



Arabica Coffee Value Chain Analysis



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Glossary

ACVCA	Arabica Coffee Value Chain Analysis
CAGR	Compound Annual Growth Rate
COP	Cost of Production
DEA	Department of Export Agriculture
DS	Divisional Secretariat
EAC	Export Agricultural Crops
EDB	Export Development Board
GAP	Good Agricultural Practices
GMP	Good Manufacturing Practices
GTZ	German Agency for Technical Cooperation
ha	Hectare
HORECA	Hotels, Restaurants and Cafés
IRDP	Integrated Rural Development Project
Kg	Kilogram
LKR	Sri Lankan Rupee
MDF	Market Development Facility
MT	Metric Tonne
SCA	Specialty Coffee Association
SWOT	Strengths, Weaknesses, Opportunities and Threats
UMWMP	Upper Mahaweli Watershed Management Project

Overview

The Market Development Facility (MDF) commissioned the Arabica Coffee Value Chain Analysis (ACVCA), to understand how the Arabica coffee sub-sector functions in Sri Lanka.

The global specialty coffee market was estimated to be USD 35 billion in 2018 and is expected to grow to over USD 80 billion by 2025. Market revenue is projected to grow at a Compound Annual Growth Rate (CAGR) of 13.3 per cent and market volume is projected to grow at a CAGR of 8.3 per cent. Emerging trends in speciality coffee consumption include premiumisation, single origin and traceability. Sri Lanka's prevailing system of smallholder production positions it well to take advantage of this growing global demand focused on quality and diversity.

The study collects information from bean to cup, charts the pathways to scale and identifies the underlying constraints that impede growth. This investigation and subsequent recommendations aim to help stakeholders at each stage of the value chain align their efforts and achieve sustainable growth in this niche industry.

This report explains the Sri Lankan Arabica value chain in four parts:

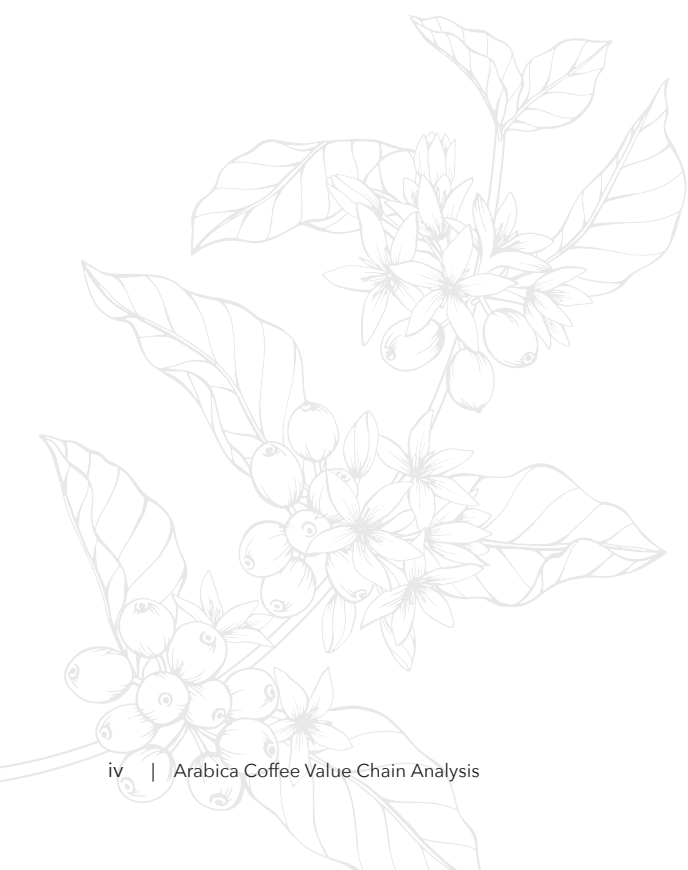
- Data collection
- Value chain mapping
- Analysis of opportunities and constraints
- Recommendations

The research team led by Dr. M.A.P.K. Seneviratne collected primary data through field work, and secondary data, through official documents. Researchers used questionnaires, key-informant interviews and focus group discussions to interview coffee growers, nursery operators, collectors, traders, green bean processors, roasters, exporters, government officials, NGOs and policy makers.

The research team analysed the collected data through a value chain mapping exercise. In this effort, investigators charted all aspects of the Sri Lankan coffee industry, the actors and their relationship to one another. Then, the report recognised linkages among business activities, contacts, scales of operation and institutional programs.

This investigation identified three common value chain models present in the domestic Arabica trade. Through a Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis, the researchers framed the crucial characteristics of the value chain and determined the constraints and opportunities for improvement.

The findings are summarised in this report and followed up with practical recommendations to develop the current value chain. This analysis covers the full range of activities related to the Arabica coffee industry, including plant variety selection, geographical suitability, nursery practices, plant distribution, assistance schemes, maintenance of cultivations, harvesting and processing, value addition opportunities and promising target markets (tourism and export industries).



Executive Summary



1. Executive Summary

MDF's Arabica Coffee Value Chain Analysis (ACVCA) found that the Arabica coffee industry in Sri Lanka can be profitable if quality and consistency improves and production increases.

The Sri Lankan coffee industry was booming in the 1800s but eventually failed because of monocropping and the subsequent spread of a fungus called coffee leaf rust that decimated plantations across the country. Since the 1970s, the Department of Export Agriculture (DEA) has executed projects to bring this trade back through robust assistance programs. These projects laid the groundwork for business opportunities, but it appears that the industry's full potential is yet to be realised.

The coffee value chain begins with seedling availability in nurseries. Researchers identified Arabica plant varieties to be the best investment choice. These trees are well suited to grow in the vast mid- and upper highlands and fare best when growers intercrop the plants, especially with tea.

In the harvesting link of the value chain, growers often strip trees of all cherries, mixing ripe green beans with those which are pest infested, overripe and underripe. Farms that employ labourers to pick only fully developed crops increase their initial expenses but reduce the overall Cost of Production (COP) in the value chain.

Bean processing can be either dry (a labour-intensive method that requires less infrastructure) or wet (a method that first pulps and hulls the cherries before drying them). At a cottage level, cherries are mostly dry processed, which result in a lower quality flavour and aroma palette.

Traders or collectors purchase the beans from home gardens or estates and determine the price based on crop quality. Cherries that are sorted by plant variety and ripeness fetch higher prices than batches that mix Robusta and Arabica coffee and do not sort beans. Unfortunately, researchers found that the latter practice

is quite common and results in lower profits for farmers.

In the next step of the value chain, bean traders and collectors sell to roasters, who do the final product processing, packaging and consumer marketing.

Researchers determined that the Sri Lankan coffee value chain can successfully expand into exports once industry actors optimise their practices through short, medium and long-term initiatives.

The country is well positioned geographically and climatically to produce high quality, specialty coffee. However, there is much room for improvement. To start, stakeholders across the value chain and governmental decision-makers need to have better communication. The DEA should commit to industry expansion by improving extension services, increasing assistance programs and updating databases dedicated to Arabica farming.

Nurseries need to provide more Arabica saplings and farmers must employ harvesters to only pick ripe, healthy cherries for processing. It is highly recommended that all future bean processing be done through the "wet" method for the final products to be high quality and competitive. DEA assistance programs can help provide infrastructure to realise this goal.

The DEA should also establish bean quality standards and certification programs to provide transparent explanations for price differentiations. Growers and traders will be motivated to commit to producing superior products if they participate in educational programs that explain the characteristics and importance of cherry excellence.

Once production and quality of raw materials increases, specialty coffee can become a thriving export industry.

Methodology



2. Methodology

Researchers used a combination of qualitative and quantitative data collection techniques to establish and investigate the Sri Lankan coffee value chain.

2.1 Study Area

Arabica grows best at 600-2,200 m above sea level, with temperatures of 18-24 degrees Celsius and an annual rainfall of 1,500-2,750 mm. The research team, in collaboration with the DEA, collected data from regions that have these characteristics, as mapped in Figure 1.

Figure 1: Farms analysed



2.2 Data Sources

The research team oriented their data collection with the help of documents provided by the DEA head office in Kandy, a research station in Matale and district offices in Matale, Kandy, Nuwara Eliya and Badulla. The University of Peradeniya's Postgraduate Institute of Agriculture and Sri Lanka Customs also provided informative resources, which researchers examined prior to field work.

The research team worked with the DEA, Assistant Directors and Extension Officers and spoke with an array

of stakeholders to gather data via surveys, questionnaires and group discussions. Researchers organised qualitative data using comprehensive data coding techniques and catalogued quantitative data via Microsoft Excel.

Figure 2 indicates the number of interviewees by location and Figure 3 shows the distribution of sources by role in the value chain.

Figure 2: Number of interviewees by location

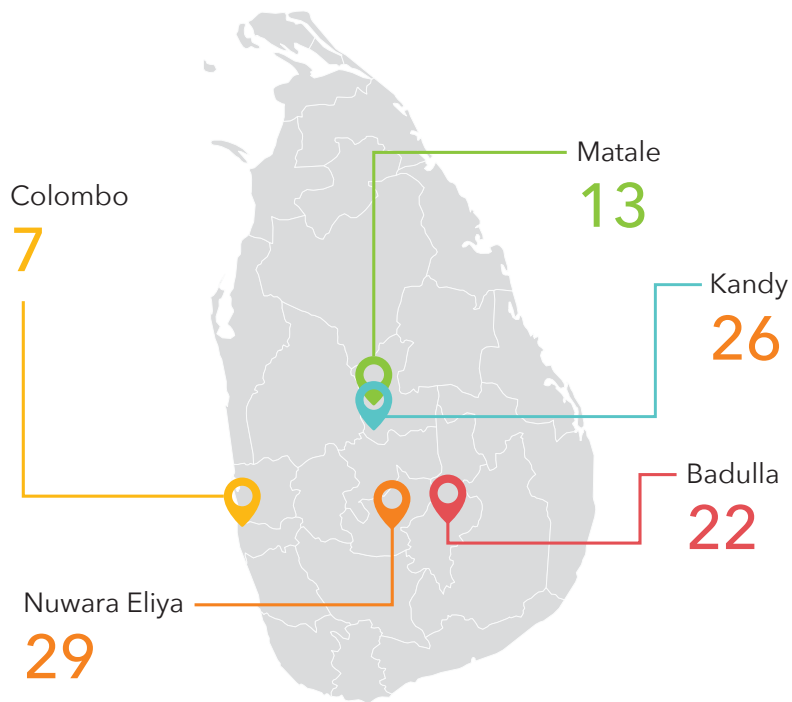
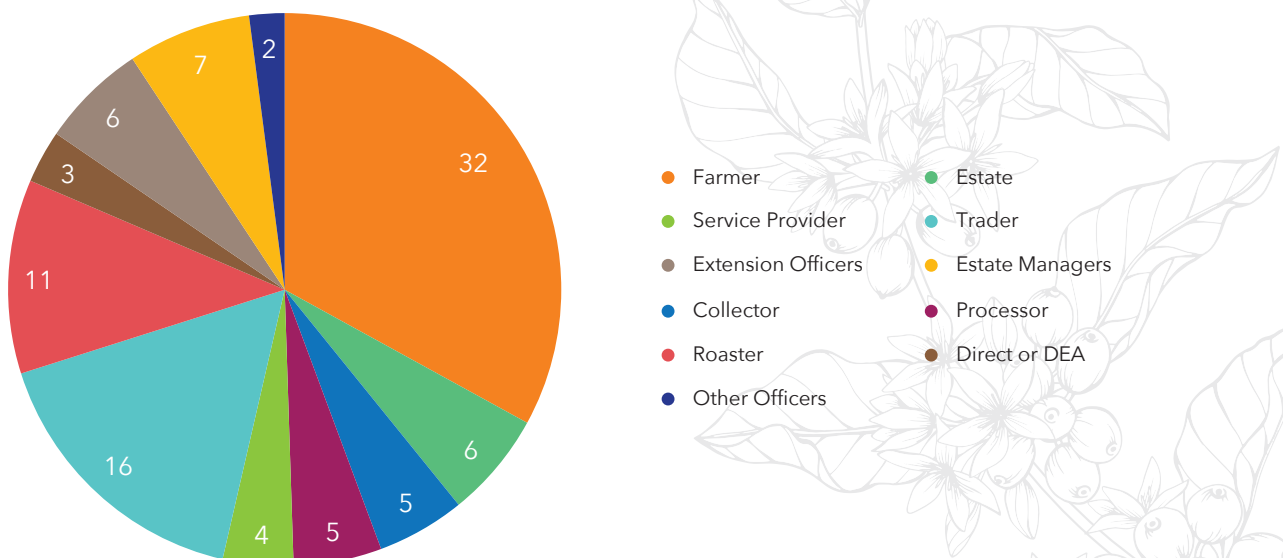


Figure 3: The distribution of sources by role in the value chain





Chapter 3

Context



3. Context

In the 1800s, Sri Lanka, known as Ceylon, was one of the largest coffee exporters in the world. Coffee production peaked in 1870 with over 111,400 hectares (Ha) cultivated but was slowly decimated by a leaf rust disease. By the 1890s, coffee plantations shrank to 4,609 Ha and tea production took over.

The industry started up again in the 1970s, with the establishment of the DEA. The institution recognised the plant's cash crop potential and launched assistance programs to provide free saplings, cash grants and technical advice to growers. In the initial project, farmers received Robusta plants for home gardens. Then, the San Ramon Arabica was intercropped with tea plantations in the 1980s, followed by the Catimor Arabica varieties in the 1990s. However, the Lakparakum variety of Arabica coffee is especially emerging as preferred variant. Lakparakum produces high yields, is characterised

by uniform ripening patterns and resistance to fungal disease and has also been recognised by the Specialty Coffee Association for its excellent taste and aroma.

Over the last 20 years, both businesses and government agencies have invested in the coffee industry. Private companies supply processing and roasting equipment and market Sri Lankan coffee to the local hospitality sector and select export markets. As per MDF's estimates, in 2014, there were only two companies involved in processing and roasting but over the last six years, that number has expanded to 10 processors and 12 roasters.

This value chain analysis specifically aims to improve the Arabica coffee industry. However, currently, it is worth noting that very few plantations produce Arabica exclusively and many mix the harvested cherries with Robusta.

3.1 Global Demand



Imports and Exports

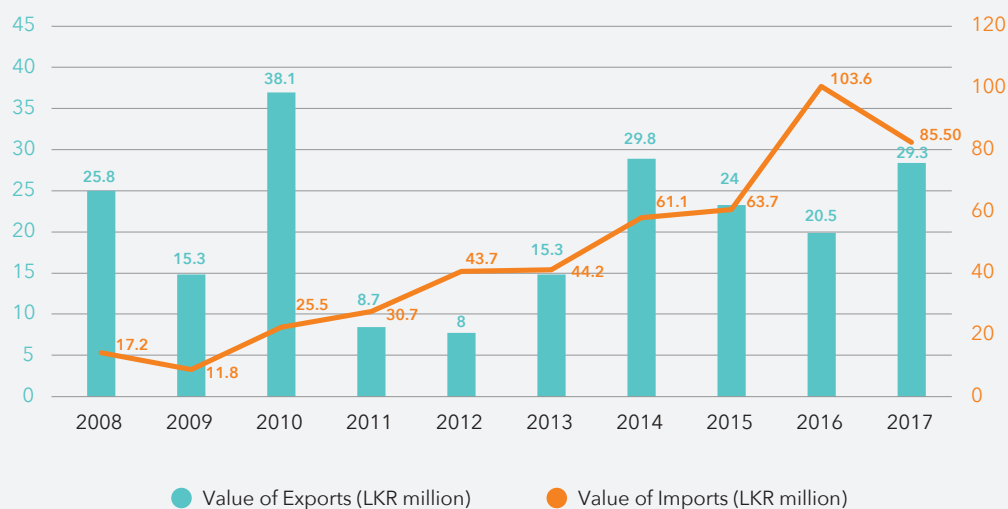
Sri Lanka is currently a net importer of coffee. In 2017, the volume of imports were nearly five times that of exports¹. Domestic Arabica coffee production is too low to export a significant amount of coffee and production is mostly consumed locally. However, Sri Lankans prefer to import coffee from countries, such as Brazil, the United States, China, Italy and Australia. According to Sri Lanka Customs statistics, the country buys seeds and roasted coffee from abroad. Although it is illegal to import green beans due to quarantine regulations, raw materials are smuggled from India because the quality is higher, and the price is more attractive at LKR 300/kg.

Figure 4 shows more detailed information about Sri Lanka's coffee imports and exports.



¹ EDB 2019

Figure 4: Sri Lanka coffee imports and exports



Source: EDB 2019²

This industry offers major growth potential. In 2018, the global specialty coffee market was estimated to be USD 35 billion and is expected to grow to over USD 80 billion by 2025. Market revenue is projected to grow at a CAGR of 13.3 per cent and market volume is projected to grow at a CAGR of 8.3 per cent.

Latin American countries dominate the supply of Arabica coffee beans to the global market, with Brazil alone accounting for nearly 50 per cent of supply. At present, Sri Lanka contributes minimally to global coffee consumption, given the small production scale, the relatively high costs and the established reputation for excellent tea, rather than coffee. That said, there is a small, but growing, export market for Sri Lankan coffee. The Maldives is the largest importer now, likely due to the presence of Sri Lankan hotel chains in the country. Table 1 details the top five countries that imported Sri Lankan coffee from 2013-2018.

Table 1: Top five countries that imported Sri Lankan coffee from 2013-2018

Sri Lanka Coffee Exports (USD)								
Importing Country	2013	2014	2015	2016	2017	2018	% share	% YoY
Maldives	1,000	29,000	42,000	51,000	59,000	83,000	29%	61%
Chile	-	-	2,000	18,000	28,000	2,000	1%	-89%
Australia	10,000	15,000	30,000	12,000	25,000	35,000	12%	191%
China	6,000	17,000	14,000	-	18,000	13,000	5%	-
United States	13,000	18,000	17,000	9,000	14,000	21,000	7%	141%

Source: EDB 2018

² Sri Lanka Export Development Board. 2019. Export Performance Indicators 2019. <https://www.srilankabusiness.com/ebooks/export-performance-indicators-of-sri-lanka-2010-2019.pdf>



Specialty Coffee

The Specialty Coffee Association (SCA) defines speciality coffee as “coffee and coffee products that garner a premium to commodity coffee in the same markets³.” Rather than a specific type of coffee variety, processing technique, roasting method, or retail presentation, speciality coffee includes diverse, high quality products produced by a range of processes along the value chain. Key factors that shape the demand for speciality coffee include bean source and quality, value chain relationships, batch exclusivity, traceability and premium prices.

Technically, to earn a “speciality coffee” label, final products must receive a cupping score of 80 or above. Table 2 gives an overview of cupping scores and grades.

The Lakparakum variety of Arabica coffee grown in Sri Lanka and processed through a fully washed technique received an official cupping score from the Specialty Coffee Association of 86, which lands it within the excellent range and confirms its categorisation as a speciality coffee.

Table 2: An overview of cupping scores and grades

Score	Grade	Specialty Coffee Certified
90-100	Outstanding	Yes
85-89	Excellent	Yes
80-84	Very Good	Yes
<80	Below Specialty Coffee	No

Source: Specialty Coffee Association

European and American consumers continue to dominate the market for speciality coffee, although demand is growing in India, China and other countries with large, emerging middle classes. Consumers, especially those in the millennial age range, increasingly prioritise coffee produced ethically and sustainably⁴. The growing desire for these products provide an opportunity for Sri Lanka as speciality consumers are increasingly interested in directly sourced, high quality coffee and are willing to pay premium prices for such products⁵.

To meet growing global demand, sector experts estimate that production must double, or even triple, over the next 30 years⁶. Additionally, as consumer desires become more sophisticated, countries with limited production, such as Sri Lanka, can focus on speciality coffee products.

³ Specialty Coffee Association, 2019. Price Crisis Response Initiative. https://static1.squarespace.com/static/584f6bbe5e23149e5522201/t/5ebd4d5f1e9467498632e0b8/1589464434242/AW_SCA_PCR_Report2020+-+December+2019+-+Update+May+2020.pdf

⁴ Panhuysen, S. and Pierrot, J. (2018). Coffee Barometer 2018.

⁵ Ibid

⁶ Ibid



Domestic Market

Although Sri Lanka is likely to remain a modest player in the global coffee market, there is significant growth in the domestic coffee industry, primarily in the hotel, restaurants and cafés (HORECA) sector. Because locally produced coffee does not have an established reputation yet, hospitality businesses tend to import speciality coffee, but this is slowly shifting.

The HORECA business sector is composed of 2,355 hotels, restaurants and cafés⁷ and data shows that this industry buys the most coffee in the country. It is estimated that nearly 74 per cent of these establishments import their coffee, while traditional Robusta roasters supply another 17 per cent of businesses. Currently, approximately 10 per cent of Sri Lankan hospitality organisations purchase speciality coffee from the growing group of local providers.

Data on coffee consumption within Sri Lanka is limited, but Table 3 provides some insights into the amount of local demand, which includes both locally produced and imported coffee.

Table 3: Domestic coffee consumption

Coffee (MT)	2013	2014	2015	2016	2017
Annual Imports	-	52	49	97	67
Annual Exports	-	57	24	14	14
Domestic Production	5,567	6,593	5,360	6,112	6360
Domestic Consumption	-	6,588	5,385	6,195	6413

3.2 Arabica

The Arabica genome sequence is publicly available, which helps researchers understand and target key agronomic traits important to growers and coffee consumers. This information will improve the beans in a variety of ways, such as better, novel flavours, uniform fruit ripening, disease resistance and enhanced plant drought adaptation. This enables coffee farmers worldwide to increase productivity, quality and profitability.

Compared to Robusta, Arabica is a healthier, more predictable, resilient plant in Sri Lanka. Arabica blooms after monsoonal rainfall and cherries mature nine months later whereas Robusta flowers irregularly and cherries mature after 10 to 11 months. The root systems of Arabica are comparatively deeper, which gives the plant more flexibility to search for nutrients in soil. Unlike Robusta, the Arabica plant is self-pollinating. This improves genetic stability and reliable flavour and aroma attributes

over generations. Robusta has a higher caffeine content and a more bitter taste.

Nuwara Eliya and Badulla are the major growing districts for Arabica. The crop fares better in higher elevations. Ganga Ihala Korale, Udadumbara and Huluganga are Arabica growing Divisional Secretariats (DS) in Kandy District and Rattota, Ukuwela and Ambanganga Korale are the divisions growing Arabica in Matale District.

Early hybrid Arabica varieties include San Ramon, Catimor, HDT and S9. San Ramon Arabica is characterised by a short life and short stature (60 cm) of plant in comparison to other Arabica varieties. This strand is not profitable and is no longer used. Catimor Arabica is initially productive at 2,500 kg/ha but its genetic purity degrades over time. HDT produces comparatively large cherries at a rate of 2,000 kg/ha of green bean. It is resistant to fungal

⁷ SLTDA, 2020

disease and is popular in Nuwara Eliya. S9 produces medium-sized cherries, also at a rate of 2,000 kg/ha, but it is sensitive to berry borers. Researchers found that S9 produced coffee has a very good colour, taste and aroma while HDT has a particularly pleasant mouth feel.

After extensive research, the DEA locally developed the Arabica varieties Lakparakum, Laksaviru and Lakkomali.

All three produce high yields at 3,000 kg/ha of green bean. Lakparakum is characterised by uniform ripening patterns and resistance to fungal disease. It has also been recognised by the SCA for excellent taste and aroma.

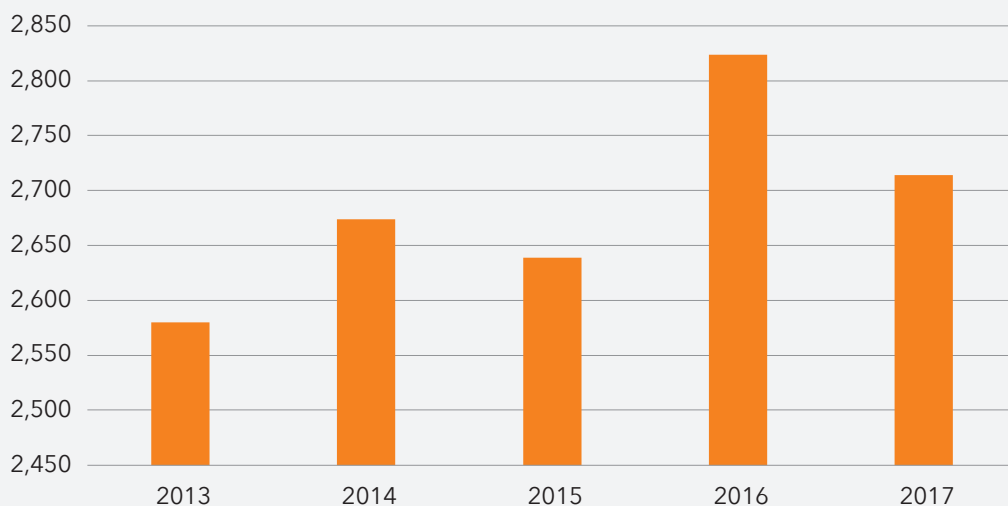
(All yields mentioned above are given in terms of green beans produced per hectare, rather than in terms of the quantity of cherries produced).



Productivity

Sri Lankan coffee productivity has stagnated. Figure 5 charts annual performance for Arabica and Robusta coffee combined. Research suggests that the industry is functioning at a sub-optimal level and that there is a sizeable margin for growth.

Figure 5: Sri Lankan coffee production



Source: Annual Performance Report, 2017

Efforts to increase supply are underway, with both the government and private sector investing in planting Lakparakum in conducive regions throughout the country. However, given the lag time between planting and harvesting (typically two to three years), it will take some time for the production figures to reflect the expanded area under cultivation.

Value Chain Analysis



4. Value Chain Analysis

Researchers identified actors and mapped linkages to understand the strengths and weaknesses of the Sri Lankan Arabica coffee industry.

4.1 Actors

The Sri Lankan Arabica value chain includes a varying number of actors. Nurseries and the DEA offer technical support by way of seedling supply, financial incentives and extension services. Coffee farmers plant, grow and harvest the crops. Traders and collectors work on different scales (village or regional), purchase both processed

and unprocessed cherries and sell to other traders or roasters. Laborers working in wet processing to pulp and hull the beans have great influence over product quality. Finally, the roasters grade, sort, dry and roast the beans. They are also responsible for marketing, retailing and exporting green beans and finished coffee products.

4.2 Mapping

This analysis identified three typical value chain models in the Sri Lankan Arabica industry.

The first and shortest chain consists of a single actor who handles all activities: growing, wet processing, drying, roasting and marketing, as shown in Figure 6.

In the next value chain, visualised in Figure 7, the second minimum number of actors participate. Small-scale home gardens typically fall into this category. While this value chain has some variation on actor roles, usually it involves a farmer, a trader and a roaster.

Figure 6: Single actor value chain model

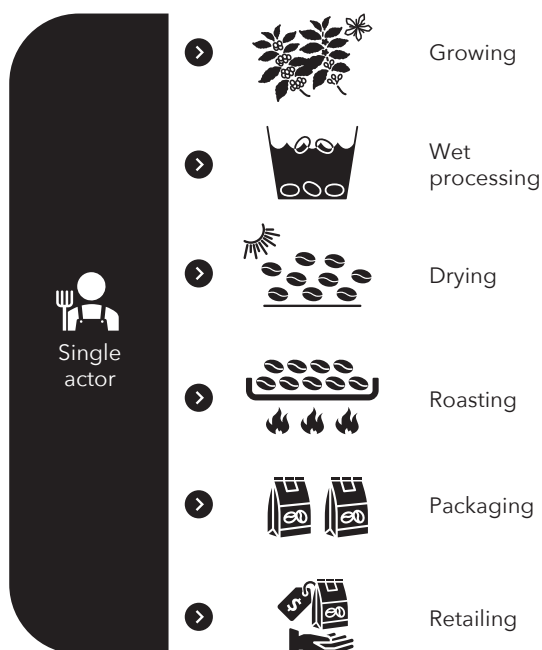
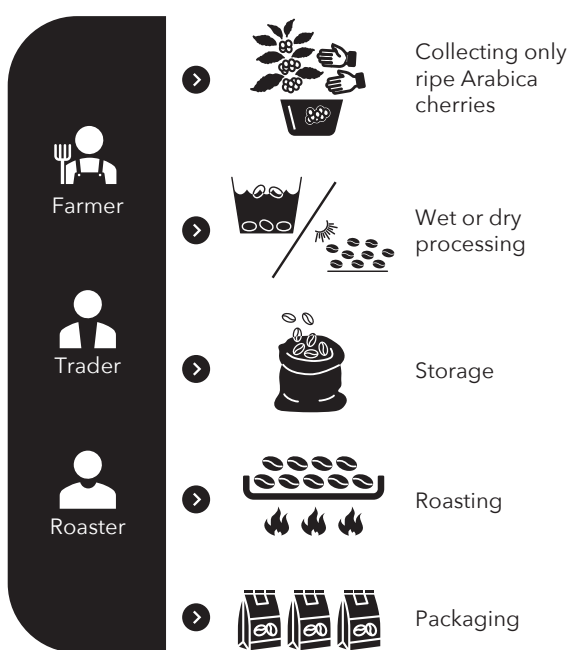


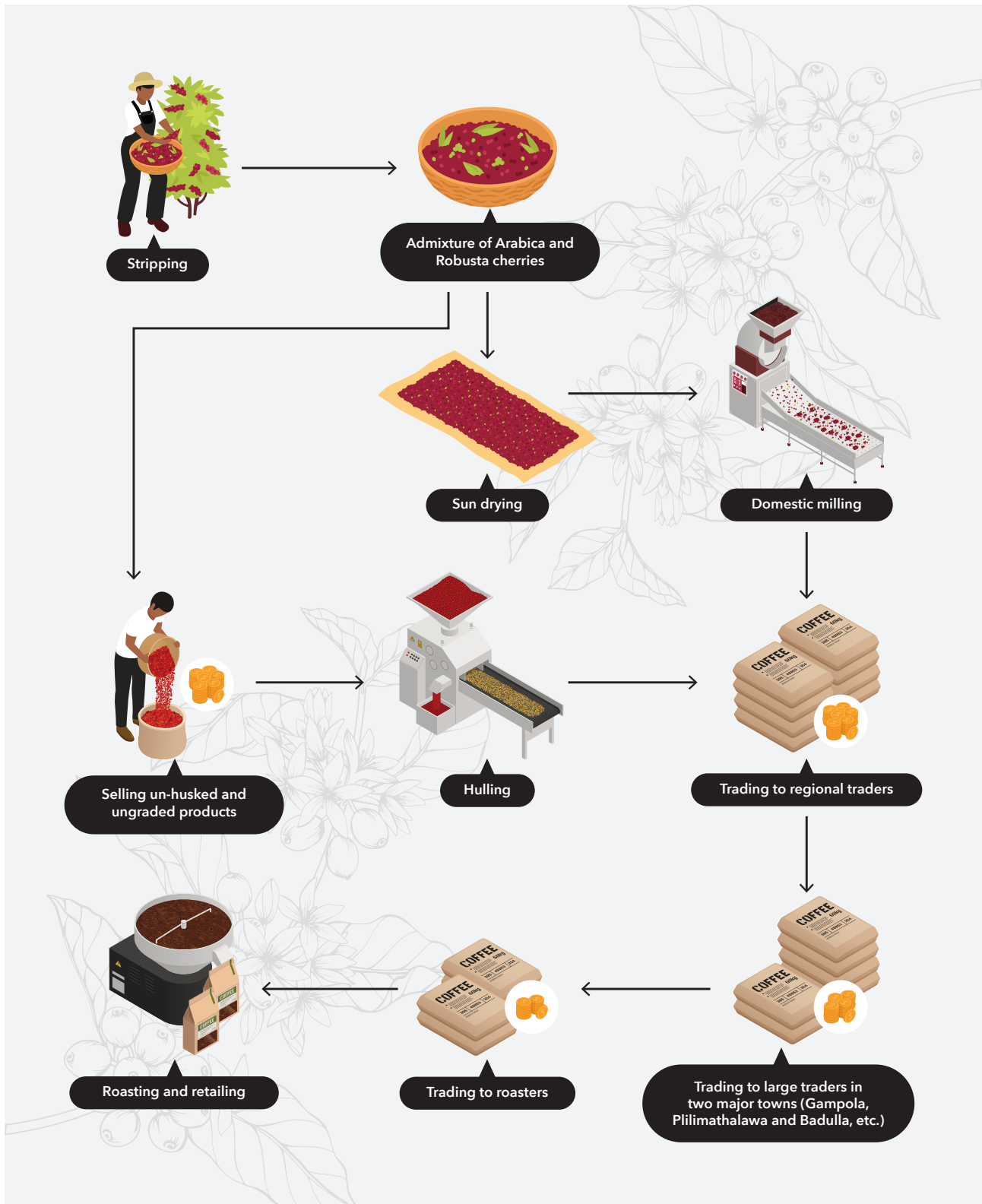
Figure 7: Farmer-trader-roaster value chain model



In the third value chain, known as the “general value chain model,” the processes are characterised by bulk collection and include many different traders and processors. As business activities and relationships become increasingly complex, it becomes more difficult

to trace bean origin and usually results in a mixture of Arabica and Robusta coffee beans. The complicated nature of this value chain leads to inconsistent quality, raw material instability and the inability to justify fixed pricing. This model is represented in Figure 8.

Figure 8: Traditional value chain

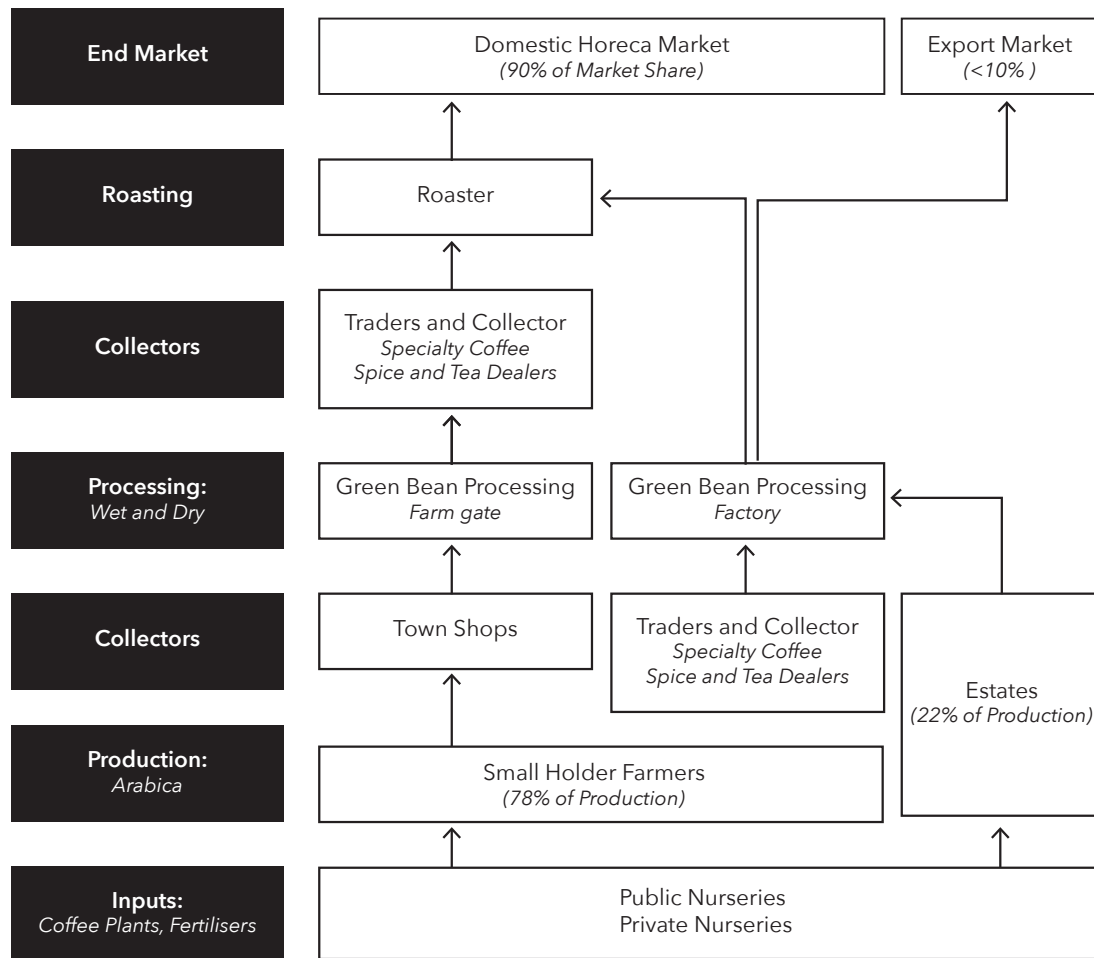




Current Market System

The following diagram explains the movement of the coffee from the sapling to the cup through market actors involved in this sector. Each market actor fulfills a specific function while a few actors who have a vertically integrated business model performs more than one market functions.

Figure 9: General Value Chain Model



Cost of Production



5. Cost of Production

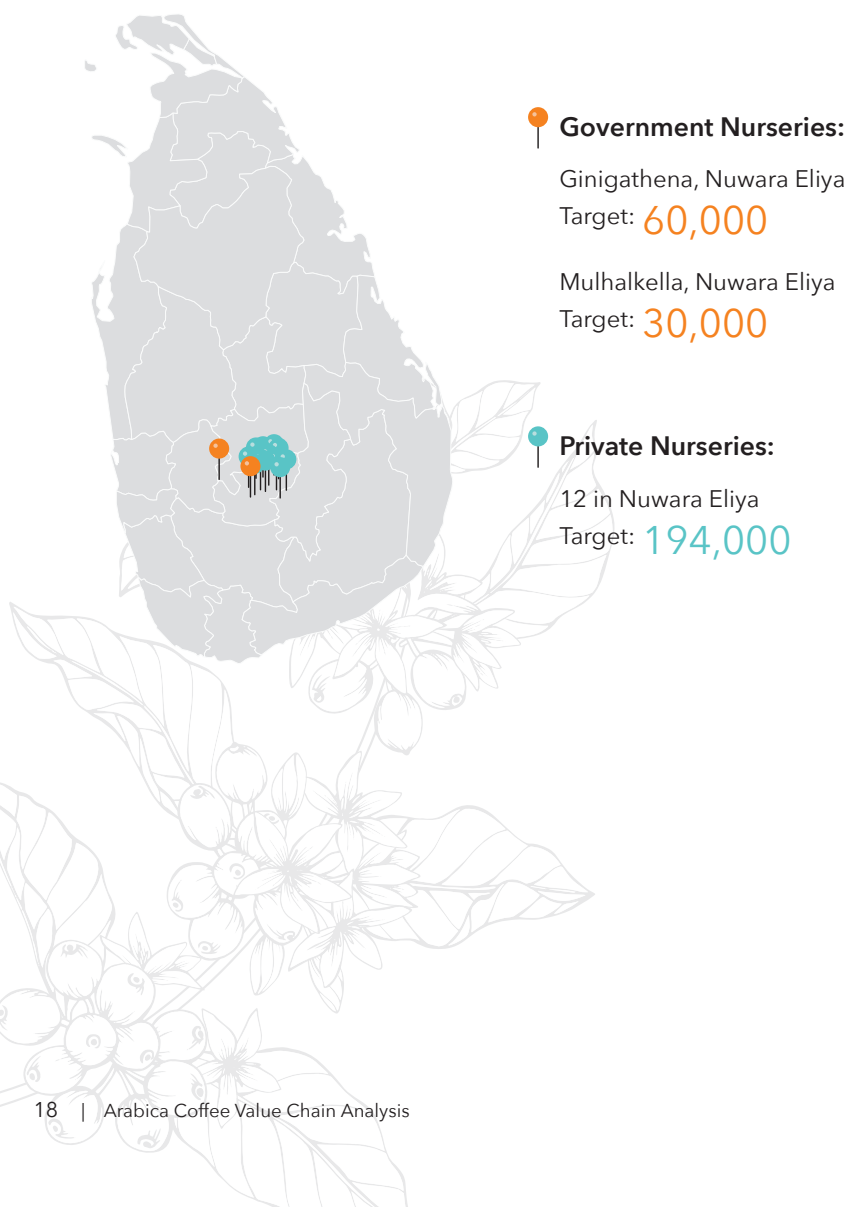
COP evaluates all expenditures and earnings in the entire Sri Lankan Arabica coffee value chain. This includes business practices at the input, production, processing, roasting and end market levels.

5.1 Nurseries

The value chain begins with nursery provided saplings and fertilisers. Healthy plant availability is key for market productivity. The Sri Lankan government remains heavily involved in supplying free inputs to farmers, with little demonstrated appetite to change this system from farmers, processors or the government itself.

The DEA is responsible for nursery registration, arranging seed material as well as certifying and issuing new plants. They set annual targets and supervise programs that provide free plants to farmers. Recently, they have shifted to emphasise Arabica plants due to their disease resistant properties.

Figure 10: Sri Lankan nurseries in study area



The researchers interviewed four nursery owners to learn more about their experiences, successes and challenges. In these conversations, they shared that prolonged droughts and excessive rains drive up the cost of maintenance activities. Analysts found that plant maintenance activities overall are unsatisfactory, especially in the estate sector.

Nursery COP for a single plant is LKR 7-10, depending on transport and soil mixtures. Owners explained that wages for labourers are expensive and they struggle to access potting mixture materials, such as sand and cattle manure. Nurseries earn LKR 14 for each state ordered coffee plant and owners say it is difficult to turn a profit.

5.2 Farms

Coffee is either produced on smallholder farms or estates. As per MDF's estimates, estate farming makes up 20 per cent of Arabica production, with a workforce of just over 900 people. The main growing region is the central highlands, where there are approximately 5,600 smallholder farmers, as per MDF's estimates. Women are actively involved in harvesting coffee cherries, dry processing on farms and they make up a large percentage of factory processing employees. Coffee farmers come from a range of ethnic backgrounds, including the Tamil minority.

Nearly 80 per cent of the specialty coffee produced in Sri Lanka originates from smallholder farms that are 0.5 ha or smaller. Home gardens of this size are highly mixed with other crops (intentionally or otherwise) and as per MDF's estimates coffee production amounts to about 5-8 per cent of a farmer's income. MDF estimates that coffee income can increase to 10 per cent of a farmer's wage if there is better information available and growers are incentivised to focus on cherry production instead of green bean processing.

Coffee tree farming faces a myriad of challenges. Coffee is harvested once a year, in either May or October, depending on the region. Rainfall, humidity, light, wind, cloud cover, soil properties, cropping patterns and

management practices are all crucial variables. Arabica thrives in the highlands, whereas Robusta is more common in lower altitude regions. Trees fare better when intercropped within tea plantations because there is more shade and better soil condition since tea farmers often use a nitrogen fertiliser, which improves drought resistance.

Growers must actively take steps to stop pests from damaging their plants. For example, if a plant blooms off-season and the farmer does not prune properly, the tree becomes highly susceptible to berry borer infestation. Many of the respondents in this data collection set said they did not regularly prune their trees. Neglecting this step will decrease productivity over time.

Observers noted that farmers did not carefully harvest plants. When a tree is stripped, the farmer will not discard cherries contaminated by insects. Traders will buy the crop with the knowledge that some of the cherries are diseased and they will offer low prices to offset their losses due to the inclusion of inferior raw materials in the produce. Farmers also mix different coffee varieties together. Unless a buyer is paying a higher price for Arabica alone, a harvest will likely also contain lower quality Robusta green beans.

5.3 Processing

Coffee cherries can either be processed "wet" or "dry." At the cottage level, farmers often use a natural, dry method in which the skin is left intact and green beans are spread out to dehydrate in the sun. This dry processing is both labour intensive and results in suboptimal quality green beans when compared to wet processing.

If a farmer has access to the infrastructure, they may process the beans using a wet technique, which result in a higher quality product. This method washes the beans, removes the pulp and then either dehydrates the green beans in the sun or in a drying machine.

Whether a bean is processed wet or dry, the cultivation and harvesting practices deeply impact the COP. Only ripe, healthy, properly dried cherries are suitable for high quality coffee. Growers that do not separate cherries by ripeness and blend Robusta and Arabica beans compromise the quality of the crop.

The researchers found that throughout both the wet and dry processing practices, at different stages, large percentages of the beans are typically rejected, as shown in Table 4. This inefficiency drives up the final price.

Table 4: Green beans discarded during processing

Stage	Wet Processing	Dry Processing
Wastage of cherries due to pests	5-7%	5-7%
Washing	5%	Not Applicable
Hulling	25-35%	20-30%
Final Grading and Sorting	2-5%	15%

Over the past 15 years, a nascent market in more professionalised wet coffee processing has emerged. There are now an estimated 10 coffee processors responding to the greater demand for Sri Lankan

coffee, up from two in 2014. Processors have invested in equipment, but they still struggle with the inconsistent volume of high quality coffee cherries.

5.4 Trading

The people who buy raw materials from farmers are known as the “collectors” or “traders” in this value chain. In Badulla and Nuwara Eliya, tea dealers often fill the role of trader, whereas in Kandy, spice dealers take on the responsibility. Collectors buy either raw cherries or processed beans.

Higher prices reflect higher COP. Plants grown at high elevation (exceeding 800 m above sea level), single origin, wet processed, graded Arabica, especially Lakparakum coffee, can be valued at more than 1,500 LKR/kg. However, such a crop is also selectively harvested,

wet processed and graded manually, which puts the COP at around 1,400 LKR/kg.

The trader usually determines price and what constitutes acceptable quality for purchase. Some traders purchase unusable beans to mix with those of quality and sell to bulk roasters. Pure Arabica usually fetches more than Arabica/Robusta blends. Table 5 and Table 6 lists the very diverse prices traders pay for raw materials, as observed by researchers. This price fluctuation is partially due to farmers being unaware of or uninterested in pricing norms.

Table 5: Raw cherry coffee prices

Raw Cherry Coffee Prices (LKR/kg)										
Trader	A	B	C	D	E	F	G	H	I	J
Arabica	160	120	110	100	85	83	70	60	60	50
Margin Kept for Arabica	20	20	20	15	15	8	10	10	5	5
Robusta and Arabica Blend	80	75	70	65	50	45	40	40	35	35
Margin Kept for Robusta and Arabica Blend	20	15	15	12	10	8	5	2	2	2

Table 6: Processed coffee prices

Processed Coffee Prices (LKR/kg)										
Trader	A	B	C	D	E	F	G	H	I	J
Arabica	250	300	450	550	575	600	700	900	1000	1200
Margin Kept for Arabica	25	25	50	50	75	100	100	150	200	200
Robusta and Arabica Blend	250	275	300	350	400	450	500	525	535	550
Margin Kept for Robusta and Arabica Blend	20	20	25	30	50	50	75	75	100	100
Rejected (Black and Triage)	200	250	280	300	300	N/A	N/A	N/A	N/A	N/A
Margin for Rejected	10	20	15	15	20	N/A	N/A	N/A	N/A	N/A

Of the 25 farmers interviewed, 15 said the price they received was determined exclusively by the traders, seven said they compared sale prices in the area before agreeing to sell and only three said they bargained

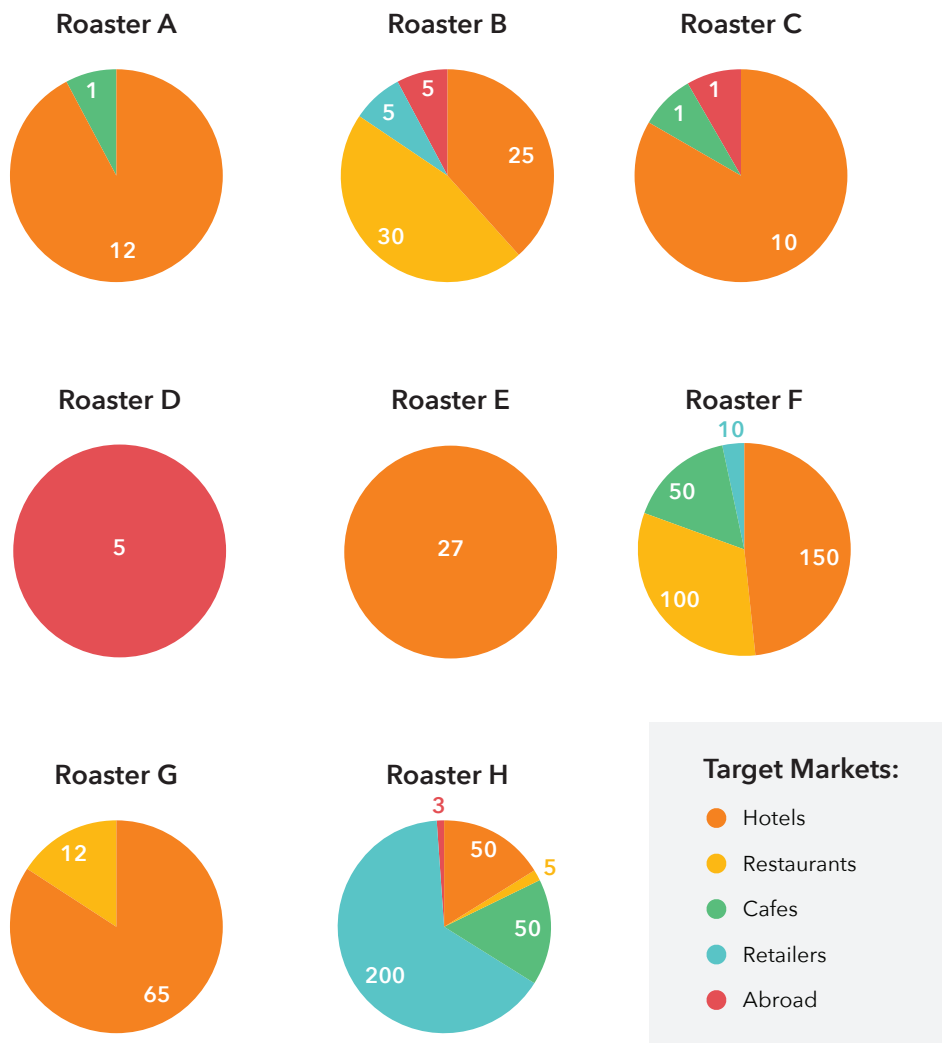
with the traders. If there was more competition among traders, or farmer-collector relationships were stronger, it can be expected that raw material sale prices would increase for growers and be more consistent.

5.5 Roasting

Roasters manage the final leg of the value chain. They are responsible for roasting, packaging and marketing final products. As in processing, this sector has been growing over the last five years. As per MDF's estimates, in 2014, there were only two roasters and now there are 12. Some roasters perform both the processing and roasting functions, granting them greater control over final product quality.

Of the 11 interviewed roasters, seven sold only to the domestic market, three catered to both foreign and local consumers and one sold their product overseas exclusively, albeit in limited quantities. The roasters that work both locally and internationally said that they sell 15-25 per cent of their total production abroad. Eight roasters provided researchers with their target market and consumer data, as displayed in Figure 11.

Figure 11: Sri Lankan coffee roaster target markets



Currently, the main retail outlet for specialty coffee is the domestic HORECA sector. Estimates suggest that about 10 per cent of the hospitality industry sources domestically roasted coffee. Protectionist government regulations and import taxes increase the cost of imported

coffee, positioning quality, domestically roasted coffee as a viable alternative. There is room and opportunity to expand further into both the domestic and international coffee consumer markets.



Comparative Advantage



6. Comparative Advantage

Sri Lanka is well positioned to have a thriving Arabica coffee industry thanks to decades of strategic investment. The market system dynamics present many challenges from both supply and demand perspectives, but this

variety of coffee also has meaningful retail opportunities. Climatically, the highlands are an ideal location to grow high quality, specialty beans that will be very successful in international niche markets.

6.1 Strategic Investment

Both the private and public sector have invested in the local coffee industry. Private companies have funded pulpers, hullers and drying facilities and the government has offered decades of assistance programs to support all aspects of the value chain.

The DEA, Ministry of Agriculture and the EDB have recognised the opportunity to invest in the industry and are supporting a range of initiatives to expand coffee cultivation in Sri Lanka through national planting programs and continued protectionist regulation on green bean imports. EDB has helped promote Sri Lanka branded products at international trade fairs, as well as via some limited financing programs.

The DEA has conducted important research on coffee varieties that has led to more robust plants. They have also implemented development programs and provided free planting material and cash grants to farmers. By identifying geographical regions most suitable for Arabica and introducing Good Agricultural Practices (GAP), the DEA helped improve harvesting and post-harvesting operations and established value chain linkages.

The home garden program of the 1990s distributed 200 plants and after three years of successful growth, paid cash grants of LKR 5 per plant. The program offered additional funds if coffee trees were planted alongside a base crop (usually pepper) and established the coffee home gardens of Nuwara Eliya and Badulla. In 2012, these districts received an additional 18,000 plants from a DEA program.

The post-harvest improvement program started in 1998 and aimed to increase quality for Export Agricultural Crops (EAC). The project subsidised pulpers and hullers to increase wet processing. The DEA subsidised new planting programs and Arabica plant farmers received more money per hectare (LKR 35,000) compared to Robusta (LKR 20,000/ha).

In the early 2000s, the plantation advisory services assistance scheme prepared feasibility reports for plantation companies and offered consultation, which helped develop 80 hectares of Arabica coffee.

Organic farming programs began in 2005 to meet the demand for EAC in the international market. The plan provided financial assistance to cover increased maintenance costs, such as manure production. The DEA began issuing organic, GAP, Good Manufacturing Practices (GMP) and fair-trade certificates in accordance with the Sri Lanka Standards Institute and other relevant organisations. Unfortunately, this plan did not meet expectations because of certification struggles.

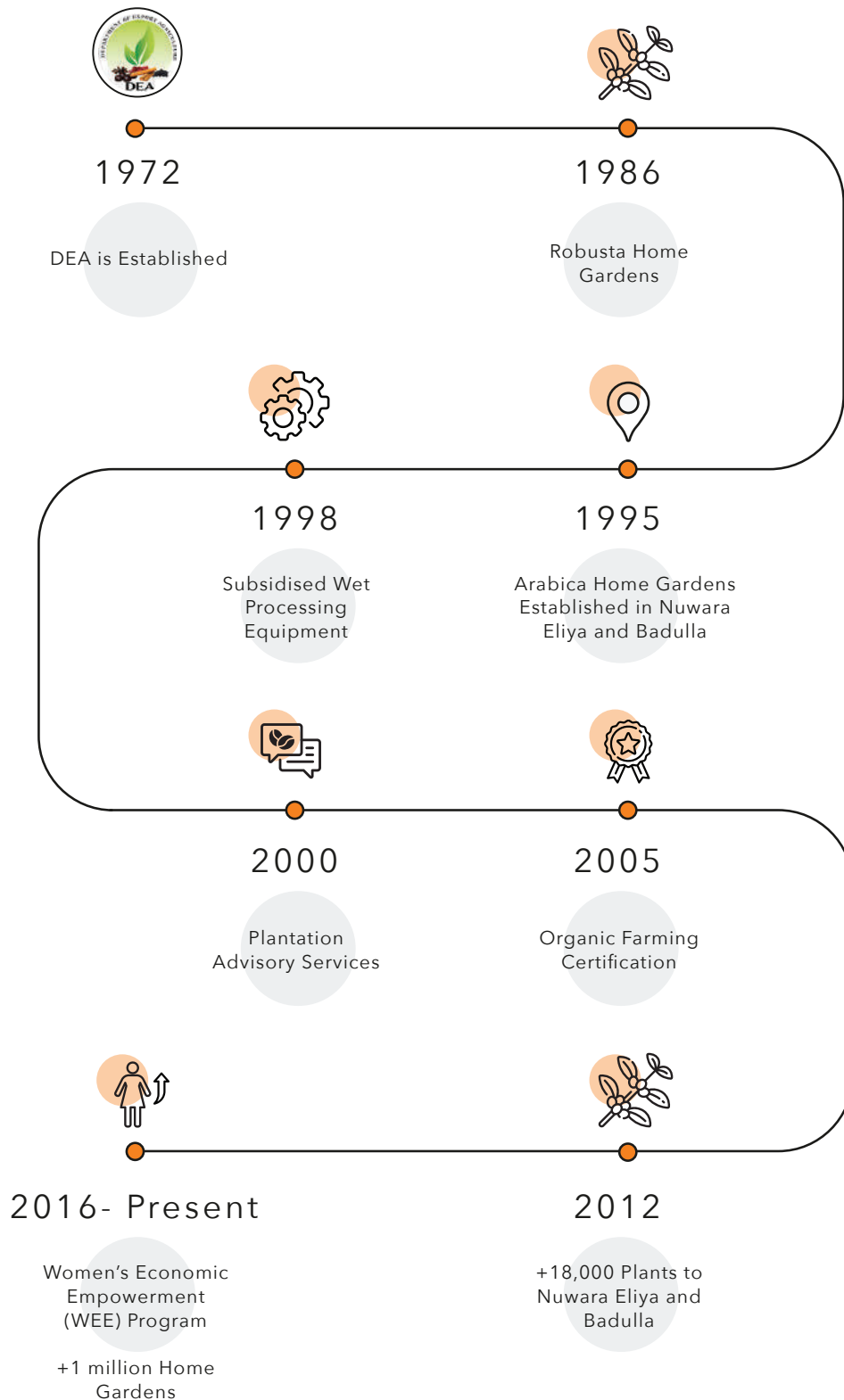
The latest home garden program began in 2016 and focuses on Women's Economic Empowerment (WEE). It is expected to establish one million home gardens, each with 100 coffee plants. Productivity improvement programs aim to increase the per unit productivity for existing coffee plantations and improve crop management. It was observed that new planting programs have not yet backed the estate sector, but the research team determines this would be a positive step for the overall industry.

Other governmental departments have helped increase the country's comparative advantage in the Arabica coffee industry. After the Sri Lankan EDB determined domestic and international demand for the trade, they provided processing centre upgrades, grants and marketing support. The EDB promotes traceability and safety measures.

The Presidential Secretariate in Nuwara Eliya District provided funds to the Walapane Divisional Secretariat. The project invested in a dryer, 10 pulpers and two hullers. Plant nurseries in the area are rearing 20,000 seedlings of the Lakparakum variety for the initiative. The aim of this program is to establish a brand called 'Udarata ran copi' (upcountry golden coffee).

The Department of Customs and Department of Agriculture both authorise coffee bean importation and restrict access to some imports to prevent new crop diseases, which puts domestically grown beans at an advantage.

Figure 12: DEA assistance program highlights



6.2 Market System Dynamics

For locally grown Arabica to be globally competitive, all stakeholders must work to make the quality, quantity and export sale price more attractive. The current approach to increase supply mainly relies on government support to increase land earmarked for coffee cultivation. Less investment is directed at improving farm productivity,



reducing wastage or improving quality at the production stage. The government will likely continue to supply subsidised planting materials and companies will continue to expand their supplier networks as cultivation increases.



Supply Challenges

Researchers spoke to coffee collectors, traders and roasters to find out more about challenges in the supply chain. They found that the harvesting or processing practices, as detailed in Table 7, negatively impact domestic specialty coffee quality:

Table 7: Negative harvesting and processing habits

 Practice	 Consequence
Stripping (harvesting ripe, underripe and overripe cherries in a single batch)	➤ Underripe cherries have a grassy flavour and overripe cherries have a fermented fruity flavour
Collecting old cherries that fall to the ground	➤ Can lead to mould contamination and musty flavours
Overfermentation	➤ This causes fermented, fruity, sour or onion-like flavours
Poor fermentation tank hygiene (such as leaving some beans in the bottom of the barrel)	➤ Leftover beans produce foul, rotted or sour flavours
Drying location deficiencies (such as drying directly on soil, unclean surfaces or the roadside)	➤ Can lead to mould contamination, musty and earthy flavours
Drying process deficiencies (such as slow drying processes, thick drying layers and storing partially wet coffee for long periods of time)	➤ Can lead to mould contamination, musty and earthy flavours and breakage during hulling process
Over drying	➤ This causes damage to the bean during hulling and milling processes

Currently, there are many defects in bulk volumes available. Sorting bad quality cherries, those dried improperly and dividing Arabica and Robusta during the harvest stage could remedy some of these problems. All the traders interviewed said that they never refuse to buy coffee because of low quality. However, most do not have drying facilities, so they cannot store the cherries properly and must sell their lots on the same day of purchase or risk mold infestations.

Generally, green bean quality is too low and not consistently available. Supply is insufficient to cater to demand. Although there is opportunity to expand this industry, most farmers do not realise the potential. Of the farmers interviewed, it was found that seven thought coffee demand had decreased, 19 were not aware of changes in coffee demand and only three said they saw demand and price increase over the last three years.

Farmers and processors who use traditional methods do not benefit from the new, more efficient technologies available. Researchers found that outdated water conservation measures can have negative consequences on crop growth during drought. Although farmers currently only harvest once a year, they could increase their yields if they would utilise modern, innovative agricultural science.

The value chain is fragmented and not transparent. Growers would be in a more favourable position with more access to information. For example, farmers are not convinced that it is more profitable to grow Arabica than Robusta. They also sometimes have unrealistic price expectations and try to charge high amounts for low quality beans. This study asked home garden owners and smallholder farmers about the source of their plants. Most could not recall. Less than 5 per cent of respondents knew that the plants were Arabica, and none could name the particular variety they grew.



Demand Challenges

Researchers found that the Arabica market demand is five times higher than current production can meet. The Sri Lankan coffee industry is currently not able to provide a continuous supply to buyers because of substandard harvesting, processing and marketing practices.

There is such a limited amount of quality raw materials that roasters can only supply select consumers. They predominantly supply domestic markets. However, Sri Lankan Arabica struggles to be price competitive domestically. Current laws restrict the import of unprocessed coffee cherries, but not on roasted coffee. An Indian roasted coffee can be imported for LKR 2,000/kg. A similar Sri Lankan Arabica product would cost LKR 4,000/kg. Furthermore, there is widespread availability of low-quality raw materials, Nescafe and illegally smuggled coffee beans. These features make higher priced locally sourced Arabica difficult to promote. There is potential for Sri Lankan specialty coffee, although it costs more than the world average, as consumers appear to be willing to pay a premium for the products abroad if they were able to trace the origins of the raw materials and quality was high.

The current market is quite susceptible to shocks. Respondents said currency fluctuations, electricity interruptions, political instability and decreased tourism after the Easter day terrorist attacks in 2019, and then due to the COVID-19 pandemic impact all local businesses. These overarching challenges affect the entire value chain.



6.3 Opportunities in Arabica

Despite these challenges, Sri Lanka is rife with opportunities and reasons to expand the domestic specialty coffee industry.



Climate

Climatic factors, such as rainfall, humidity, light, wind, cloud cover, soil properties, cropping patterns and management practices are all crucial variables in this farming industry. Coffee is highly sensitive to climate change and traditional Arabica growing areas, such as the East African Highlands, will become unsuitable as global temperatures rise. Researchers found that coffee crops will thrive in a warmer world if they are intercropped with trees or moved to higher elevation. Vast amounts of arable land located in the Sri Lankan highlands that are underutilised.

Arabica coffee estates that already operate in regions of high elevation are known for being high quality and specialised. They have become popular in hotels and restaurants in Colombo, Kandy and Galle. These farms, located in Maturata, Hantana, Maskeliya, Bogawantalawa, Pundaluoya and Lindula, operate in a single origin value chain. Coffee production in the towns of Talawakelle, in Nuwara Eliya, and Haldummulla and Hali-ela, in Badulla, can grow if farmers are linked with roasters. There is an opportunity to increase the production volumes.

A recent study on different Arabica coffees with similar genetic characteristics but different agroclimatic plantation conditions and international geography found that Sri Lankan coffee brew had a better aroma than that of Brazilian, Colombian or Ethiopian origin⁸.



Niche Markets

The specialised characteristics of domestically cultivated Arabica is a major selling point as niche products become more attractive to consumers. The practice of micro-lots, for example, where a consumer can trace a bean back to the origin farm, field or harvest, is already in operation in several villages in Kandy and Nuwara Eliya. This production can tap into the rapidly growing specialty coffee market, provided the quality is maintained. This market is estimated to be worth USD 83.5 billion by 2025⁹.

There is potential to increase value by differentiating products through superior coffee beans and unique experiences. Combining the Arabica beans with cinnamon powder in a coffee brew is one example of a value-added product.

Entrepreneurs can also market coffee husks as a mulching material in ginger planting beds. The dried, pulped, removed skin, called "cascara", can be used in carbonated beverages and coffee drinks. Dry, natural processing results in high quality cascara. Since the process is common in Sri Lanka, the country is well poised to enter this market.



International Interest

Researchers identified international markets with large Sri Lankan diasporas to be potential locations to launch Sri Lankan Arabica promotional programs. Small consumer countries interested in specialty coffee are also an excellent target market.

International development agencies have been believers in the Arabica coffee industry for decades. The Dutch government implemented the Integrated Rural Development Project (IRDP) from 1988 to 1995. The project distributed HDT, S9 and Catimor Arabica varieties to establish more home gardens in Kotmale, Walapane and Hanguranketha in Nuwara Eliya. The German Agency for Technical Cooperation (GTZ) funded the Upper Mahaweli Watershed Management Project (UMWMP), a water conservation project, in Nuwara Eliya between 1990 and 1996. They identified Arabica coffee as a suitable crop for soil and soil moisture conservation.

Although Sri Lanka does not currently produce enough Arabica to compete with the global market at present, international consumers are interested. Japanese companies have invested in and purchase from Sri Lankan processors. European investors have already started purchasing wet processed Arabica green beans. It is anticipated that this market will become more profitable in the future if the value chain becomes more reliable and resilient.

⁸ Department of Export Agriculture Annual Performance Report, 2016

⁹ Adroit Market Research

Inclusive Growth Opportunity



Inclusive Growth Opportunity

The growth of Arabica coffee in Sri Lanka has the potential to benefit Sri Lankan farming households.

7.1 Pro-poor Growth

Arabica coffee is primarily a smallholder crop. Short gestation periods, easy maintenance and a small canopy makes it appropriate for home gardens. The DEA has identified 1,195 villages positioned at an elevation high enough to be suitable for Arabica coffee farming.

Aside from cash crop profits, harvesting coffee offers short-term employment opportunities for the rural poor. Collecting cherries is usually a one-round operation, so labourers participate to earn side-income. This is particularly convenient for women who often prefer flexible, seasonal work.

Outsourcing services, such as drying, pulping, washing and hulling also need daily paid workers. Usually these operations are carried out by women for a daily wage of LKR 500. This analysis interviewed four farmers who hired labours and they payed workers LKR 500, 600, 700 and 1,000, respectively, for each eight-hour shift. It was found that in Kotmale, workers earned LKR 15/kg for hulling services and LKR 20/kg to dry cherries.

As per MDF's estimates, depending on the region, coffee may only contribute 2-8 per cent of a smallholder farmer's earnings with the majority coming from mixed

Figure 13: Tasks for laborers



crops. While this is currently an insignificant amount, it does offer a seasonal increase in income and poses an opportunity to grow that percentage with productivity enhancing interventions. MDF's estimates indicate that if farmers focus their labour on harvesting quality cherries and reduce their efforts at green bean processing, they can expect a 5-10 per cent increase in their coffee income. Although Sri Lankan youth do not presently find coffee farming to be an attractive career path, if incomes increase, more young people will be drawn to the industry.

Many coffee farmers are not registered with the respective government agency as working in that role. It was found in field assessments in Kotmale District that over 800 families were involved in coffee farming but a mere 10 per cent of them were listed among official records. Improved databases systems to take note of industry participants will give government officials a better idea of how many rural farmers are engaged in Arabica coffee.

Coffee farmers include Sri Lankans from all major ethnic groups, including those belonging to the Tamil ethnic minority, who predominantly work on tea plantations.

7.2 Women's Economic Empowerment

Coffee is a cottage industry. Except for land preparation, women are most involved in cultivation and harvesting coffee at a farm level. Most employees at the processing stage are also female.

Home garden programs that target female farmers can have a powerful impact on Women's Economic Empowerment (WEE). A recent DEA sponsored home garden program called 'Dhanasaviya' is currently underway to supply smallholder farmers with 100 Arabica plants. Under normal maintenance conditions, a single tree produces an average 1kg of coffee. This stands

to reason that 100 trees can produce 100kg of coffee. If the purchase price is LKR 1,000/kg, then coffee plant income resulting from this home garden program can reach up to LKR 100,000. Other DEA assistance projects work to improve the economic status of rural women by incorporating other economic crops in home gardens, such as spices.

Given the time intensive nature of dry processing at farm level, it is recommended to shift to wet processing exclusively. This is expected to allow women more free time to dedicate to other activities.





Value Chain Improvement and Sustainability



Value Chain Improvement and Sustainability

The ACVCA study team identified various ways in which the Arabica coffee value chain, and the specialty coffee industry, can be improved and reach full potential.



Public Sector Management and Policy

- 👍 The DEA should create an exclusive database to store all information pertaining to the Arabica sector. This will include a list of all those invested in the industry (from growers and input suppliers to roasters and exporters), as well as detailed seed availability documentation and statistics from every step of the value chain. Technical consultation should be tailored to each estate and plantation sector in a site-specific way for location-based production plans. This can be done if DEA extension services also hire more officers to tackle this increased workload.
- 👍 It is recommended to increase high quality seed material availability and certification. DEA Extension Officers should register nurseries and renew licenses each year. They also must verify plant quality before issuing saplings to farmers. Estates should establish their own nurseries so there are more production opportunities.
- 👍 Policy decision-makers should identify land areas that have high potential for being successful Arabica growing regions and offer market-based incentives to increase cultivation.
- 👍 Sri Lanka Customs officials must take measures to stop smuggling.
- 👍 In time, DEA should coordinate an island-wide pruning program to increase production. To do this, trees that have been planted in the last 20 years should receive a light trim, whereas older trees should have the main stem pruned to six inches high, in moisturised soil, and then fertilised. Increasing production is paramount for industry growth.



Farming and Processing

- 👍 Five Arabica varieties are recommended: HDT, S 9, Lakparakum, Laksaviru and Lakkomali. All of these are highly adaptive to high elevation, are resistant to coffee rust and yield 2,000-3,000 kg/ha green beans. The mid and upper farmlands are environmentally ideal for these crops and if the domestic value chain strengthens, the country can be globally competitive in the specialty Arabica coffee market.
- 👍 Farmers must adopt GMP and be given access to the equipment to do so.
- 👍 In the harvesting stage, farmers must not use a stripping technique to collect their crop. If a harvest mixes overripe, underripe or pest infested cherries with quality beans, the value chain COP increases. To encourage farmers to hire day labourers to only pick ripe red cherries, it is suggested to implement a buy-back program, improve grower-trader-roaster relationships and have transparent, fair payment systems. Harvest employment opportunities will predominantly benefit women and young farmers.
- 👍 To get the inherent flavour and aroma of Arabica coffee, research determined that all processing should be wet. This method requires coffee washing stations, that is, an area with fermentation tanks, pulper, huller and drying facilities. This infrastructure should be established on all estates and in coffee villages. To conserve water in the bean processing phase, laborers should utilise new technologies, such as parabolic drying.

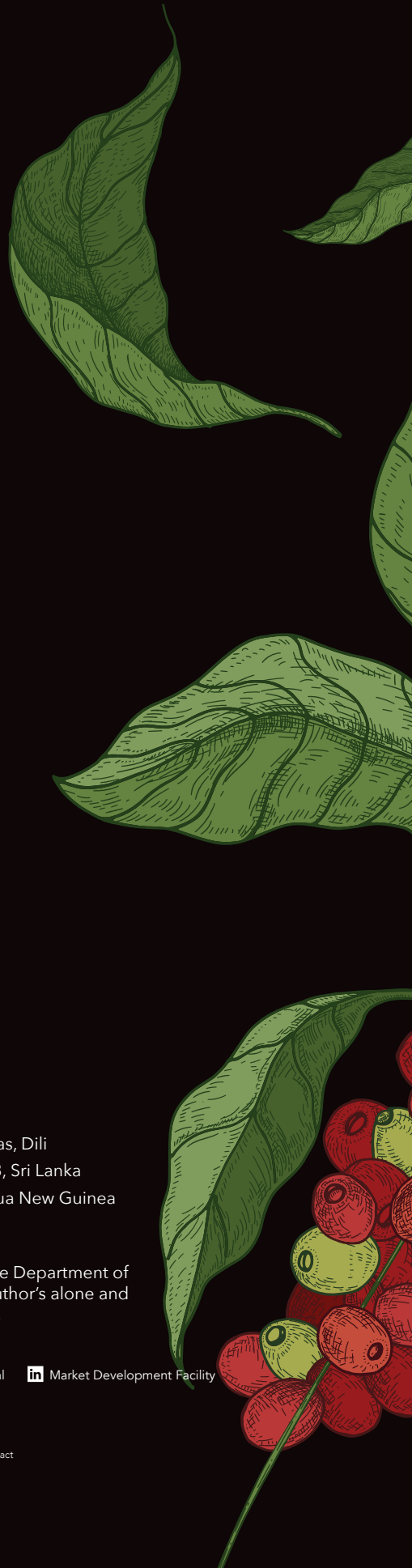
- ☑ Roasters/exporters must strengthen the connection with coffee villages. The relationships need to be better coordinated to incentivise farmers and establish a consistent, reliable supply flow. Farmers should also be encouraged to utilise underproducing tea fields to intercrop the land with coffee trees.
- ☑ It is strongly recommended to establish a transparent pricing model based on referenceable differentiations of quality. Materials should be labelled before processing to specify the variety, cropping system, elevations and subsequent harvest quality. In addition to this kind of objective labelling, products should be distinguished by quality parameters, such as moisture content, produce uniformity, colour and whether the cherries are contaminated by fungus or pests. By defining these region-dependent quality attributes, Sri Lankan Arabica will be able to be compared to international coffee and provide evidence that it is a high value product.



Promotion and Marketing

- ☑ To market Sri Lankan Arabica, it is recommended to increase green bean exports and participate in international trade fairs to spread awareness.
- ☑ Niche markets can be approached with small quantities initially and then built upon over time.
- ☑ There is potential to market to the tourism industry as well. Airlines and catering services would offer a way to exhibit the product to visitors and eco-tourism programs could arrange for travelers to visit coffee gardens or offer an excursion that would include participating in coffee bean harvesting and processing.





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- Fiji: Garden City Business Park, Grantham Road, Suva, Fiji
- Timor-Leste: 2nd Street, Palm Business & Trade Centre, Surik Mas, Dili
- Sri Lanka: No. 349, 6/1, Lee Hedges Tower, Galle Road, Colombo 03, Sri Lanka
- Papua New Guinea: Level 6, PwC Haus, Harbour City, Port Moresby, Papua New Guinea

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