World Bank, 2022), and agriculture remains the backbone of the economy. Four-fifths of the country's poor people are dependent on the rural sector. Almost half of the poor rural people are small-scale farmers.



Tea and rubber have made significant contributions to the national economy. Tea smallholder growers contribute 70% of Sri Lanka's total tea production, while smallholder rubber growers cultivate 62% of the land under rubber cultivation (IFAD, 2022).

Hence it is of paramount importance to support network development among the rural farmers, intermediaries and exporters both locally and internationally to be in line with the international requirement of food security and to make the rural folk achieve higher and sustainable income, improve production and productivity, and sustainably manage the environment. The main objective of such network development programs is to strengthen small-scale national farmer organisations and to create a robust network among them to provide improved services to their members and engage in policy processes. One example is the Lanka Farmers' Forum (LFF), implemented in Sri Lanka through the Medium-Term Cooperation Programme (MTCP), supported by the International Fund for Agriculture Development (IFAD) with the farmer organisations in Asia and the Pacific.

In general, farmers, especially in developing countries, such as Sri Lanka, depend on other farmers as a reliable source of information; therefore, it is very essential to have links or social networks constructed for farmers to share information on input prices, commodity prices, fertiliser management, pest and disease management, weather patterns, new technologies etc. The costs associated with information sharing through a social network could include the time and effort needed to maintain the link.

On the other hand, network development programs are developed locally to establish the links between the farmers and intermediaries and the exporting companies. Technology know-how, mother plants, working capital requirements and farm gate purchase of goods at fair prices will result from such programs. Out grower system operating in Sri Lanka among spice exporting companies is a suitable mechanism for network development, e.g., Bio Foods (Pvt) Ltd.

9.3.2 Entrepreneurship Development

Sri Lanka should extend spice cultivation to districts other than the wet zone areas to increase the supply of spices. The land policy will play a significant role in this, and plantation companies can be offered land to avoid adverse social effects. Eliminating the barriers on land leases will also promote newcomers to the spice industry.

Infrastructure such as roads, water, electricity and telecommunication are not keeping pace with rural needs, and support has to be extended in developing infrastructure facilities.

Out grower systems can be developed in such areas. The farmer village concept will be introduced where exporting companies provide all inputs and technical know-how for entrepreneurship development.

the government can try to pay immediate attention to extending the cultivation of black pepper to dry zone areas. Allocation of suitable land in the dry zone area for cultivation and providing the small farmers with planting material and mother plants free of charge, and a 50% subsidy and technology to larger companies for cultivation, can attract newcomers to the industry. The reluctance of the young generation towards the spice industry is a major issue, and the introduction of certified



Training programs on capacity building of farmers will develop the interest among farmers in the spice industry.

Introducing farmer–entrepreneur registration schemes will help compile a database where information sharing can be quickly done, and exploitation can be avoided.

9.3.3 Development of Spice Farmers

Piperine content found in Sri Lankan black pepper is 2-6 times higher than in other countries, and the high oil content gives Sri Lanka a competitive advantage in the world market. Pepper is mainly cultivated in the wet and intermediate agro-ecological zones in the mid and low country regions (Department of Export Agriculture, 2022). Due to the high demand created by the limited supply situation prevailing in the country, exorbitant prices have to be paid by the exporting companies, irrespective of the quality of the pepper. Therefore,

level training programs for school leavers will influence the youth joining the industry.

The introduction of machinery such as dryers and sorting machines to farmer societies and villages will reduce manual operations and the cost of production owing to the present high cost of labour. The quality of spices will also be even due to mechanized sorting and drying and hence will fetch higher prices.

Farmers should be encouraged towards low application of agrochemicals in spice cultivation, providing opportunities to enter niche organic markets and command higher prices. Farmers have a poor attitude toward diversifying land and Good Agricultural Practices (GAP) towards spice cultivation. The organic village concept can be developed among spice farmers to facilitate group certification at a low cost.

The lack of high-yielding varieties of spices suitable for different elevations and shade levels is another concern

for farmers, and the government research institutes should concentrate on developing such varieties to attract more farmers to the industry and for better yields under different climatic and soil conditions.

9.3.4 Support to Intermediaries

As the supply in Sri Lanka for black pepper is inadequate due to cultivation being limited to a few districts, seasonal variations in supply and poor response towards new cultivations, intermediaries are facing difficulties in fulfilling the current market demand. Hence it is strongly recommended that the government should promote the cultivation of black pepper in non-cultivated districts, including the dry zone, by supplying quality mother plants and good infrastructure facilities. Government support for plantation companies would be a quicker way forward.

Harvesting of light berries of black pepper by the farmers due to high demand and quick money is another problem faced by the intermediaries. The DEA should carry out awareness programs to educate farmers on the disadvantages of quantity and price due to harvesting light berries and all support to avoid such practice. Government schemes of low-cost financing through banks for short-term loans keeping the pepper harvest as a surety will ease the burden on farmers' finances. Buyback arrangements through the exporting companies also would help ease the burden on intermediaries.

Intermediaries should have proper storage and processing facilities to minimise post-harvest losses. The government should support by providing low-cost finances for the reconstruction of storage facilities and required equipment. Since the manual process of sorting is expensive and lead to quality issues, sorting equipment should be introduced to replace manual sorting and grading. Establishing central processing facilities will be another method to improve pepper quality. Buyer companies can provide such facilities to intermediaries to ensure a constant supply.

High labour costs on drying also lead to quality issues. Government should encourage mechanical drying instead of manual sun drying with low-cost finances and required technical know-how, which will encourage intermediaries towards machine drying.

Most of the intermediaries are not interested in possible system certifications. The DEA should carry out awareness programs on GMP, GAP, Organic etc., to educate the farmers on the importance of certificates due to the global demand for safe foods and the price

advantage to the farmers on certified products.

9.3.5 Capacity Development of the Stakeholders

This project's overall goal is to build stakeholders' capacity in the PCN spice value chain and to expand exports of safe and high-quality spices from Sri Lanka to overseas markets. This will also improve food safety and consumer health, and export markets. This is further expected to boost the incomes of small-scale farmers, empower women and other marginalised communities, and support efforts to reduce poverty (SDG 1) and hunger (SDG 2).

This analysis is oriented to address food safety issues in the production, post-harvest, processing and trade of Sri Lankan PCN spices by adopting improved practices along the value chain and introducing a certification system to ensure the products' credibility.

Introduce mandatory quality and safety standards such as GAP, GMP, Organic etc. and implement them throughout the spice value chain to maintain high quality throughout the value chain;

- Improve direct linkages with the producers and processors and exporters (more backward integration);
- Establish centralized collection and processing centers;
- Invest in demand-driven research on value-added product and technology development and link the research institutes with the industry to disseminate research outcomes;
- Encourage own research by private companies where entrepreneurship could be developed;
- Increase awareness of value additions among the processors and exporters for international markets;
- Promote low-cost technologies for value-added spice products;
- Provide processors access to concessionary credit schemes to lower the cost of production and maintain quality.

9.3.6 Packaging and Labelling

Packaging can be defined as "ensuring safe delivery of a product to its final consumer in excellent condition and at minimum affordable cost". It prevents spoilage, tampering, breakage or theft of products, protects from outside contamination and helps by extending the product shelf life, identifying the product contained inside, and encouraging the consumer to buy.

One of the critical aspects of food preservation is choosing the proper packaging, considering the nature

of the product and the kind of packaging needed. The packaging material that is required is determined by the nature of the product, its physical form and properties.

Apart from the 'protect and preserve' function, the packaging is a communication medium. Packaging information such as product name, date marking, net weight, usage instructions, nutrition information, ingredient list and manufacturer's details are mandatory labelling requirements.

9.3.7 Quality and Traceability

Tracing an item through various stages of production, manufacturing, processing, handling, transportation, sales, and consumption is important for assuring quality down the supply chain.

Traceability helps to determine the origin of a product, ingredient or component. Product failure issues can be identified, contained and resolved quickly, reducing the loss and cost. Informing supply chain entities of product information is crucial, especially regarding the batch and lot number, manufacturing, and expiry date.

When such a traceability system is in place, it facilitates recalls when a batch of a particular product fails in compliance. This ensures the quality of the end product as all products that fail safety and quality requirements can be traced back and removed. The step where contamination occurred can also be traced back and controlled to prevent a recurrence of this problem.

Reviewing the traceability system of spices throughout the industry, from the farm to export, is undertaken by a series of interventions. Traceability back to the farm and eventually to the cultivar was not possible at key processing facilities at the time of the initial intervention since all the data were collected manually and did not include sufficient details to trace back to the location on the farm and specific trees from which the product came. This was of particular importance as some buyers wanted products from farms and specific trees on those farms that had the desired characteristics of the finished product being offered for sale in the destination market. Systems had been established at selected facilities to make this possible but had not been adopted elsewhere.

The requirement for traceability back to specific farms, quadrants on farms, and in some cases, specific trees (e.g. with GPS locational markers) is important not only for compliance with Food Safety and Quality (FSQ) requirements, including GAPs but also for commercial reasons. This process is required to facilitate specific buyers wanting products with specific characteristics

(as in the case of the German firm discussed above) and certification of authenticity (Gordon, 2021).

9.4 Marketing

9.4.1 Branding and Farmer Stories

The 'Ceylon Spice' master brand was launched by the Export Development Board, as Sri Lanka's latest national branding attempt for the spice sector, in 2019, with the government aiming to achieve higher export targets from the 'Spices and Concentrates' sector. This trademark supports growers, processors, and manufacturers of spices, by helping them to identify their products as Sri Lankan-made and also inform customers and consumers that all significant parts, produce, processing, and products are of genuine Sri Lankan origin. Cinnamon, pepper, clove, nutmeg, mace and cardamom are covered under the 'Ceylon Spices' master brand as a result of the government's initiative to recognise and follow a 'Master Brand' approach for the collective promotion of 'Ceylon Spices', rather than promoting them individually.

One of the priority sectors identified in the National Export Strategy (NES) document is Spices and Concentrates. One of the strategic objectives is to become globally recognised as an innovative player in the value-added spice market. Branding of spices is a 'priority action item' in the NES to achieve a set export target of USD 880 million from the 'Spices and Concentrates' sector by 2022.

The Sri Lankan government is planning to have a consistent branding story running across all its brands. All brands and products from Sri Lanka should be known for a commitment to high quality, ethical standards, and strong environmental sustainability credentials. This can be the unique differentiator in an age where consumers seek authenticity, traceability, and quality. The policy of the government is to encourage greater value addition and value capture here in Sri Lanka, moving away from commodity exports. As a country with a good agricultural base, Sri Lanka has to move into adjacent sectors such as food processing, flavours, extracts and essences, for the pharmaceutical and cosmetics industry, and food-related products for the health and wellness industry. A vital aspect of building a global spice brand is to build a good narrative, weaving a story that makes people intrigued and curious about spices and Sri Lanka.

Market diversification and product differentiation through strong branding campaigns and consumer awareness of Ceylon Cinnamon, Ceylon Pepper and other spices in high-end markets such as Europe, the US,

Japan, and the Gulf region can be highlighted as a vital strategy to be competitive in the international market and capture greater value in Sri Lanka.

The SLEDB is the owner of the 'Ceylon Spice' trademark. The SLEDB developed the brand architecture strategy to express the relationship between Ceylon Cinnamon, Ceylon Pepper and other spices within the portfolio, as well as the visual identity or face of the brand that represents the larger ideas captured in the brand definition model. The masterbrand and brand architecture places all Ceylon Spices that meet the required standards under one trademark namely – 'Ceylon Spices' – which maximises brand awareness by focusing brand marketing on a single brand strategy and brand image. It also lowers brand marketing costs by eliminating the need for separate and distinct logos and imagery.

9.4.2 Geographical Indication (GI)

A geographical indication (GI) identifies a good as originating in the territory of a member or a region or locality in that territory, where a given quality, reputation or another characteristic of the good is essentially attributable to its geographical origin. It is a link between a place, people and a product. A few examples of GI's to quote are "Darjeeling tea from India", "Kampot pepper from Cambodia", "Champagne from France", "Parmigiano Regiano" in Italy, and "Scotch Whisky" in the UK.

GI was originated in France associated with French wine in the 19th century, followed by many more products and countries. Obtaining GI will protect added value to the product and will attract a high price to the product, and this will have a direct impact on rural development and export revenue. Geographical Indications (GIs) are given to products from a specific designated geographical area and granted to producers' organisations or representatives. It is the highest level of branding and protection given to products in the world.

Ceylon Cinnamon is the first-ever GI granted to a Sri Lankan product, registered in the EU with technical assistance from UNIDO. Arrangements were made by the SLEDB along with the related government agencies, cinnamon industry representatives, and with technical support under the EU– Sri Lanka Trade Related Assistance. The technical support included guidance on how to protect GI systems against malpractice, drafting of the technical specification, control and certification related to GI of goods, registration with special reference to EU and regional procedures, traceability of production, quality control along the value chain, governance of the

GI through an association, and a strategic promotional plan for Ceylon Cinnamon.

With export sales of USD 202m in the year 2020, cinnamon is Sri Lanka's highest-grossing spice and one of the leading foreign exchange earners. Sri Lanka's cinnamon output also reflects the largest share in the world market. GI for Ceylon Cinnamon will give Sri Lankan producers a specific identity to the product, mainly as to where the product initially originated (place of origin) from and the direct links to the product until it reaches the final end consumer. "Ceylon Cinnamon" is the protected name covering products coming from the bark, including quills, powder, and bark oil, and other value-added product from the leaves of the cinnamon tree, leaf oil. The inner bark is the main consumed part of this spice.

Department of Export Agriculture, along with the private sector and the Food and Agriculture Organization (FAO) in Colombo, is making arrangements to obtain GI for "Kolonna Pepper" which is one of the best peppers in Sri Lanka, with many more products to follow.

Sri Lanka is yet to complete its legal framework to create a GI system with an interim regulation under the Intellectual Property Act to allow for the registration of GI in Sri Lanka. The National Intellectual Property Office (NIPO) will act as the GI competent authority in Sri Lanka and be in charge of the GI registrar, focusing on the formal examination and cooperating with other technical agencies (DEA, EDB, etc.) for substantive examination of GI application.

9.4.3 Export Promotion

Export promotion is widespread, and most governments intervene, from providing infrastructure support to direct export subsidies, though WTO rules currently limit the latter. They are promoting exports as a priority for developing and developed countries, given the strong relationship between exports and economic growth. Export promotion through government intervention has been an essential contributor to the impressive export performance of East Asian countries led by Japan and the four Asian tigers, namely Hongkong, Korea, Taiwan and Singapore and lately by the Southeast Asian countries Malaysia, Indonesia and Thailand.

As Sri Lanka's apex organisation for promoting exports globally, the Export Development Board (SLEDB) is involved in trade promotion as an integral part of export development. Small & Medium-sized Enterprises (SMEs) and other sectors benefit enormously from concerted,

coordinated and well-designed promotional campaigns to propel Sri Lankan products to regional and international markets.

Identified as an essential component of the National Export Strategy, trade promotion includes:

- The development of economic policies;
- Interventions and initiatives aimed at improving trade performance in a target location or industry showcasing Sri Lanka trade, industries, and services on global platforms;
- Brand building and positioning Sri Lanka globally and locally as a country relevant to products and services.

The SLEDB works with multiple public, private, diplomatic and global partners to promote Sri Lankan trade through conventional and digital channels. The conventional methods of trade showcasing include the organisation and participation at trade events and exhibitions globally, and organising periodical globally synchronised events in all trade missions overseas to promote brand Sri Lanka, its exports and investment opportunities, targeting specific industry sectors. SLEDB also promotes Sri Lankan industries and services online through digital marketing and advertising (e.g., E-marketplace).

Trade events and exhibitions are one of the best methods to portray Sri Lankan products and services to the global market and build a link between local exporters and global buyers. The SLEDB organises the participation of Sri Lankan exporters at major International Trade Fairs in potential overseas markets to facilitate B2B promotions. Some product-specific trade fairs for spices are Biofach- Germany, Gulf Food -Dubai.

Among these events are industry-specific trade fairs, multi-product fairs, regional fairs and solo exhibitions. In addition, the SLEDB collaborates with local industry-based institutions to organise local trade events, which helps to promote Sri Lankan products to global markets. Moreover, the SLEDB also facilitates the participation of SMEs at international trade events and exhibitions to promote and facilitate mid-range exporters in the global arena.

Inward buying missions are a popular method of trade promotion carried out by the SLEDB but, in the recent past, have slowed down due to travel restrictions. Buyers from leading companies abroad visit Sri Lanka through the Sri Lankan embassies, and SLEDB organises matchmaking sessions for Sri Lankan exporters, followed by factory visits.

The German Trade Promotion Desk and the Centre for Promotion of Imports from Developing Countries (CBI) have collaborated with the SLEDB in organising buyer-seller meets for the Sri Lankan export community.

Trade Chambers, namely the Ceylon Chamber of Commerce (CCC) and the National Chamber of Exporters (NCE), organise the participation of their members at overseas trade exhibitions in a small way. Through the Sri Lankan Embassies abroad, the Department of Commerce also carries out trade promotional programs for Sri Lankan exporters.







10 Conclusion and Recommendations

10.1 Conclusion

The spice sector in Sri Lanka, having a great potential, faces several challenges and threats related to the traditional marketing system despite its critical role in the economy. Various issues are faced by the value chain actors, including food safety, productivity, quality aspects and traceability issues. This document proposes recommendations and is the basis for the formulation of a project proposal to convert these issues and threats into opportunities. This document has offered detailed value chain (VC) analyses of three spices pepper, cloves, and nutmeg (PCN), focusing on existing gaps in Food Safety and Quality (FSQ), starting from farm gates to distribution channels and end markets. It also details necessary conditions to access the international markets and to increase competitiveness in international trade.

The traditional value chain of spices in Sri Lanka is characterised by farmers, decentralised unknown-quality product purchases and sales, several intermediaries without essential functions (such as collectors, village traders, shops, wholesale buyers), and weak linkages among the different value chain actors. Farmers often sell their spice crops to itinerant traders or collectors, who sell to city traders and wholesalers, processors, exporters, and international buyers. The chain length lowers the price paid to farmers and complicates attempts to improve quality or produce a differentiated product. However, this chain serves an essential function by drying, sorting, grading, and other low-level value-adding activities. At the same time, the length of the chain reflects each intermediary's advantage in its territory, close knowledge of people, and an operation whose scale is appropriate to the supply of spices.

Small farmers sell their spice crops to petty itinerant traders because they give farmers in-kind or cash advances, and they often need money immediately for farming and other purposes. This arrangement obliges small farmers to sell at a low price and be left out of price differentials based on quality and grades. In addition, especially in the case of pepper, the fear of on-farm theft of the crop, and consequent loss of income, causes farmers to harvest early when the crop is not fully ripened, resulting in not achieving maximum yields and expected quality. The chain is long, and isolating exporters are painfully aware that their price differentials do not reach the farmer because each intermediary takes

a share of the proceeds or benefits. Domestic profit in the spice trade depends on a trader's or buyer's ability to buy when prices are low, process and grade the commodity according to price differentials, store it until prices rise, and then sell it, thereby taking advantage of price differentials and price volatility, and maximising income. Unfortunately, very few small farmers have the financial ability or expertise to engage in this activity. Furthermore, growers do not have the financing or market information to engage in trading activities that generate a risk premium for competent intermediaries when prices fall. They require consistent economic incentives to produce and handle spices in a manner that distinguishes their products.

With a few exceptions, small farmers in Sri Lanka have not organised themselves, nor have they been organized successfully through a top-down approach. Therefore, they have no voice or bargaining power, and few effective means for learning about production technologies or marketing strategies. This has resulted in low-value addition in the chain, lack of quality concern, poor incentives for the farmers to make investments, and sluggish growth. This set-up has dominated spice marketing for a long time without a significant change except for certain attempts by the DEA, Spice Council, SAPPTA, NGOs, INGOs, and entrepreneurial firms who have integrated backwards towards the cultivation while linking smallholder farmers into dynamic modern supply chains.

Integrating smallholders goes a long way in addressing challenges such as overcrowding in the value chain, liquidity shortages, and, most importantly, establishing a connection between the farm-gate price and spice quality. When farmers receive quality-based price differentials, the price becomes predictable. However, this will require specific and testable quality measurements based on market demand. With more predictable prices, farmers are more inclined to invest in better techniques and practices, and the industry is more capable of offering differentiated products.

The organic market may be a special case based on a market niche, but it still presents a model for high-end differentiated markets and other high-quality markets. Instead of establishing the price premium on organically produced spices, larger buyers and exporters could devise ways to reward selected farmers for producing the highest quality grades by entering into strategic alliances based on pre-established prices.

The marketing structure of spices in Sri Lanka is characterized by its traditional nature at the domestic level and a relatively high degree of sophistication at the exporter level. Despite the greater scope of further expansion, current production is mainly used for domestic consumption and bulk exports due to various issues. The significant problems concerning the production aspect include high cost of production, poor yield levels and insufficient supply, poor or unknown quality of the product, scattered smallholder cultivation, and pest and disease problems. Moreover, rapid changes are occurring in the domestic and export procurement systems in terms of increased quality concerns due to the development of high-quality modern trade, bulk procurement by domestic manufacturing firms, and improved testing and quality awareness in the global trading system and end-users.

Over the past decade or so, the average cyclical challenges of the spice trade have intensified by additional significant problems associated with increased regulatory attention in some critical overseas markets to food safety, plant health, and environmental and social aspects of spice production and trade. This increased regulatory compliance has triggered various responses by Sri Lankan producers and processors/exporters, the DEA, and other government and non-government agencies. Changes have been, and continue to be, made in production, post-harvest, processing practices and technologies, quality assurance and supply chain management systems, and monitoring and testing products.

The lack of harmonization of international standards for spices is a cause for some uncertainty within the trade and adds costs for exporters since they must use different technologies and employ different types of tests to satisfy different markets. The harmonization of international standards would reduce this uncertainty and enable more uniform procedures.

Spice value chains in Sri Lanka have been blessed to be surrounded by a network of vibrant supporting institutions from the state and private sectors engaged in promoting cultivations, ensuring high-quality supply, and increasing export earnings. The Department of Export Agriculture is the leading government organization in the production sector; they provide technical assistance, field training, advisory campaigns, and subsidy programs to uplift the production level. Export Development Board, SAPPTA, SLSI, ITI, and Spice Council also play essential roles in different value chain stages by conducting research and development programs, education, finance, market development,

technical assistance, lobbying the government, etc., focusing on product quantity and quality, farmer income, technology, and employment among others. Other than that, there are many opportunities in the sector, such as the inherent quality of Sri Lankan spices, increasing local and international demand, rising prices for quality products, etc.

However, the spice sector has not captured the full advantage of these opportunities. Therefore, this study recommends strengthening the existing extension system to ensure quality, knowledge and technology transfer, introducing centralized collection and processing, transparent pricing mechanism based on quality and grades, efficient communication along the value chain, improving value addition targeting international demand and promoting export towards non-traditional high-end consumers.

10.2 Recommendations

The recommendations highlighted in this report are based on the information and feedback received from key players in the spice industry in Sri Lanka, ranging from farmers to the high-end processors and exporters and other private and public stakeholders of the country. The facts highlighted by the majority of the survey respondents stress the improvement of technology and technical know-how of farmers with the ultimate goal of long-term improvement in yields and the quality of the spices in the country. The recommendations mentioned are of practical value that can be implemented in an actionable manner in partnership with local spice sector players to benefit the industry.

It has become evident, internationally and in the case of Sri Lanka, that the design and implementation of comprehensive development strategies can be the task of neither the private nor the public sector alone, but that joint efforts must be undertaken to achieve a significant impact.

Globally, the standards are becoming more critical; this trend will prevail and bear challenges and opportunities for Sri Lankan exporters. Companies will take the rising cost of complying with these standards and must also demonstrate compliance to abide by the standards set by international buyers. A branding strategy can only be successful based on high-quality products.

10.2.1 Recommendations to Address the Constraints of Farmers

Challenges	Recommendations	Related Institutions
Most PCN spices are grown in scattered small plots of lands, under mixed and non-intensive cultivation with little inputs, leading to competition between crops for nutrients and low yields.	• Conduct studies to find productivity actions and development plans. • Conduct productivity improvement programmes and implementation of modern agricultural practices. • Replanting and new planting programmes to ensure sustainability. • Encourage mixed cropping with other crops in home gardens. • Encourage commercialization of spice cultivation by adopting mono-cropping systems. • Expand spice cultivations to non- traditional areas and intercropping with perennial cropping systems. • Improve the capacity of public extension services, especially GAP and modern techniques. • Provide incentives for the producers to adopt GAP.	DEA SAPPTA Spice Council Tea Board TRI DOA
Unavailability of high yielding planting materials	• Development of new varieties. • Maintain own nurseries. • Strengthen the existing nursery network.	DEA
Absence of proper infrastructure and technology	• Disseminate newly developed technologies to grassroots level producers. • Facilitate access to finance to adopt new technologies and best practices.	DEA BOI Financial institutions
Rainfall patterns and climatic changes affecting the crop and flowering of plants	• Encourage and educate to use rainwater, and drip irrigation systems. • Conduct proper research to develop drought-tolerant varieties. • Provide incentives for the producers to adapt modern irrigation practices (e.g., drip irrigation).	DEA
Lack of labour and high labour cost	• Promote good agricultural practices and mechanization to reduce labour requirements. • Having higher quality will lead to higher prices, and the possibility of higher salaries.	DEA
Unavailability of fertilizer, chemicals, and inputs	• Encourage and educate farmers on using non-synthetic materials and promote the adoption of Good Agriculture Practices (GAP).	DEA
Effect of pests and diseases	• Adoption of effective pest and disease control. • Educate on measures and practices to use safe chemicals. • Conduct research to identify control methods and to develop resistant varieties.	DEA

Challenges	Recommendations	Related Institutions
Traditional methods which are highly labour intensive are used for processing	Develop appropriate techniques and technology programs for processing and introduce mechanization.	DEA ITI Spice Council
Post-harvest damage	Educate on correct processing and storage of spices to reduce post-harvest losses and assist in developing post-harvest facilities and equipment.	DEA
Price instability, lack of bargaining power & unfair price	- Provision of market information. - Establish centralized collecting points and processing units at selected places where producers could sell their products. - Promotion of collective action institutions such as clusters, networks and associations. - Government intervention to set a stable and minimum farm gate price based on grades and standards. - Introduce a guaranteed price scheme.	DEA Spice Council SAPPTA
Low effectiveness of extension services	Improve extension services' capacity, efficiency, and reach by increasing resources, especially GAP and modern techniques.	DEA
Low and inconsistent quality of products	- Introduce mandatory quality and safety standards and implement them throughout the value chain. - Integrating smallholders with dynamic value chains by promoting out-grower schemes. - Introduction of improved post-harvest techniques instead of sun drying and other unhygienic traditional drying practices. - Training programme to make them aware of international standards and demand.	DEA ITI SLSI SAPPTA Spice Council
Poor attitude among farmers to diversify land and GAP/GMP of spice cultivation and harvesting	- Encourage farmers to diversify from other non-cash crops to spices. - Educate farmers by organizing field trips to show the economic return of correct cultivation of spices. - Construct model farms in each village to educate farmers on acceptable agronomical practices, including standards, harvesting, drying, and value-adding. - Distribution of processing equipment to farmers and farmer organizations at a subsidized price.	DEA
High cost of obtaining and maintaining Standards certificates	Provide incentives for stakeholders who wish to achieve quality standards.	DEA SLSI

Table 30: Recommendations to address the constraints of the farmers
Source: UNIDO-SL VC Analysis of PCN

10.2.2 Recommendations to Address Constraints of Intermediaries

(Particular emphasis on collectors, shops, wholesalers, government and non-government stakeholders)

Challenges	Recommendations	Related Institutions
Inadequate supply of spices due to seasonal variations and cultivation of spices are limited to few districts	- Encourage cultivation of spices by plantation companies, intercropping, and expand cultivation into the dry zone and other areas, including the North and the East. - Programmes to increase the productivity of existing crops.	DEA SAPPTA TRI Tea Board DOA
Inadequate supply of quality black pepper due to high demand for light berries with attractive prices at farm gate and willingness of farmers to sell light berries to earn "quick money."	- Promote harvesting of mature heavy berries through awareness campaigns highlighting the economic loss to the farmers and the economy by harvesting light berries. - Improve processing and storage facilities to reduce post-harvest damages. - Educate farmers, especially the pepper farmers, to manage their finances better so that they do not resort to picking light berries.	DEA
Poor hygienic conditions in processing, storage and transport	- Assistance to build/reconstruct processing facilities and buy equipment. - Promote proper storage and transport system protected from rain, sun, and excessive heat. - Establish central collecting/processing/ storage centres to improve the quality of spices. - Promote GMP.	DEA Spice Council SAPPTA
High labour cost for drying	Promote the use of mechanical drying by extending technical and financial assistance.	DEA
Less concern to assure the quality of the spices, lack of awareness of international standards and specifications	- Intensify the awareness programmes. - Strengthen and introduce new technologies for quality assurance and improvement of spices.	DEA ITI
High competition amongst collectors	- Make them aware of collecting quality products. - Shorten the supply chain by getting the farmers to sell directly to wholesalers and exporters, using formal contractual arrangements.	Spice Council Farmer Organizations DEA
High cost of obtaining and maintaining standards and certificates	- Provide incentive schemes for stakeholders who wish to achieve quality standards. - Cost/benefit analysis and analysis on return on investment.	DEA SLSI

Challenges	Recommendations	Related Institutions
Lack of awareness of the importance of obtaining and maintaining standards	- Improving the capacity of public extension services, especially on GMP and modern techniques. - Introduce mandatory quality and safety standards and implement them throughout the spice value chain.	DEA SLSI SAPPTA Spice Council
Weak linkage with the large buyers and exporters	- Increase access of local traders to large buyers. - Explore market opportunities for spices at the international market. - Increasing awareness on value additions for the international market. - Improving the linkage of the intermediaries with the producers and processors/exporters. - Introducing improved drying techniques instead of sun drying and other unhygienic traditional drying practices. - Promote knowledge and skill on post-harvest technology.	DEA EDB

Table 31: Recommendations to address the constraints of the farmers
Source: UNIDO-SL VC Analysis of PCN

10.2.3 Recommendations to Address Constraints of Processors and Exporters

Challenges	Recommendations	Related Institutions
Inadequate amount of supply of spices and predominantly black pepper to meet the international demand.	- Increase the productivity of the existing crop. - Promote value addition rather than bulk exports; development of new products. - Research and development efforts need to be stepped up to enhance the use of spices in both food and non-food sectors. - New food products should seek to take advantage of the trend towards "hot" and ethnic foods. - In the non-food sector, the intrinsic properties of spices (medicinal, insecticidal, anti-bacterial, etc.) should be investigated comprehensively to develop new products for the market.	DEA SAPPTA ITI
High market concentration (India, Europe, Pakistan, USA) & high competition from traditional spice producers/exporters	- Branding of Sri Lankan PCN spices at the country and individual level. - Conduct promotional activities to diversify and enter new markets. - Exporters should be encouraged to look beyond India into other markets; equal attention must be paid to both light and heavy berries markets. - There has been a significant growth in some new markets, including China, central European countries, and the Middle East. These and other new markets should focus on a concerted campaign to improve consumption.	SLEDB Spice Council

Challenges	Recommendations	Related Institutions
Quota on pepper exports under ISLFTA	Removal or renegotiation of pepper quota.	SLEDB Department of Commerce
Exporters have little or no direct involvement in cultivation	Encourage backward integration of exporters.	DEA SLEDB SAPPTA
Inadequate supply of quality spice products due to low standards	- Buy directly from farmers and process according to export/buyer requirements. - Implement quality and safety standards at the production and processing stages of the spice value chain. - Set up steam sterilization treatment plants for use by exporters.	DEA SAPPTA Spice Council
Quality standards of developed countries can act as a trade barrier	- Implement mandatory standards for spice exports to prevent adulteration, thereby ensuring the quality of Sri Lankan spices whilst encouraging good agricultural and manufacturing practices upstream in the value chain. - Ensure access to markets in developed countries and meet their expectations, continued emphasis on improving the quality of products exported and processes have to be continued. - In addition to the traditional quality considerations relating to grading and physical cleanliness, attention must be paid to the spice products' microbiological and chemical safety. - Awareness of spice growers, traders and processors of the quality requirements of importing countries. - Need to improve and encourage stakeholders to put in place quality systems such as GAP/ GMP/ HACCP/ ISO 22000.	SLEDB/SLSI/ Spice Council/ SAPPTA DEA
High cost and inadequate technology/facilities to extract essential oils	Encourage export-oriented foreign direct investment into the sector to encourage oil extraction units at a commercial scale close to the cultivation area.	DEA BOI
Inadequate testing capabilities of local laboratories to meet emerging stringent requirements	Invest in advanced testing equipment, which can detect low limits of pesticides, aflatoxins, ochratoxins, etc., to export to more developed markets.	ITI SLSI
Lack of market research at the international level	Conduct market research to identify new markets and expand existing markets.	SLEDB

Challenges	Recommendations	Related Institutions
Major markets limited to India, USA, and EU	- Strengthen promotion campaign on spice brand products at the international market. - Strengthen brand promotion campaigns.	SLEDB
Insufficient promotional activities in the international market	- Develop promotional campaigns for spice industry through electronic and print media. - Trade Mark registrations. - Establish a mechanism to obtain Geographical Indications.	SLEDB NIPO
Lack of research undertaken to measure end market requirements	Conduct market research to identify new markets and expand existing markets for spices.	SLEDB
High cost of obtaining and maintaining standards certificates	Provide incentive schemes for stakeholders who wish to achieve quality standards.	DEA SLEDB SLSI
High market concentration towards low end markets such as India and Middle East	- Exploring (market research) the market potential in high-end markets such as the USA, UK, European Union and Australia and conducting promotional activities for Sri Lankan spices in such markets. - Promote value-added exports such as oil and oleoresins rather than bulk exports.	SLEDB ITI
Lack of value addition, product development and modern technology	- Investments in demand-driven research on value-added products and technology development; link research institutes with the industry to disseminate research outcomes. - Encourage own research by private companies. - Increasing awareness on value additions among the processors and exporters for international markets.	DEA SLEDB ITI Spice Council

Table 32: Recommendations to address constraints of processors and exporters
Source: UNIDO-SL VC Analysis of PCN

10.3 The Validation Workshop

Introduction: The validation workshop was organized as part of a project preparation grant (STDF/PPG/721) from the World Trade Organization (WTO) Standards and Trade Development Facility (STDF) to strengthen food safety and quality compliance for select Sri Lankan spices through the application of traceability solutions. The workshop validated the assessment report and the developed project proposal.

Hosting partners: STDF and UNIDO.

Title of the event: “Strengthening the export-oriented quality performance of the spice sector through quality schemes, digitalization and cluster development.”

Venue and date: Friday, 04 November 2022, from 09:00 AM – 01:00 PM GMT (Colombo) at GF06 hall, Galle Face Hotel, No.02, Galle Road, Colombo 03, Sri Lanka.

Participants: The participants of the validation workshops were selected based on their experience and involvement in the PCN value chain. A variety of stakeholders in both the public and private sectors and

academia were invited to the workshop, with many in attendance (participant list attached as Annex).

Meeting room setup: The standard meeting room for the workshop included five round tables with 10 seats each, a head table, and a podium to make presentations, and a laptop was provided to each table with a zoom connection enabling virtual participants to interact.

Moderator: Mr. Sampath Senanayake, National Agribusiness Specialist, UNIDO, functioned as the moderator and briefed everyone on the format of the session and how it would be conducted.

Feedback and results: Recommendations to be included in the project document.

Proceedings:

The opening session was chaired by Ms. A. P. P. Disna, the Director General of the Department of Export Agriculture, Mr. Sarada de Silva of the Spice Council and Dr. Jairo Villamil Diaz, International Senior Specialist of UNIDO.

Ms. Pamela Sumithrarachchi, National External Relations Advisor – UNIDO, welcomed all the participants to the workshop. The introductory speech included how the initial request for financial support towards the Sri Lanka spice sector was made by Mr. Sarada de Silva of The Spice Council (TSC), and explained how this program was initiated. The keynote address on “National outlook on priorities and spice sector development” was delivered by Ms. A.P.P. Disna, Director General – Department of Export Agriculture. The value chain analysis, key takeaways and recommendations was delivered by Mr. Sampath Senanayake, National Agribusiness Specialist – at UNIDO and Dr. Jairo Villamil Diaz, International Senior Specialist-UNIDO. At the end of the presentations, Dr. Jairo from UNIDO gave a summary of the full exercise carried out by UNIDO in developing the proposal with the support of the DEA and the way forward on the day’s program.

A time of questions and discussion followed the presentations, and participants discussed various points of interest from the presentations. Their comments were recorded, and modifications were made to the report based on all the issues raised by the workshop participants.

Dr. Jairo also welcomed other comments from participants on the assessment report and the project proposal. Participants were then divided into five groups to discuss the questionnaires, which were distributed.

After a lively discussion, the rapporteur of each group reported on their discussions, which are reflected in the revised project proposal document. All participants were allowed to comment on the presentations of each group.

Plenary Session 1 – VC Methodology & Key Takeaway

Group 01

Question

Alongside pepper, cultivating other crops, such as cloves and nutmeg, is recommended. What are effective means to increase their collective production?

Answers

- New plant varieties should be introduced, and more planting materials to be distributed;
- Replanting should follow correct cultivation practices, and authorities should have a method to distribute materials related to identified gaps;
- Introduce better zones for cultivation;
- GAP, GMP and traceability systems to be introduced to the spice sector;
- Soil conditions should be improved where quantity and quality could be developed;
- Should focus on training to improve the product quality as quantity is not the best criterion;
- Farmers should be trained, as pepper cultivation needs more skilled labourers, otherwise, most of the profit will have to be allocated to find skilled labour;
- Extend training facilities at the Cinnamon Training Academy to other spices;
- Look into the possibility of introducing mechanical plucking systems;
- Harvesting of cloves needs skilled labour. Since manual harvesting is required for clove harvesting, training should be provided.

Comments

- PCN products are rain-fed, which greatly affects productivity and quality; hence, good irrigation systems must be introduced;
- 85%-90% of the nutmeg production is from the Kandy district, which can also be cultivated down south; we should look into this possibility. The DEA successfully started a program to cultivate pepper and cinnamon in Anuradhapura and Polonnaruwa areas;
- In terms of quality, Badalkumbura and Matale areas are best for growing pepper. Central processing facilities need to be introduced while zoning the products.

Group 02

Question 1

How would you overcome the current trend towards low quality, which results in low-value addition in the chain?

Question 2

What are your proposals to improve food safety & quality and the implementation of related international standards?

Answers Q1

- Attitude changes in all key players, including exporters, as they are reluctant to pass information to farmers/producers;
- Quality starts from the farmer level, and consumer requirements should be passed on to farmers/producers;
- System certification should start from the farmer level aiming at high-end markets and value-added products;
- Farmers and processors should gain an equal share of the profit as the exporter;
- The government should only play the custodian role as a policymaker, and the private sector needs to drive the chain;
- Strong ties between the private and public sectors should be maintained.
- One policy for all products should be implemented;
- GAP and, GMP, HACCP should be followed accordingly.

Answers Q2

Small farmers are not using ISO standards hence GAP for farmers and GMP for processors to be introduced.

Comments

- One particular standard should be maintained (the same should be done during training);
- National awareness should be increased in improving quality (in general);
- Should not overuse fertilizer;
- Digital Apps' to communicate the prices;
- Setting up a premium price for products is important.

Group 03

Question

What are short and long-term solutions to quality-related price differentiation and overcoming price instability?

Answers

- Sri Lankan spice trade is 30-40% higher than the rest of the world because of the Indo- Sri Lanka Free Trade Agreement;
- Food standard regulations should be improved;
- The majority of the segregation of the product happens at the final stage; therefore, it is better to segregate them from the initial stage;
- The farmer doesn't realize the price fluctuations penetrating the global economy;
- General pricing scale: there is a delay in points going to the ground level.

Group 04

Question

What are your proposals to address upstream constraints to quality compliance, improve farmers' bargaining power, and shorten the length of the chain?

Answers

- As there is a knowledge gap, the farmers need to be educated to bridge the gap and thereby improve product quality;
- Farmers sometimes do not attend these training; instead, they send a family member (especially their wives) to participate on their behalf, which sometimes turns out to be someone who is not involved in the farming process;
- Therefore, the team suggested providing a certificate during this training, and this certificate needs to be considered when buying products so that the farmers may adhere to the quality;
- Central service facilities adhering to quality standards;
- The USAID once supported the Matale District with a central drying facility where people can come and get their products dried by paying the price per kilogram. Because of this facility, farmers did not need to purchase drying equipment. Instead, they were able to dry their crops and produce high-quality products for the market. Experience proves that providing a facility on a free-of-charge basis is not successful, so exporters introduce central service facilities by charging a nominal value per kilogram;
- There is a knowledge gap among farmers on the amount of moisture levels to be maintained. The middlemen get most of the profit from these products while the farmer gets a smaller portion;
- A digital app should be developed for farmers to communicate with the consumers resulting in direct contact with the buyer;
- The establishment of storage or technical facilities could be improved by getting private logistic companies involved in the process;
- The adulteration process takes place when middlemen are involved;

- The DEA can play a critical role in working with these intermediaries so that the farmers will get the premium;
- The farmer will be more empowered if the country has regional laboratory facilities;
- Mobile laboratories at affordable prices for the small farmers;
- Village-level auctions can be held for farmers to gain more revenue.

Comments:

- Intermediaries will play a major role in adulteration hence eliminating the middleman from the process;
- 30% – 40% of the cloves production is from the Kegalle district and harvesting is done in April-May. Within a day, harvesting is done for about 5000 kg. However, sufficient drying facilities should be established since there are no drying facilities.

Group 05

Question

Question: What are some effective cluster-based marketing techniques and market access initiatives that the private sector and the government should support?

Answers

- High-end markets – farmers and processors are not aware of the quality requirements, and awareness of voluntary and compulsory certifications is needed;
- Farmers need the GAP certification, but getting the certification is expensive;
- Pre-inspection schemes are necessary;
- SLSI has funds available under the scheme, which is operated under the Ministry of Industries, and SMEs can apply under the same. Processors need the GMP government sponsorships are available to receive this;
- Even though India is a spice hub, Sri Lanka maintains high quality. Penalties for poor-quality products must be imposed while introducing premiums for high-quality products.

Comments

- At present, context quality and standards are very strong requirements of the EU market. The German market is planning for a CSR standard to be made compulsory and the UK market is aiming for a standard on shortening the VC, and these areas should be looked into for the years 2023 – 2024;
- Two weeks' waiting time for the export inspection scheme had to be addressed.

Plenary Session 2 – Impact, related benefits, and expected contributions to the project implementation.

Group 01

Question

What are the most effective ways to mainstream the application of international standards throughout the value chain? Please explain your ideas after considering the ground realities.

Answers

- 3P's must be followed and standards should be mandatory for all;
- Identify the buyer's condition and act accordingly;
- Support the introduction of internationally or locally accredited labs;
- Traceability and price motivation are the areas to be supported;
- Must have continuous training for value chain actors;
- Processors/exporters should follow ISO 22000 and personal certification schemes.

Group 02

Question

What is the best modality for effective cluster coordination and development, and what services are most critical for the spice sector development?

Answers

- Farmers must adhere to standards;
- Promote one single standard for a product. The farmer automatically adopts the standards when no exporter or processor buys the product.

Group 03

Question

What would you do to bring a transparent and stable price mechanism based on quality parameters?

Answers

- Various pricing can be seen in the market, and the information farmers have sometimes is wrong;
- Actual information should flow to the farmer level;
- An indicative price should be set up;
- Spice council: LKR 300- 400 variation can be seen;
- Every Tuesday, the DEA collects information on prices and publishes it on its website in 14 districts.

Group 04

Question

How would you increase productivity, value addition, and product diversification?

Answers

- To increase productivity, a fair price should be divided among the players (from the total revenue);
- Farmers should be educated;
- Sellers could promote socioeconomic stories and spread them among everyone to add value to their products;
- Should educate the players about the trends in the market. For example, since spices are vegan, the labelling could be done likewise;
- The product should be identified differently (and then go for diversification);
- Hygiene and contamination.

Comments

- Stories behind farmers will be a very good promotional tool to promote PCN products. Eg.5S is in the culture of the Japanese and is a very good promotional tool;
- Packaging and product diversification are areas to look into;
- Should look at the current trends and work towards trends;
- Vegan products to be promoted as there is a big demand;
- Support and promote research and go for product identification.

Group 05

Question

How would you propose improving and implementing technology and technical methods and practices among value chain actors, especially farmers?

Answers

- Technology is a major driving force to increase the quality and the number of products. The farmers

must be trained to use new technology within their farming practices;

- The technology is already there, but the players do not use it for many reasons, including unawareness;
- The use of technology could be increased in the current context;
- Wherever possible, mechanization is necessary;
- Premium prices for quality products must be encouraged for others to adhere to quality.

The workshop indicated their overall agreement and validation of the assessment report and project proposal, with the expectation that it would be revised as suggested by the workshop.

The moderator provided a summary of the session at its conclusion, thanked the speakers for their presentations, and encouraged attendees to evaluate the session on the post-workshop aid memoire that will be sent to them.

Conclusions:

There was an excellent level of participation in the discussions by all present at the workshop, which resulted in a range of constructive comments, questions and suggestions that will be taken into account to update the project report. The participants also expressed strong interest in the proposed value chains, especially considering ever-growing quality concerns, export potential, present economic crisis, and global demand for spices.

Participants from the DEA expressed their interest in the approach adopted by UNIDO and indicated that they would be interested in following the development and working with UNIDO.

Finally, the participants fully endorsed the presented PCN spice value chain analysis with the inclusion of the additional features suggested during the workshop and strongly encouraged the UNIDO to move forward on to the next development phase as soon as possible.

A group photograph of the participants in the workshop was taken upon completion of the program.



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12 Appendices

Appendix 1: Sample Survey Questionnaire for Spice Farmers

Questionnaire for Spice Farmers

1. District (Mark only one oval)
☐ Kandy ☐ Matale ☐ Kegalle
2. Name
3. Address.....
4. Telephone Number.....
5. Email Address.....
6. What are the main crops do you cultivate? (Tick all that apply)
☐ Pepper ☐ clove ☐ Nutmeg ☐ Other spices ☐ Other Crops
7. How much of land do you cultivate? (Tick all that apply)

	NIL	Less than 1 acre	1- 5 acres	6 - 10 acres	Above 11
Pepper	☐	☐	☐	☐	☐
Cloves	☐	☐	☐	☐	☐
Nutmeg	☐	☐	☐	☐	☐
Other	☐	☐	☐	☐	☐
8. What are the main activities that you perform? (Tick all that apply)
☐ Cultivation ☐ Harvest ☐ Collect ☐ Storage ☐ Processing ☐ Direct export ☐ Indirect export
9. Where and whom do you sell your products? (Tick all that apply)
☐ Exporters ☐ Brokers ☐ Wholesalers ☐ Associations ☐ Shops ☐ Local collectors ☐ Others
10. What are your buyer's main requirements? (Tick all that apply)
☐ Quality ☐ Price ☐ Reliability ☐ Standards ☐ Other
11. Do you have a written contract/agreement with your clients/buyers?
☐ Yes ☐ No
12. Do your clients/buyers monitor your activities? (Tick all that apply)
☐ Yes ☐ No ☐ Sometimes
13. What do you require to comply with the buyers' requirements?.....
14. Do you know about the existing international/national standards and regulations affecting your business?
☐ Yes ☐ No
15. Are any of your products certified under various programmes? (Tick all that apply)
☐ ISO norms GAP ☐ GMP ☐ Organic ☐ Do not know any of above
16. Do you grade products according to quality?
☐ Yes ☐ No
17. If yes to the above question, what are these grades? And what are the selection criteria?.....
18. Have you faced rejection or price reduction from any of your supplies?
☐ Yes ☐ No
19. If yes, to the above question, please explain the reasons for rejection.....
20. Where do you obtain information / technical support with regard to standards?.....

21. Who provides support/service for your cultivation? (Tick all that apply)

- ☐ Government institutions such as DEA and DOA ☐ Non-Governmental Organisations ☐ Buyers ☐ Farmer Organisations ☐ Others

22. What are your immediate requirements? (Tick all that apply)

- ☐ Equipment ☐ Training ☐ Technical Expertise ☐ Other

23. What are the most serious challenges facing you/industry? (Tick all that apply)

- ☐ Quality planting material (QPM) ☐ Insects and Diseases ☐ Climate Change ☐ New agriculture technology ☐ Access to buyers ☐ Other

24. How can the government or other institutions help the spice industry or farmers to overcome these challenges?

25. Are there any other players in this value chain that you think we should talk to? If yes, could you give us few referrals?

26. Mobile number of the DEA official.....

27. Name of the DEA official

Appendix 2: Sample Survey Questionnaire for Intermediaries

Questionnaire for Spice Industry Intermediaries

1. District
Mark only one. ☐ Kandy ☐ Matale ☐ Kegalle
2. Name
.....
3. Designation
.....
4. Company Name
.....
5. Address
.....
6. Telephone Number
.....
7. Email Address
.....
8. Website
.....
9. What are the main activities that you perform?
Tick all that apply.
☐ Cultivation ☐ Harvest ☐ Collect ☐ Storage ☐ Transport
☐ Processing ☐ Direct Export ☐ Indirect export ☐ Other:
10. Number of employees?
Tick all that apply.

	NIL	1 - 10	11 - 25	26 - 50	51 - 100	101 - 500	501 - 1000	1001 +
Male	☐	☐	☐	☐	☐	☐	☐	☐
Female	☐	☐	☐	☐	☐	☐	☐	☐
Permanent	☐	☐	☐	☐	☐	☐	☐	☐
Temporary	☐	☐	☐	☐	☐	☐	☐	☐
11. Whom do you sell your products to?
Tick all that apply.
☐ Exporters ☐ Brokers ☐ Wholesalers ☐ Associations
☐ Other:
12. What are the main products and the quantities that you buy or sell per year?
Tick all that apply.

	NIL	1 - 100 MT	101 - 500 MT	501 - 1000 MT	1001 - 5000 MT	10001 - 50000 MT	50001 + MT
Pepper	☐	☐	☐	☐	☐	☐	☐
Cloves	☐	☐	☐	☐	☐	☐	☐
13. What are your buyer's main requirements that are most difficult to meet?
Tick all that apply
☐ Quality ☐ Price ☐ Reliability ☐ Standards
☐ Other:
14. Do you have a formal contract/agreement with your clients/buyers?
Mark only one
☐ Yes ☐ No
15. Do you receive any assistance or collaboration from your buyers?
Tick all that apply.
☐ Advances ☐ Credit ☐ Information ☐ Inputs ☐ Technical Assistance
☐ Other:
16. Do your clients/buyers monitor your activities? If yes, how do they monitor?
.....
17. What are the main problems do you have with regard to your suppliers?
Tick all that apply.
☐ Quality ☐ Price ☐ Standards ☐ Punctuality ☐ Volume
☐ Cost of collecting products ☐ Other:
18. What kind of help do you provide to your suppliers?
Tick all that apply.
☐ Inputs ☐ Seeds or Plants ☐ Credit ☐ Technical Assistance
☐ Other:

19. What type of information do you reiterate to your suppliers regarding your requirements?
Tick all that apply.
- ☐ Quality ☐ Quantity ☐ Grade ☐ Chemical Use ☐ Delivery dates
☐ Other:
20. What difficulties do your suppliers have in meeting your requirements
.....
21. What are the existing international/national standards and regulations affecting your business?
Tick all that apply.
- ☐ ISO norms ☐ GAP ☐ GMP ☐ Organic ☐ Fair Trade
☐ Other:
22. Do you grade products according to quality? If yes, what are these grades? And what are the selection criteria?
.....
23. Where do you obtain information with regard to standards?
.....
24. What specific problems did you experience in complying with the standards?
.....
25. Are any of the farmers you source from certified under various programmes?
Tick all that apply.
- ☐ ISO norms ☐ GAP ☐ GMP ☐ Organic ☐ Fair Trade
☐ Other:
26. What kind of support/service do you receive? Who provides them? Are these services useful?
.....
27. Do you have additional observations or comments that we have not discussed?
.....
28. What are your immediate requirements?
Tick all that apply.
- ☐ Equipment ☐ Training ☐ Technical Expertise
☐ Other:
29. What are the most serious challenges facing you/industry?
.....
30. How can the government or other institutions help the spice industry to overcome these challenges?
.....
31. Are there any other players in this value chain that you think we should talk to? If yes, could you give us few referrals?
.....
32. Name of the DEA official
.....
33. Mobile number of the DEA official
.....

Questionnaire for Private Associations

1. Name of Private Associations.....
2. Address / Location.....
3. Contacted Person.....
4. Name Designation.....
5. Contact Information.....
6. Telephone Number Email.....
7. Website Date established.....
8. What are the major objectives of your association?.....
9. Who are your beneficiaries?.....
10. What are the main benefits for its members/ stakeholders?
11. What are the main activities of the association?.....
12. How do you communicate information with your members/ beneficiaries?
☐ Telephone ☐ Email ☐ Post ☐ Other
13. How do you promote your association and your supports to this PCN sectors?
 Please pick the reason/s and give marks to them ("X"). Rank them according to your preference.
 (1,2,3...)

	Promotion Details	Give marks (1=least, 5= highest)					Rank
a)	By Advertising (Television, News Paper, web)	1	2	3	4	5	
b)	By Sales promotion	1	2	3	4	5	
c)	By social media (E.g.: - Face Book)	1	2	3	4	5	
d)	By Public Relations	1	2	3	4	5	
e)	By Sales Organization	1	2	3	4	5	

14. If you have any "other" option, please specify. (E.g.: - Referrals)

15. Do you monitor your member/beneficiaries' activities? YES/ NO
 Please mention the reason/s or how.....
16. What are the most serious challenges in the PCN sectors?

17. Is there any potential to value addition for the 3 products (PCN)? Yes/No:
 If yes.....
18. What is the potential for value addition to the 3 products (PCN)?

19. What prevents from adding value to the products in the PCN sectors?

20. Do you know the standard available for this PCN sectors? Yes/No:
 If yes;.....
21. What are the existing international/national standards and regulations affecting your
 business? (E.g.: ISO norms, GAP, GMP, organic, fair trade, etc.)
 International.....
 National.....

22. What are the advantages and disadvantages with standards?

No	Advantages	Disadvantages

23. Are there any comments for regulations/standards formulated by the government and private sector for the development of the PCN sectors? Yes/No

If yes;

24. What are factors that affected the for the development of the PCN sectors?

.....

25. What are the factors that affect to promote the PCN products exports/sells - Production Process Details? *Please pick the reason/s and give marks to them("X"). Rank them according to your preference. (1,2,3...)*

	Production Process Details	Give marks (1=least, 5= highest)					Rank
a)	Quality production with general standards	1	2	3	4	5	
b)	Way of deliver to exporter.	1	2	3	4	5	
c)	Used ISO standards	1	2	3	4	5	
d)	Used Organic certifications	1	2	3	4	5	
e)	Have traceability	1	2	3	4	5	
f)	Phytochemical analysis	1	2	3	4	5	

- a. If you have any "other" option, please mention those. (E.g.: - Any Other Certificates)

.....

26. What are the factors that affect to promote the PCN sectors exports/sells - Physical Evidence? *Please pick the reason/s and give marks to them("X"). Rank them according to your preference. (1,2,3...)*

	Physical Evidence	Give marks (1=least, 5= highest)					Rank
a)	Interface of product-Packaging	1	2	3	4	5	
b)	Interface of product- Labelling	1	2	3	4	5	
c)	Internet/web pages /web cites	1	2	3	4	5	
d)	Paperwork (such as invoices, tickets and dispatch notes)	1	2	3	4	5	
e)	Brochures, Business cards	1	2	3	4	5	
f)	Uniforms and employee dress	1	2	3	4	5	

- a. If you have any "other" option, please mention those. (E.g.: - Handouts)

27. Does the PCN sectors grade products according to quality? Yes/No:

If yes:

28. What are these grades? And what are the selection criteria?

No	Grade	Selection criteria

Please specify?.....

29. Have you noticed any changes in the natural resources as a result of production of these different spices (PCN)? (Damages to bio-diversity, soil quality depletion, soil erosion, landslides, etc.) Yes/No
If yes;.....

30. What are the changes in the natural resources?.....

31. Are there any government policies/laws/regulations that are helpful to your business? Yes/No
If yes;

32. What are the policies/laws/regulations that are helpful?.....

33. Are there any changes of those that you would suggest to improve the PCN sectors? Yes/No:

If yes;.....

34. What changes would be helpful?.....

35. Who are the most important people according to you to develop this industry?

	Stakeholders	Give marks (1=least, 3= highest)			Rank
a)	Exporters	1	2	3	
b)	Brokers/ Agent	1	2	3	
c)	Trader/dealer	1	2	3	
d)	Farmers /Producers	1	2	3	
e)	Government Institutes	1	2	3	
f)	Private Institutes	1	2	3	
g)	Brand ambassadors	1	2	3	
h)	Marketing Persons	1	2	3	

a. If you have any "other" option, please mention those. (E.g.: - Government)
.....

36. Please mention three key players in this value chain that you think we should talk to?
.....

37. Do you have additional observations or comments that we have not discussed regarding this PCN sectors? Yes/No
If yes;.....
Please specify?.....

Introduction

An Integrated Value Chain Analysis for Quality Competitiveness of Export-Oriented SPICES in Sri Lanka. Strengthening food safety and quality compliance for select Sri Lankan spices (Pepper, Clove, Nutmeg) through the application of traceability solutions.

A project of The Standards and Trade Development Facility (STDF) and implemented by United Nations Industrial Development Organization (UNIDO).

Objectives of the Questionnaire

The spice sector faces a number of critical and distinct food safety challenges, which led to export rejections and the ability to access export markets. Most Sri Lankan smallholders lack traceability-related techniques/technologies and often struggle to demonstrate compliance with international standards. The purpose of the survey is to consult framers and stakeholders in Sri Lanka to incorporate their insights on where intervention would be appropriate/beneficial to ensure alignment with national development priorities and to enhance ownership of the resulting project.

Data Protection

In submitting this form, I agree to my details being used for the purposes of value chain development of Sri Lankan spices. The information will only be accessed by necessary STDF and UNIDO staff. I understand my data will be held securely and will not be distributed to third parties. I understand that when this information is no longer required for this purpose, official UNIDO procedure will be followed to dispose of my data.

Questionnaire for Government Institutions

1. Name of the Government Institution
2. Address / Location.....
3. Name of the contact person and designation.....
4. Telephone number.....
5. Email.....
6. Website.....
7. What spice does your institution work with primarily?
☐ Nutmeg ☐ Pepper ☐ Cloves ☐ All of the above
8. What are the main objectives of the Institution/ Association with regard to the Pepper, Clove and Nutmeg (PCN) spice sector development?
.....
9. What are the main activities of the Institution/Association when it comes to the spice sector development? If other, please specify.

☐ Trade and investment support	☐ Coordination and implementation	☐ Knowledge-based technical assistance	☐ Engaging in collaborative activities with stakeholders	☐ Capacity building for farmers
---	--	---	---	--

☐ Other
10. What are some of the pressing challenges for the Pepper, Clove and Nutmeg (PCN) spice industries? Please include the relevant spice name and then the relevant challenges.
.....
11. What is the potential for value addition in the specific spice industry?
☐ Extremely low ☐ Relatively low ☐ Extremely high ☐ Relatively high ☐ Other
12. What prevents from adding value to spice-based products in your opinion?
.....

13. How do you communicate information with relevant members/beneficiaries? Please provide each specific beneficiary and then the relevant form of communication (emails/newsletters/media platforms/ other)
.....
14. Do you provide any assistance to your members/beneficiaries? (Please specify if Yes or No, if yes, please provide a brief description below on what kind of assistance)
.....
15. Do you monitor your members/beneficiaries' activities? (If yes please provide a brief description below on what how you monitor them)
.....
16. Does the industry grade Pepper, Clove and Nutmeg products according to quality? (If yes, what are these grades? And what are the grading selection criteria?)
.....
17. How do you inform / create awareness about the applicable standards among beneficiaries?
.....
18. In your opinion, what are the advantages associated with standards in the PCN industries?
.....
19. How is your government institution/association involved in the Pepper, Clove and Nutmeg spice sector development?
.....
20. In your opinion are there any challenges in the current regulations/standards formulated by the government and private sector for the development of spice sector?
.....
21. Have you noticed any implications on the environment as a result of production of different spices? (Damages to bio-diversity, soil quality depletion, soil erosion, landslides, etc.) If yes, please provide a brief description below.
.....
22. What support services / incentives are given to small-scale farmers growing Pepper/Cloves/Nutmeg through your institution/association?
.....
23. Are there any improvements or changes by the government that you would like to see in any of the current policies/ laws/regulations pertaining to the selected spices?
.....
24. Do you have additional observations or comments on anything we have not discussed?
.....
25. Specify 3 other people with relevant organizations including contact details that you think will be able to provided more information on PCN products.
.....
26. Please provide any additional suggestions for improvement on supply of high-quality pepper, cloves and nutmeg.
.....

Questionnaire for Exporters

1. Email
2. Company Name
3. Name
4. Designation
5. Contact Number
6. Website
7. Which of the following best describes the structure of your business?
 - ☐ Sole Proprietor ☐ Partnership ☐ Limited Liability Company
 - ☐ Other:
8. Which of the following best describes the (primary) spice sector in which your business operates?
 - ☐ Pepper ☐ Clove ☐ Nutmeg
9. From which type of suppliers do you currently buy the most of your product?
 - ☐ Individual Producers ☐ Associations (groups) of producers ☐ Intermediaries
10. Please indicate how many suppliers from each category below

	1 - 5	5- 10	more than 10
Individual producers	☐	☐	☐
Associations (groups) of producers	☐	☐	☐
Intermediaries	☐	☐	☐
11. How many years have you been exporting?
 - ☐ Less than 1 yr ☐ 1 to 5 years ☐ 5 – 10 years ☐ More than 10 years
12. How many people (full-time equivalent) do you employ?

	Less than 1 yr	1 to 5 years	5 – 10 years	More than 10 years
Male	☐	☐	☐	☐
Female	☐	☐	☐	☐
13. What do you consider the main barriers to selling your goods and/or services to foreign customers? (Tick all that apply)
 - ☐ Regulatory barriers/complexity ☐ Can't get financing to offer foreign customers ☐ Obtaining visas and work permits
 - ☐ Unaware how to utilize free/foreign trade agreements ☐ Insufficient protection of intellectual property rights (patents, copyrights, trademarks) ☐ Too costly
 - ☐ Other
14. On a scale of 1 to 10, with 10 being the most difficult, how difficult was entering the exporting arena for your business? (Please circle your answer)

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----
15. Would you be willing to adapt your product and/or packaging to better suit foreign markets?
 - ☐ Yes ☐ No ☐ Maybe

16. Does your company have adequate knowledge and capability to customize your product and its packaging in order to meet foreign market demands and cultural preferences?

- ☐ Yes ☐ No ☐ Maybe

17. What factor(s) is necessary to increase local procurement ratios of raw and packaging materials? (Tick all that apply)

- ☐ Quality improvement by local suppliers ☐ Localisation of inspection and technological certification control ☐ transportation infrastructure ☐ Other
- ☐ Strict observance of delivery dates by local suppliers ☐ Improvement in the local logistical and divisions

18. Is your company's website capable of processing international orders?

- ☐ Yes ☐ No ☐ Maybe ☐ Don't have a website

19. How many countries are you exporting to?

- Less than 5 5 -10 More than 10

20. What is the primary distribution channel you use to sell your exported goods/services?

- ☐ Direct - Sales team or Internet ☐ Sales Agent / Manufacturer's Representative ☐ Consultant / Export Management Company
- ☐ Wholesaler/ Distributor ☐ Dealer ☐ Other

21. How would 'Free Trade Agreements' with the other countries (India, Pakistan) and Preferential Trade Agreements with the EU (GSP +) ease cost and complexity when exporting?

- ☐ Significantly ☐ Minimally ☐ Don't know
- ☐ Somewhat ☐ Not at all
- ☐ Any Free Trade Agreements/ Preferential Schemes

22. Which of the following has your company benefited from as a result of free trade agreements? (Tick all that apply)

- ☐ Access to new foreign markets ☐ technical regulations ☐ Access to new investment opportunities
- ☐ Opportunity to expand existing export operations ☐ Access to foreign government contacts ☐ Other
- ☐ Access to foreign standards and

23. What are the existing international/national standards and regulations affecting your business? (Tick all that apply)

- ☐ ISO Norms ☐ GAP ☐ GMP
- ☐ The Company has obtained required standards and is complying with necessary regulations
- ☐ Other

24. From where do you usually obtain information with regard to standards?

25. Do you have a “traceability system” (ability to trace all processes from procurement of raw materials to production, consumption and disposal) already in place? If not, please tick all that apply.

- | | |
|---|--|
| ☐ My business is too small to need traceability | ☐ I do not have the financial resources to implement traceability |
| ☐ I do not have the knowledge or expertise to implement traceability | ☐ other |

26. Do you currently have adequate personnel and infrastructure to support the traceability process?

- ☐ Yes ☐ No ☐ Maybe

27. Why do you think a traceability system is necessary in your business operation? (Tick all that apply)

- | | |
|--|---|
| ☐ To comply with government regulations | ☐ To manage legal liability risk |
| ☐ To comply with customer requirements | ☐ To gain competitive advantage |
| | ☐ To prepare for product recall |

28. Have any spice exports been rejected/returned due to non-compliance with standards?

- ☐ Yes ☐ No

a. If yes, provide reasons why?

29. What kind of government policy changes would you like to see for exporters in the future? Please provide details below.

.....

30. Please provide a referral of a similar exporter/s

.....

31. Do you have any additional observations or suggestions to increase spice exports? Please, provide your feedback below.

.....



District	Pepper	Cloves	Nutmeg	Other
Kandy	29	6	14	22
Kegalle	37	36	19	15
Matale	27	9	4	12
Total	93	51	37	49

Appendix 6 : Major spice crops cultivated by number of farmers
Source: UNIDO-SL VC Analysis of PCN

District/Extent (Acres)	Less than 1 acre	1 - 5 acres	6 - 10 acres	Above 11 acres
Kandy	20	14	2	0
Kegalle	33	37	0	0
Matale	6	12	5	2
Total	59	63	7	2

Appendix 7 : Extent of land under pepper, cloves and nutmeg
Source: UNIDO-SL VC Analysis of PCN

District/Activity	Cultivation	Harvesting	Collecting	Storage	Processing	Direct Exports	Indirect Export
Kandy	30	31	7	7	5	0	6
Kegalle	41	37	11	11	7	0	0
Matale	33	35	9	12	8	0	8
Total	104	103	27	30	20	0	14

Appendix 8 : Main activities performed by farmers
Source: UNIDO-SL VC Analysis of PCN

District/Buyers	Exporters	Brokers	Wholesalers	Associations	Shops	Local Collectors
Kandy	3	2	20	0	12	16
Kegalle	4	1	33	1	9	15
Matale	2	7	23	1	4	6
Total	9	10	76	2	25	37

Appendix 9: Buyers of the products from the farmers
Source: UNIDO-SL VC Analysis of PCN



District/Requirement	Quality	Price	Reliability	Standards
Kandy	33	11	14	25
Kegalle	37	20	6	20
Matale	19	23	3	20
Total	89	54	23	65

Appendix 10: Main requirements of the buyers when purchasing from farmers
Source: UNIDO-SL VC Analysis of PCN

District/ Awareness of standards	Yes	No
Kandy	17	18
Kegalle	14	27
Matale	10	25
Total	41	70

Appendix 11: Awareness of standards and regulations by farmers
Source: UNIDO-SL VC Analysis of PCN

District/Certifications	ISO	GAP	GMP	Organic	Do not know
Kandy	0	1	0	11	23
Kegalle	0	4	0	9	29
Matale	2	0	0	8	25
Total	2	5	0	28	77

Appendix 12: Product certifications by farmers
Source: UNIDO-SL VC Analysis of PCN

District/ Grade according to quality	Yes	No
Kandy	12	23
Kegalle	16	25
Matale	10	25
Total	38	73

Appendix 13: Product grading according to quality by farmers
Source: UNIDO-SL VC Analysis of PCN



Activity	Responses
Cultivation	11
Harvesting	12
Collecting	28
Storage	18
Transport	13
Processing	10
Direct Export	3
Indirect Export	6
No Comment	1
Total	100

Appendix 14 : Intermediary activities
Source: UNIDO-SL VC Analysis of PCN

Type of Support	Percentage %
Credit facility	32
Technical support	24
Inputs	22
Seeds/plants	3
Reasonable price	11
Fertiliser	1
No comment	5
Cash purchase	1
Total	100

Appendix 17 : Support provided to the suppliers by intermediaries
Source: UNIDO-SL VC Analysis of PCN

Type of Certification	Responses	Percentage %
ISO	0	0.00
GAP	1	1.67
GMP	0	0.00
Organic	11	18.33
Fairtrade	6	10.00
No Certification	42	70.00
Total	60	100

Appendix 15: Systems certifications
Source: UNIDO-SL VC Analysis of PCN

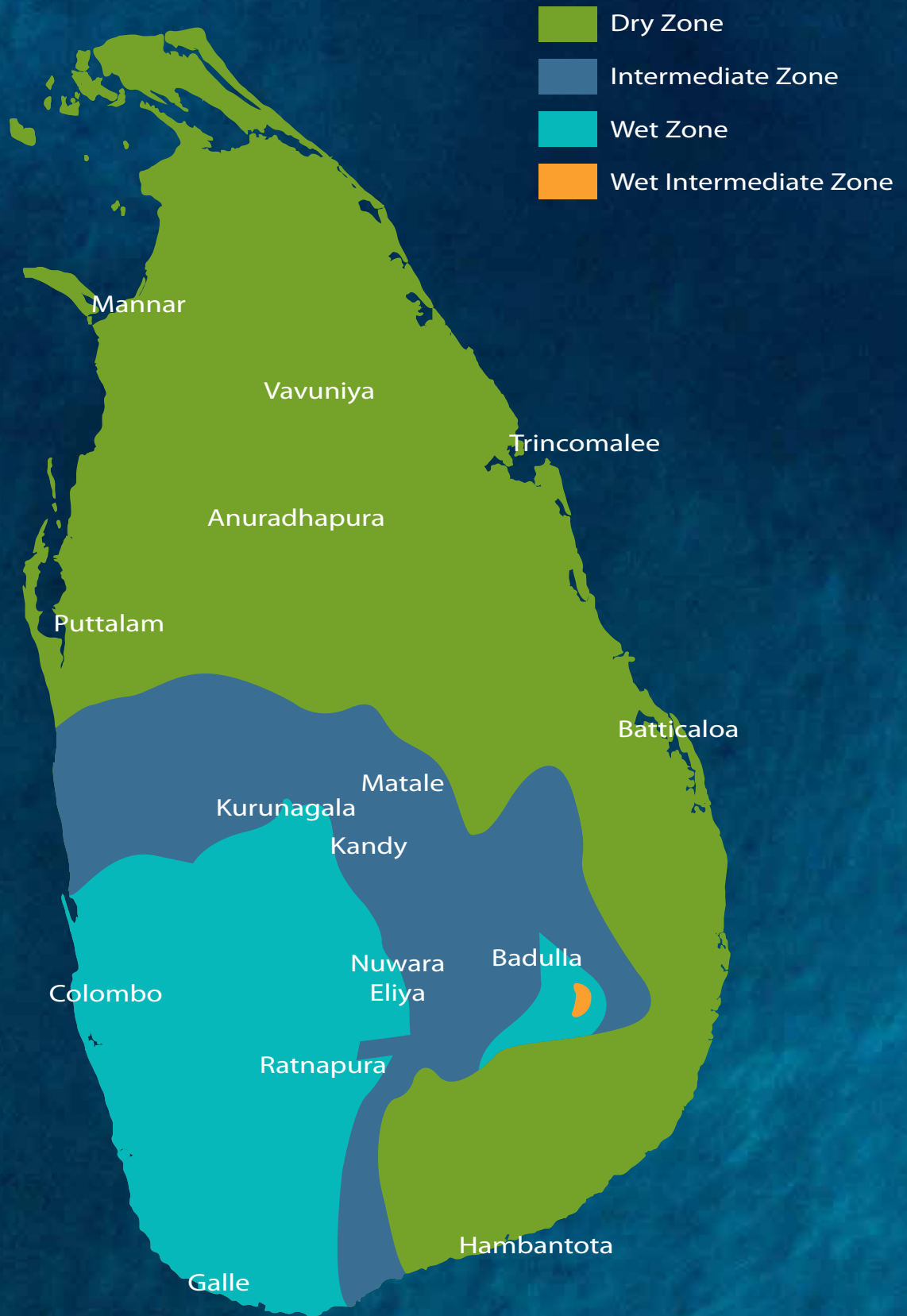
Information	Responses	Percentage %
Quality	59	64
Quantity	6	7
Grade	15	16
Chemical Use	8	9
Delivery dates	3	3
Noting	1	1
Total	92	100

Appendix 16 : -Most critical information required by the intermediaries
Source: UNIDO-SL VC Analysis of PCN

Requirement	Responses	Percentage %
Equipment	52	50
Training	21	20
Technical Expertise	24	23
Financial Assistance	4	4
Certifications	1	1
None	2	2
Total	104	100

Appendix 18 : Requirements of the intermediaries
Source: UNIDO-SL VC Analysis of PCN

Agro-ecological zone



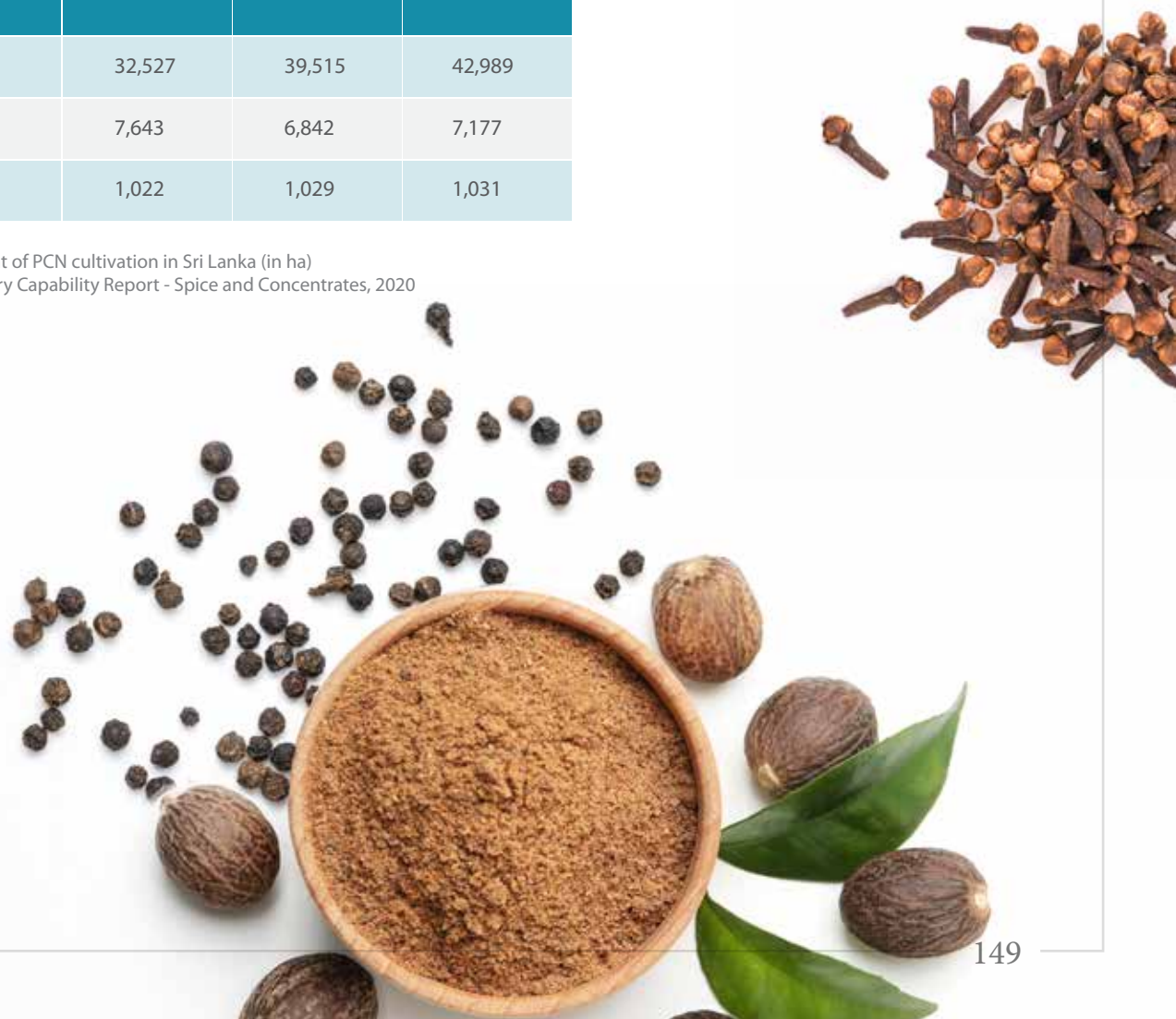
Appendix 19: Agro-ecological zones in Sri Lanka
Source: Researchgate.net

Spice	Areas	Season	Commercial Grades	Price Range (Rs)	SL Position	SL Share	Major Markets
Pepper	Matale, Kandy, Kegalle, Ratnapura, Gampaha, Badulla, Monaragala, Hambantota	August, September	GR1 GR2 White Pepper	900.00 – 1100.00 800.00 – 1000.00 1,800.00 – 2,000.00	13	1.6	India, Germany, USA
Clove	Matale, Kandy, Kegalle, Gampaha, Matara	March, April	n/a	1,100.00 – 900.00	7	3	India, USA, UK, Saudi Arabia
Nutmeg	Matale, Kandy, Kegalle, Nuwara Eliya, Badulla	September, October	No 1 No 2 BWP	600.00 550.00 450.00	6	3.2	Japan, UK, EU, Pakistan, Singapore

Appendix 20: Pepper, Cloves and Nutmeg – Areas of cultivation, commercial grades, price ranges, and major foreign markets
Source: EDB Industry Capability Report - Spice and Concentrates, 2020

Spice Crop	2015	2016	2017
Pepper	32,527	39,515	42,989
Cloves	7,643	6,842	7,177
Netmeg	1,022	1,029	1,031

Appendix 21: Extent of PCN cultivation in Sri Lanka (in ha)
Source: EDB Industry Capability Report - Spice and Concentrates, 2020



HS code	Product Label	Exported value in 2013	Exported value in 2014	Exported value in 2015	Exported value in 2016	Exported value in 2017
090411	Pepper of the genus Piper, neither crushed nor ground	125,357	66,201	139,568	68,052	79,126
090412	Pepper of the genus Piper, crushed or ground	2,215	2,935	4,050	4,241	4,632

Appendix 22: Pepper exports from Sri Lanka (Value in USD thousand)

Sources: ITC calculations based on UN COMTRADE statistics.

HS code	Product Label	Exported value in 2017	Exported value in 2018	Exported value in 2019	Exported value in 2020	Exported value in 2021
090710	Cloves, whole fruit, cloves and stems, neither crushed nor ground	46,592	-	29,240	15,872	36,494
090720	Cloves, whole fruit, cloves and stems, crushed or ground	387	-	738	1,087	646

Appendix 23: Clove exports from Sri Lanka (Value in USD thousand)

Sources: ITC calculations based on UN COMTRADE statistics.



HS code	Product Label	Exported value in 2013	Exported value in 2014	Exported value in 2015	Exported value in 2016	Exported value in 2017
090811	Nutmeg, neither crushed nor ground	13,940	12,956	9,463	9,553	9,205
090821	Mace, neither crushed nor ground	4,853	3,383	3,552	2,340	3,980
090812	Nutmeg, crushed or ground	1,770	1,805	1,751	1,452	1,042
090822	Mace, crushed or ground	313	478	285	119	195

Appendix 24: Nutmeg exports from Sri Lanka (Value in USD thousand)

Sources: ITC calculations based on UN COMTRADE statistics.

Importers	Exported value in 2017	Exported value in 2018	Exported value in 2019	Exported value in 2020	Exported value in 2021
World	85,132	-	47,635	54,697	124,459
India	63,670	-	33,839	42,282	109,041
Germany	6,907	-	6,675	5,241	6,602
United States of America	5,238	-	1,028	1,346	1,226
United Arab Emirates	1,458	-	156	566	963
Spain	38	-	458	618	785
Australia	526	-	300	532	677
Netherlands	595	-	515	311	514
Belgium	186	-	229	152	387
Maldives	722	-	410	207	358
France	310	-	426	225	353

Appendix 25: Countries importing pepper from Sri Lanka (value in USD thousand)
Sources: ITC calculations based on UN COMTRADE statistics.



Importers	Exported value in 2017	Exported value in 2018	Exported value in 2019	Exported value in 2020	Exported value in 2021
World	46,980	-	29,978	16,959	37,140
India	25,396	-	18,645	7,776	19,469
United Arab Emirates	2,085	-	1,746	336	4,379
United States of America	2,013	-	1,650	2,061	2,153
Germany	1,679	-	735	978	1,693
Saudi Arabia	2,303	-	1,116	1,661	1,592
France	141	-	504	341	896
United Kingdom	800	-	575	749	705
Dominican Republic	252	-	75	0	658
Türkiye	477	-	148	529	489
Mexico	194	-	0	0	454

Appendix 26: Countries importing cloves from Sri Lanka (value in USD thousand)
Sources: ITC calculations based on UN COMTRADE statistics.

Importers	Exported value in 2017	Exported value in 2018	Exported value in 2019	Exported value in 2020	Exported value in 2021
World	20,132	-	21,542	17,585	19,307
India	6,807	-	11,445	5,592	6,306
Germany	539	-	1,612	2,530	3,350
China	0	-	321	1,913	2,186
United Arab Emirates	4,359	-	2,829	2,231	1,788
Bangladesh	652	-	1,029	1,429	1,506
Egypt	525	-	433	835	825
Dominican Republic	21	-	341	485	495
Japan	345	-	171	190	445
United Kingdom	260	-	208	283	379
Pakistan	932	-	764	366	332

Appendix 27: Countries importing nutmeg from Sri Lanka (value in US\$ million)
Sources: ITC calculations based on UN COMTRADE statistics.

Exporters	Imported value in 2017	Imported value in 2018	Imported value in 2019	Imported value in 2020	Imported value in 2021
World	59,778	-	83,556	95,037	99,621
India	51,861	-	83,004	94,752	99,021
Area Nes	268	-	0	0	196
Bangladesh	0	-	0	0	142
United Arab Emirates	3	-	2	0	141
Pakistan	15	-	0	0	81
Australia	0	-	1	0	17
China	5	-	96	243	9
Germany	4	-	5	2	6
Myanmar	2	-	0	0	3
Netherlands	4	-	1	0	3

Appendix 28: Leading pepper importing destinations (value in US\$ million)
Sources: ITC calculations based on UN COMTRADE statistics.



Exporters	Imported value in 2017	Imported value in 2018	Imported value in 2019	Imported value in 2020	Imported value in 2021
World	87	-	98	0	61
India	74	-	96	0	61
Netherlands	0	-	0	0	0
Saudi Arabia	0	-	0	0	0
United States of America	0	-	0	0	0
Italy	0	-	0	0	
Japan	0	-	2	0	
Russian Federation	0	-	0	0	
United Arab Emirates	0	-	0	0	
Türkiye	12	-	0	0	
United Kingdom	0	-	0	0	

Appendix 29: Leading clove importing destinations (value in USD thousand)
Sources: ITC calculations based on UN COMTRADE statistics.

Exporters	Imported value in 2017	Imported value in 2018	Imported value in 2019	Imported value in 2020	Imported value in 2021
World	2,248	-	853	208	3
India	1,153	-	846	3	3
Australia	0	-	0	0	0
Canada	0	-	0	0	0
China	0	-	0	0	0
Switzerland	0	-	0	0	0
United Arab Emirates	0	-	4	68	0
Egypt	0	-	0	137	0
United Kingdom	0	-	0	0	0
United States of America	0	-	0	0	0
Area Nes	42	-	0	0	

Appendix 30: Leading nutmeg importing destinations (value in USD thousand)
Sources: ITC calculations based on UN COMTRADE statistics.



UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

BESPA – Food (Best Practices for Agri-food Sector Development)

Project number: 190345

UNIDO - United Nations Industrial Development Organization
 New CSL Building 5th Floor, No:133, Kinsey Road, Colombo 08, Sri Lanka
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www.unido.org

REASON	Stakeholder workshop with food industry	VERSION: 1
		CODE:
MEETING AGREEMENT		

MEETING INFORMATION			
Organized by:	UNIDO	Date:	04 - 11 - 2022
Organization:	Multiple	Start time:	9.00 am
Coordinator:	Pamela Sumithrarachchi	End time:	1.00 pm
Secretary:		Place:	GF06 hall, Galle Face Hotel, No.02, Galle Road, Colombo 03.

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Plenary Session 1 – VC Methodology & Key Takeaways

The Objective

The findings from the value chain analyses on pepper, cloves, and nutmeg/mace are the basis for the project proposal that aims to strengthen food safety and quality-related (FSQ) compliance with international standards (e.g., Codex Alimentarius) and market requirements, which is to be reinforced by the application of quality schemes and ICT-based traceability solutions.

A breakout session

The breakout session creates a more personal feel that feeds off active engagement from the audience. A breakout session is organized to learn, discuss, brainstorm, confirm the findings, and formulate recommendations that will be binding to the stakeholders; all the questions and topics revolve around the workshop's main theme.

1. Guidelines for breakout group

- Stick to the overall topic of the event
- Each person in the group should have the opportunity to share ideas and network with those around them
- The group needs to select a person to present their ideas at the end of the session
- UNIDO officials perform the role of moderator – 1 official per group
- No of groups – five (5) (maximum)
- Size of the group – maximum of ten (10) persons
- The timeframe for group discussion – 20 minutes
- The timeframe for presentation per group – strictly 5 minutes
- Virtual participants shall be assigned to breakout group(s) and engage via Zoom
- Allocation of a maximum of one question per group

2. Discussion topics for select spices: Pepper, Cloves, and Nutmeg

- Main constraints to low production volume
- Standards, quality assurance, and quality management system
- Quality-based price differentiation and predictability
- Cluster development and shortening the value chain
- Marketing & market access barriers and consumption patterns



Plenary session 1 – Discussion Questions

- I. Farmers participating in pepper cultivation in Sri Lanka have steadily increased. Field data collection confirms that farmers typically grow pepper alongside other crops, such as cloves and nutmeg, and a significant number of farmers depend on pepper as their primary source of income. Most farmers grow spices in their small plots of land (home gardens); according to the survey of farmers, the average plot is about 1-5 acres. Cultivation and harvest have been affected at the production level due to low productivity, climatic changes, high cost and limited supply of inputs, including labour, quality planting material and technology, pests/diseases, price fluctuations, theft, and inadequate extension support/assistance for cultivation.

Alongside pepper, cultivating other crops, such as cloves and nutmeg, is recommended. What are effective means to increase their collective production?

- II. At the producer level, there is little concern about the quality of spices. This can be attributed to poor pre and post-harvest management practices, high labour costs, lack of quality and food safety awareness and limited access to testing services. Furthermore, many smallholder spice producers must be fully aware of market requirements and consumption trends. Quality signals must be trickled down sufficiently from the exporters through the value chain. The lack of standards harmonization for spices is a cause for some trade uncertainty and added costs for exporters since they must use different technologies and employ different tests to satisfy different market requirements. Due to these factors and the lack of backward integration, the farmgate quality of spices does not match end-market quality standards resulting in difficulty in achieving a premium price and access to higher-end markets.

How would you overcome the current trend towards low quality, which results in low value-addition in the chain?

What are your proposals to improve food safety & quality and implementation of related international standards?

- III. Several challenges confront stakeholders at different points along the value chain, mainly upstream at the farmer level and, most significantly, the farmgate price. Most smallholder farmers are price takers with little or no bargaining power over price, though, at the moment, they are receiving a reasonable price for their expenses. Due to the lack of quality-related price differentiation and price instability, cultivators are not interested in upgrading production quality. Given the instability of prices, farmers mentioned that the government, private sector, and other stakeholders should intervene in the market, setting a fair marketplace and a constant price.

What are short and long-term solutions to quality-related price differentiation and overcome price instability?



- IV. Farmers characterize the traditional value chain of spices in Sri Lanka, decentralized low-quality product purchases and sales, several intermediaries without essential functions, such as collectors, village traders, shops, wholesale buyers, and weak linkages among the different value chain actors. Farmers often sell their spice crops to itinerant traders or collectors, who sell to town traders and wholesalers, processors/exporters, and international buyers. The chain length lowers the price paid to farmers and complicates attempts to improve quality or produce a differentiated product. In the upstream portion of the value chain, concern for the quality and safety of the product is low compared to the exporters. Addressing these constraints requires a multi-pronged approach involving the private and public sectors, including value chain actors. Furthermore, there are no international/national standards and regulations governing the collection of raw materials.

What are your proposals to address upstream constraints to quality compliance, improve farmers' bargaining power, and shorten the length of the chain?

- V. Given that much of the spices from Sri Lanka are destined for developing countries, attention to quality and safety considerations has been low. However, to diversify markets away from traditional markets, facilitate access to markets in developed countries, and meet their market requirements, there has to be a lot more emphasis on improving the quality of products and processes along the value chain. While the industry has undertaken initiatives toward this end, especially in the cinnamon sector, much remains to be done to uplift the competitiveness of the spice sector. Strengthening cluster development and other measures to mobilize producers are critical for establishing greater export orientation, securing strategic alliances, and improving market access.

What are some effective cluster-based marketing techniques and market access initiatives that the private sector and the government should support?



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Plenary session 2 – Impact, related benefits, and expected contributions to the project implementation

The Objective

The findings from the value chain analyses on pepper, cloves, and nutmeg/mace are the basis for a project proposal that aims to strengthen food safety and quality-related (FSQ) compliance with international standards (e.g. Codex Alimentarius) and market requirements, which is to be reinforced by the application of quality schemes and ICT-based traceability solutions.

Breakout Group Discussion & Presentation

The breakout session creates a more personal feel that feeds off active engagement from the audience. A breakout session is organized to learn, discuss, brainstorm, confirm the findings, and formulate recommendations that will be binding to the stakeholders; all the questions and topics revolve around the workshop's main theme.

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- Virtual participants shall be assigned to breakout group(s) and engage via Zoom
- Allocation of a maximum of one question per group

2. Discussion topics for select spices: Pepper, Cloves, and Nutmeg

- Standards, product specifications, and related practices
- Value Chain coordination & cluster development
- Backward integration of exporters & price stability
- Capacity building and mainstreaming application quality schemes
- Introduction of technology to reinforce quality compliance and to strengthen traceability/transparency along the value chain

Plenary Session 2 – Discussion Questions

- I. Quality standards of developed countries can act as a trade barrier; collectively defining/harmonizing standards & market requirements and proliferating awareness about them is the first step to converging actors under a common framework of practices. Therefore, implementing mandatory standards for spice exports ensures the quality of Sri Lankan spices whilst encouraging good agricultural and manufacturing practices upstream in the value chain. To provide access to markets in developed countries and meet their expectations, continued emphasis on improving the quality of products exported and processes must be continued. Introducing mandatory quality and safety standards and implementing them throughout the value chain and training programmes to mainstream awareness about international standards is imperative to increasing demand and maintaining the consistent quality of products.

What are the most effective ways to mainstream the application of international standards throughout the value chain? Please explain your ideas after considering the ground realities.

- II. With few exceptions, small farmers in Sri Lanka have never organized themselves, nor have they been organized successfully through top-down; therefore have no voice, no bargaining power, and few effective means for accessing conformity assessment, learning about production technologies or marketing strategies. Improving the spice supply's quality, quantity, and consistency will need structural improvements in the value chains to strengthen linkages between exporters and processors and smallholders, stimulate plantation interest in spices, and improve agronomic services to growers. A cluster development program will establish and formalize the linkages between farmers/intermediaries and exporting companies and organize local associations for better coordination amongst smallholder producers and enhance the quality and support given to the PCN value chain. The cluster and network development goals are to create value for the customers and prosperity for the spice industry in Sri Lanka.

What is the best modality for effective cluster coordination and development, and what services are most critical for the spice sector development?

- III. Quality-based price incentives are too small to change farmers' production or post-harvest practices; the cash motivations in the value chain feed this problem. The value chain is so long and isolating that exporters are painfully aware that their price differentials do not reach the farmer because each intermediary takes a piece. And the small farmer is almost always obligated to sell to itinerant traders who rarely pass on quality-based price incentives. When farmers receive quality-based price differentials, the price becomes predictable. This, however, will require specific and testable quality measurements based on market demand. With more predictable prices, farmers are more inclined to invest in better techniques and practices, and the industry is more capable of offering differentiated products. Defining a strategy to maintain a stable and minimum farm gate price by the



private sector and the government intervention to introduce a guaranteed price scheme based on grades and standards are vital to price stability, improved bargaining power & fair price mechanism.

What would you do to bring a transparent and stable price mechanism based on quality parameters?

- IV. The significant challenges faced by the industry are international tariff and non-tariff barriers, competition, increasing cost of production, lower productivity, lack of value addition, and innovative products. Our quality, service, marketing and branding need visionary thinking, unrestrained innovation and continuous improvements. Increasing the productivity of existing crops, promoting value addition rather than bulk exports, developing new products, and research and development efforts need to be stepped up to enhance the use of spices in food and non-food sectors. It is essential to promote and enforce internationally recognized quality schemes and certificates of compliance based on food safety, quality and environmental standard requirements to ensure that the overseas buyer is supplied from a reliable source. New food products should take advantage of the trend towards "hot" and ethnic foods. In the non-food sector, the intrinsic properties of spices, such as medicinal, insecticidal, and anti-bacterial, should be investigated comprehensively to develop new products for the markets.

How would you increase productivity, value addition, and product diversification?

- V. Due to the absence of proper infrastructure and technology, traditional methods, which are highly labour-intensive, are used for processing. Lack of labour, high labour costs, and the unavailability of fertilizer, chemicals, and inputs have hindered cultivation and demoralized farmers. Therefore, it is vital to encourage and educate farmers about mechanization to streamline labour requirements, minimize the application of non-synthetic materials, and promote the adoption of Good Agriculture Practices (GAP). Developing appropriate techniques and technology programs for processing, introducing mechanization, and disseminating newly developed technologies to grassroots producers are pressing needs. Teaching improved post-harvest techniques instead of sun drying and other unhygienic traditional drying practices is essential for sustainability. Introducing traceability and compliance checking systems is vital to reduce rejection risk and improve quality (including food safety) and productivity.

How would you propose improving and implementing the use of technology and technical methods/practices among value chain actors, especially farmers?



Appendix 34: Validation workshop pictures





VALUE CHAIN ANALYSIS ON
**PEPPER, CLOVE, AND
NUTMEG**
IN SRI LANKA



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STANDARDS *and* TRADE
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