BIG ONION VALUE CHAIN
A Story of Gaps

Roshini Rambukwella
Ruvini Vidanapathirana
Thushara Dharmawardana

Working Paper 18 **March 2022**

Hector Kobbekaduwa Agrarian Research and Training Institute
114, Wijerama Mawatha
Colombo 07
Sri Lanka

First Published: March 2022

ISBN: 978-624-5973-18-7

National Library and Documentation Services Board - Cataloguing-In- Publication Data

Rambukwella, Roshini

Big Onion Value chain: A Story of gaps / Roshini Rambukwella, Ruvini Vidanapathirana and Thushara Dharmawardana- Colombo: Hector Kobbekaduwa Agrarian Research and Training Institute, 2022. -

x,81p.; 28 cm. (working paper; No. 18)

ISBN: 978-624-5973-18-7

i. 658.8095493 DDC23 ii. Rambukwella, Roshini (Co. author)
iii. Ruvini Vidanapathirana (co-author)
iv Thushara Dharmawardana (co-author) v. Title
vi. Series

1. Onion Industry – Sri Lanka
2. Marketing - – Sri Lanka
3. Agriculture-Economic aspects-Sri Lanka

Final typesetting and lay-out by: Dilanthi Hewavitharana

Cover page design by: Udeni Karunarathna

Tel. Phone : +94112696981
: +94112696437

Fax : +94112692423

Email : librarian@harti.gov.lk

Web page : www.harti.gov.lk

FOREWORD

The biggest problem with big onions is about a big gap, i.e. the one between local demand and supply. The demand-supply asymmetry naturally results in the country incurring a sizable import bill. Addressing the mismatch, as this study reveals, requires consideration of serious interventions at key points in the supply chain, among other things.

The researchers have based their conclusions on information provided by all actors along the big onion value chain and have derived policy recommendations following analysis. The analysis is nuanced by consideration of both local and imported value chains and thereby obtains important information about margins made by these players.

They have also highlighted the importance of compiling a reliable database in order to resolve issues in seed production. Fertilizer availability or rather lack thereof as well as rising prices have been duly noted. A series of policy interventions have been recommended with respect to seed production as well as overall efficiency in resource deployment to improve productivity. Moreover, the issue of post-harvest losses has also been addressed by the research team and relevant recommendations proposed.

While some of the problems identified are associated with issues precipitated by the Covid-19 situation, many of them nevertheless predate the advent of the pandemic. In other words there are processes that needed to have been addressed long before related restrictions exacerbated the issues the researchers have identified. Considering the importance of big onions in the overall agricultural picture and even while acknowledging constraints that were in part Covid-19 related and in part the yield of both global and local realities there are things that can be done, this study concludes. Those entities mandated to intervene would certainly find useful insights as they design new strategies and re-craft methodologies currently being applied.

Malinda Seneviratne
Director/CEO

ACKNOWLEDGEMENTS

As the research team, we express special thanks of gratitude to Mr. Malinda Seneviratne, Director/CEO of HARTI who enabled us to undertake this important research at HARTI and the support extended in various means until its publication. We would also like to thank to Ms. Renuka Weerakkody, Research Fellow and Mr. Shantha Hewage, Senior Research Officer for their invaluable facilitation to conduct the study smoothly on time. Our sincere gratitude also goes to Mr. Siriwardana, present Big Onion Crop Leader and Mr. P.R.C.Y. Pallemulla, former Big Onion Crop Leader of the Department of Agriculture for all the assistance extended us to undertake this study with academic background.

We also thank Mr. J.C.K.B. Lionel, Statistical Officer (Acting) for his assistance extended to collect primary data at the field level and Mr. K.A.R. Pathmasiri, Statistical Assistant for his assistance in secondary data collection. It is with the deep appreciation that we acknowledge Mr. S.A.K.B. Senerath, Mr. K.A. Amila Kodithuwakku and Mr. R.B.D.M. Rajapaksha who assisted in data collection and data analysis. A special thank-you to Ms. Chandrika Dahanayake, Assistant Registrar (Programme) for the administration facilitation provided during the study. A thank-you to Ms. K.S.N. Perera for English language editing, the Publication Unit for final page setting and printing process. Last but not least, many thanks go to all the HARTI staff specially including the Data Management Division and the Food Systems Division for their support extended at the beginning until publication to make this study a success.

Roshini Rambukwella
Ruvini Vidanapathirana
Thushara Dharmawardhan

EXECUTIVE SUMMARY

Big onion, mainly confined to Matale and Anuradhapura cultivating districts, is marked by a demand-supply asymmetry that has triggered a staggering annual import bill. Despite repeated efforts to accelerate production, the local big onion industry further downsized in terms of the cultivated area, farmer population and yield, which in turn necessitated higher imports.

The outbreak of the Covid-19 pandemic has added a host of new challenges to an already struggling industry with imports being restricted, limited availability of stocks and escalating market prices. Lapses in the supply chain and market inefficiencies have further deepened the crisis. Hence, this study - a detailed Value Chain Analysis (VCA) of big onions in Sri Lanka - identifies the major constraints and opportunities of production and marketing with a view to obtaining recommendations for intervention.

The sample consists of all actors along the big onion value chain: producers, importers, collectors, wholesalers, retailers and consumers. Survey and interview methods were used to extract data while qualitative analysis tools such as chain mapping and SWOT analysis were employed to identify the opportunities and constraints.

The study reveals that the Self Sufficiency Ratio (SSR) was very low in 2019 (7%) and 2020 (10%) while recording high imports and low production. A huge gap between the imported value of big onions and its tax revenue was also reported. The big onion supply was largely (97%) utilized for food; the quantity reserved for processing was negligible. The study also finds that the total availability exceeded the total requirement of the year with unrestricted imports. Gradual fall in extent and production after 2015 led to an escalation of the retail price even during the local harvesting season.

The data from 2015 to 2020 reveals that the farmer, followed by the retailer, receives a major share of the retail price. In terms of market margins and cost of each channel of local big onion, the highest market efficiency was recorded for channel one with low marketing cost and margins. Along the imported big onion value chain, the retailer received the highest margin followed by the importer. Wholesalers and collectors obtained the least margins in both imported and local channels.

Scarcity of good quality seeds resulting in an increased seed price is largely attributed to a subsequent boom in the cultivation cost in the 2021 *Yala*. Adverse weather conditions and the lack of a reliable data base are the major stumbling blocks in the seed production sector. Lack of chemical fertilizer and agrochemicals and high prices were the major challenges with regard to production.

The study recommends state subsidies should be provided to decrease the cost of production and that private sector investment be solicited in seed production. Furthermore, concerted efforts should be directed to increase productivity and input use efficiency while minimizing post-harvest losses. Storage facilities should be upgraded with government intervention. An integrated approach needs to be adopted to maintain a database to make accurate demand-supply predictions.

LIST OF CONTENTS

		Page No.
FOREWORD		i
ACKNOWLEDGEMENT		ii
EXECUTIVE SUMMARY		iii
LIST OF CONTENTS		v
LIST OF TABLES		vii
LIST OF FIGURES		**viii**
ABBREVIATIONS		**x**
CHAPTER ONE		
Introduction		**1**
1.1	Background	1
1.2	Research Problem	1
1.3	Significance of the Study	3
1.4	Objective of the Study	4
CHAPTER TWO		
Review of Literature		7
2.1	Importance of the Agricultural Value Chain	7
	2.1.1 What is a Value Chain	7
	2.1.2 Importance of the Value Chain	9
2.2	Production and Marketing of Big Onion in Sri Lanka	11
2.3	Big Onion Value Chain in Other Countries	11
CHAPTER THREE		
Material and Methods		15
3.1	The Conceptual Framework of Agricultural Value Chain	15
3.2	Description of the Study Area	15
3.3	Sampling Procedure	17
3.4	Sources of Data and Method of Collection	18
3.5	Method of Data Analysis	19
CHAPTER FOUR		
The Supply Situation		25
4.1	Local Supply	25
	4.1.1 Production Areas and Cultivated Extent	25
	4.1.2 Big Onion Varieties	27
	4.1.3 Production	27

4.1.4 Average Yield 29
4.2 Imports 31
4.2.1 Quantities and Values 31
4.2.2 Value and Tax Revenue 34
4.2.3 Countries 35

CHAPTER FIVE
Market Situation and Value Chain Analysis 37
5.1 Characteristics of the Market 37
5.2 Size of the Market 37
5.3 Price Behaviour 40
5.4 The Product Flow 44
5.4.1 Value Chain Network Map for Local Big Onion 44
5.4.2 Marketing Cost, Margins and Market Efficiency of Local Big Onion Value Chain 46
5.4.3 Market Channel for Imported Big Onion 48
5.5 Cost of Production 51
5.6 Summary of the Gross Margin Analysis of Big Onion 54

CHAPTER SIX
Value Chain Actors 55
6.1 Actors/Stakeholders Along the Value Chain 55
6.2 Actors' Involvement and Description 56
6.2.1 Input Suppliers (Seed) 56
6.2.2 Producers/ Farmers 60
6.2.2.1 Production Information 61
6.2.2.2 Harvesting and Marketing Information 64
6.2.3 Big Onion Importers 68
6.2.4 Collectors 69
6.2.5 Wholesalers 69
6.2.6 Retailers 70
6.2.7 Consumers 70
6.3 Government Intervention 70
6.4 SWOT Analysis of the Big Onion Value Chain 72

CHAPTER SEVEN
Summary of Findings and Recommendations 75
7.1 Summary of findings 75
7.2 Conclusion 78
7.3 Recommendations 78

REFERENCES 80

LIST OF TABLES

		Page No.
Table 3.1	Agrarian Service Centers which Mainly Cultivated Big Onions	17
Table 3.2	Value Chain Actors and Sample Size	18
Table 4.1	Cultivated Extent of Big Onion 2010 – 2020 (Hectares	26
Table 4.2	Production of Big onion 2010 – 2020 (Metric Tons)	28
Table 4.3	Average Yield of Big onion 2010 – 2020 (MT/Hec)	29
Table 4.4	Average Yield of Big Onion in China, India and Sri Lanka (2010 – 2020)	31
Table 4.5	World Top Ten Big Onion Producing Countries	35
Table 5.1	Total Availability, IDR, SSR and per Capita Availability of Big Onion in Sri Lanka	38
Table 5.2	Onion Consumption Analysis	39
Table 5.3	Domestic Supply and Domestic Utilization of Big Onion	39
Table 5.4	Total Availability and Total Requirement of Big Onion Per Year	40
Table 5.5	Price comparison for Big Onions between Local Production Season and High Import Season (Rs/kg)	43
Table 5.6	Producer's Share and Gross Price Margin of Local Big Onion (Matale)	44
Table 5.7	Marketing Cost, Margins and Efficiency in Different Channels	47
Table 5.8	Margins and Price Flow of Imported Big Onions Traded Through the DDEC and Colombo Wholesale Market	50
Table 5.9	Big Onion Production Cost per Acre, 2020 *Yala* and 2021 *Yala*	52
Table 5.10	Labour Cost for Different Activities of Big Onion Production	54
Table 5.11	Summary of the Gross Margin analysis for Big Onions - 2020 *Yala* and 2021 *Yala*	54
Table 6.1	The Role of Main Actors Along the Onion Value Chain	55
Table 6.2	Big Onion Seed Requirement, Local Seed Production and Seed Imports	57
Table 6.3	Problems Faced by Farmers in Producing Big Onion True Seeds	59
Table 6.4	Farmer Participation and Production of Big Onion Seeds in Matale District	59
Table 6.5	Land Ownership	62
Table 6.6	Duration of Selling Harvest	65
Table 6.7	Issues and Constrains Faced by Big Onion Farmers	66
Table 6.8	Suggestions by Big Onion Farmers	67
Table 6.9	Special Commodity Levy for Big Onion (2015 -2021)	71
Table 6.10	SWOT Analysis of the Onion Value Chain	72

LIST OF FIGURES

		Page No.
Figure 1.1	Extent, Production and Imports of Big Onion	2
Figure 2.1	Value Chain Flows	7
Figure 2.2	Value Chain Functional Model	8
Figure 3.1	Conceptual Framework of Big Onion Value Chain	16
Figure 3.2	Big Onion Cultivated Areas in 2019 *Yala*	17
Figure 3.3	Approach Developed by Kaplinsky and Morris (2001) and the Guidelines Developed by the UNIDO (2009)	20
Figure 4.1	Average Extent of Big Onion Cultivation in Major Producing Districts (2010 – 2020)	25
Figure 4.2	Total Extent of Big Onion Cultivation in Sri Lanka (2010 – 2020)	26
Figure 4.3	Total Production of Big Onion in Sri Lanka (2010 – 2020)	28
Figure 4.4	Average Production of Big Onion in Major Producing Districts (2010 – 2020)	29
Figure 4.5	Average Yield of Big Onion in Major Producing Districts (2010 – 2020)	30
Figure 4.6	Annual Imported Quantities and Values (2010 – 2021)	32
Figure 4.7	Total Availability of Big Onion	32
Figure 4.8	Imported Quantities of Big Onion by Monthly Basis (2019, 2020, 2021)	33
Figure 4.9	CIF Prices of Imported Big Onion	34
Figure 4.10	Imported Values and Tax Revenue (2010 – 2020)	34
Figure 4.11	Share of Imported Quantity of Big onion by Country Basis	36
Figure 5.1	Average Farmgate Prices of Big Onion	41
Figure 5.2	Seasonal Price Index of Big Onion (2011 – 2020 =100)	42
Figure 5.3	Market Trading Channels of Local Big Onion in Matale District	45
Figure 5.4	Value Chain Actors' Margin (Percentage)	48
Figure 5.5	Value Chain Actors' Margin (Percentage)	49
Figure 5.6	Value Chain Network Map for Big Onions (Local & Imports)	51
Figure 5.7	Cost Distribution of Big Onion Production in 2020 and 2021 *Yala*	53
Figure 6.1	Method of Store Seeds	58
Figure 6.2	Number of Farmers Cultivated Big Onion 2010 – 2020	60
Figure 6.3	Average Number of Farmers Cultivated Big Onion in Major Producing Districts	61
Figure 6.4	Distribution of Operators by Land Size	62
Figure 6.5	Seed Varieties	63
Figure 6.6	Source of Seeds	63
Figure 6.7	Type of Crop Damage	64

Figure 6.8	Method of Selling	65
Figure 6.9	Main Reasons for Quitting Big Onion Cultivation	68
Figure 6.10	Price and Commission Structure at the DDEC for Big Onion	69

ABBREVIATIONS

APMC	-	Agricultural Product Marketing Committee
CARP	-	Council for Agricultural Research Policy
CIF	-	Cost, Insurance and Freight
CWE	-	Cooperative Wholesale Establishment
COP	-	Cost Of Production
DOA	-	Department of Agriculture
DDEC	-	Dambulla Dedicated Economic Centre
DEC	-	Dedicated Economic Centre
FAO	-	Food and Agriculture Organization
HIES	-	Household Income and Expenditure Survey
IDR	-	Import Dependency Ratio
INR	-	India Rupee
NHRDF	-	National Horticultural Research and Development Foundation
NGO	-	Non-Government Organization
NAP	-	National Agricultural Policy
NPQS	-	National Plant Quarantine Service
SDG	-	Sustainable Development Goals
SWOT	-	Strength, Weaknesses, Opportunities and Threats
SSR	-	Self Sufficiency Ratio
TAMP	-	Technical Assistance to the Modernization of Agriculture Programme
UNIDO	-	United Nations Industrial Development Organization
VCA	-	Value Chain Analysis
VC	-	Value Chain

CHAPTER ONE

Introduction

1.1 Background

Big onion is a high value cash crop introduced in the early 1980s to supplement the income of the paddy farmers during the dry season and it has been popular among farmers due to high profitability and high returns. It is also an important condiment in Sri Lankan and Asian cuisine. In Sri Lanka the crop was initially cultivated in rice fields in the mid country intermediate zone, which was then spread towards the areas in the low country dry zone. It is well adapted to the dry zone; can be grown from sea level to an elevation of 2,000m. The rainfall should not exceed 750mm during the growing season. Sunny weather prevailing in 1-1/2 months is needed for crop maturity. Big onion can be grown on a wide range of soils, except ill drained and heavy soil types. This crop is mainly grown during the *Yala* season in paddy fields, predominantly under rain-fed cultivation and crop is mainly confined to the districts of Matale and Anuradhapura. Though seeds are largely imported from India by private traders, since late more farmers have turned to locally produced true seeds. Other than the local production period from August to October, larger stocks arrive at the market from India and Pakistan. Prior to 2005 imports served over 80% of the country's requirement. In the years with increased local production this share drops to 60% – 74%. With big onion becoming the main substitute of red onion of which, the consumption dropped considerably. According to the Household Income and Expenditure Survey (HIES) of the Department of Census and Statistics, the per capita consumption of big onion records an upward trend: 534.17grams/month in 2005, 569.79grams/month in 2006/07, 582.38 grams/month in 2009/10, 607.51 grams/month in 2012/13 and in the year 2016 it rose to 682.15 grams/month.

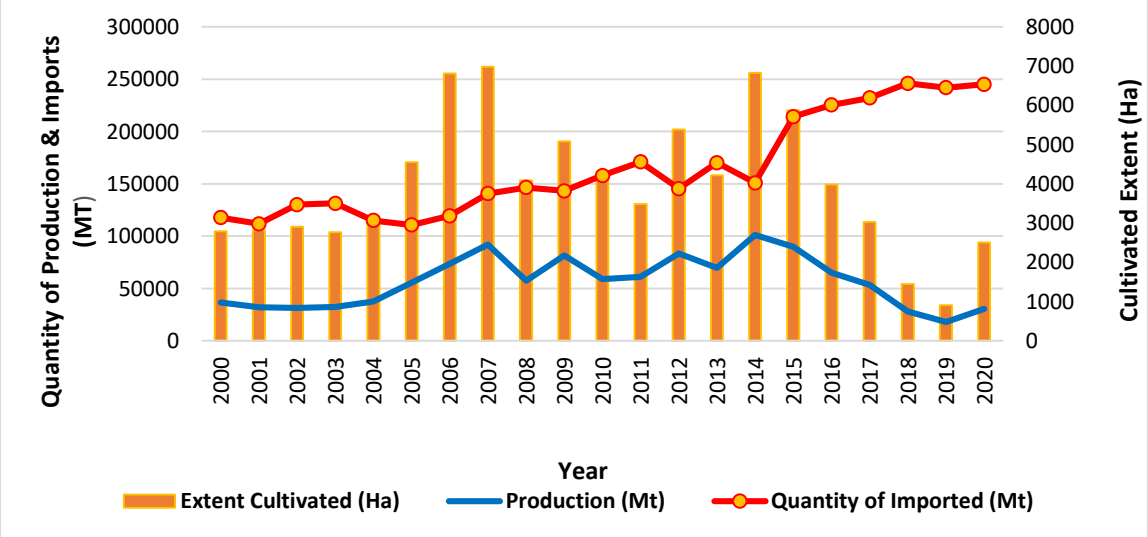
1.2 Research Problem

The government strives to achieve self-sufficiency in big onion production as a measure of frugality as Sri Lanka expended Rs.mn. 15,156 in 2019 in importing big onions. A major stumbling block in reaching that end is a dip in local production which triggers soaring prices. Reduced cultivation extent, dwindling farmer population and poor yield may have induced low production. For example, when compared to 2010, the cultivated extent of big onion has decreased by 76% in 2019. Big onion production has also dropped by 68% during the same period (Figure 1.1). During 2010–2019 the farmer involvement dropped by 77%. In the past decade, the imported quantity also increased continuously. In order to bridge the demand-supply gap the government has resorted to importing big onion on a regular basis. Except during the local production period from August to October, larger stocks reach the market from India and Pakistan. During the period from 2010 to 2019,

the share of imports accounts for 70 percent of the country's requirement, except for the years 2012 and 2014. In 2019 it further increased to 93 percent of the requirement due to low production at home. In general, the high production cost and the poor yield are the main evils that prevent the local production achieving price competitiveness. In this context, importing presumably more desirable; however, it has created a dilemma—concurrently addressing the welfare of the big onion farmers and consumers.

Due to production loss triggered by calamitous weather, India —a leading big onion importer to Sri Lanka—restricted imports since October, 2019. The dip in supplies resulted in a boom in retail and wholesale prices during the months of October and November in the same year. The Consumer Affairs Authority claimed the price surge as 'unwarranted' as it peaked in 2020, recording Rs. 300.00/kg by February 22 three times higher than the "real value" in the market (ECONOMYNEXT, 2020). Low availability created by decreased production and limited imports was further supplemented by a weak supply chain and market inefficiencies. Further, according to Priyadarshani et al., 2016, price instability being higher at farm gate level than wholesale and retail levels indicates that farmers are not safer than traders in the face of price fluctuations. To reduce price instability at the farm gate and marketing margins certain steps should be taken, though big onion marketing system in Sri Lanka is functioning more or less efficiently.

Hence by studying the value chain aspects of big onion the full chain map, the share of gross margin by actors can be understood. Understanding the role of key actors and facilitators in the chain map, understanding the gains and losses along the big onion value chain, from farmer to final consumers is also vital.



Source: Department of Census and Statistics

Figure 1.1: Extent, Production and Imports of Big Onion

1.3 Significance of the Study

The import policy of the government has a heavy impact on local big onion cultivation and price determination. Every year, upon local stocks reaching the market importation tax on imports is imposed to redress the local producers. Moreover, various state-sponsored programmes such as seed production programme, off season cultivation programme, food security and national food production programme are directed at uplifting the big onion production. The National Food Production programme aims at achieving 60 percent self-sufficiency in big onion by 2018. Big onion —being one of the major five crops identified by the government is linked with the Fertilizer Subsidies Programme and Crop Insurance Programme. The government has accelerated the other field crop production programme in 2014, through which 50 percent self-sufficiency or 50 percent import substitution in big onion was to be achieved by 2016.

Hence, a comprehensive value chain analysis will facilitate players to achieve better outcomes and guide authorities in making informed policy decisions. As a descriptive tool, value chain analysis forces the analyst to consider the both micro and macro aspects involved in production and exchange between different actors. Consequently, the potentials and problems can be delineated towards expanding big onion cultivation over and above the present levels; it will help narrow down the gap between domestic requirement and local production in future. Further, analysis of the value chains of principal crops and identifying the potential development areas is one of the research priorities of CARP, 2017-2021. The development of agricultural VC is a major priority investment area of the Agriculture Modernization Project.

At the same time, through the new policy document: “Vistas of Prosperity and Splendour”: the government intends to promote small producers who own small extents of land to produce high quality outputs using modern technology. Through this policy it aims to develop systems to promote cultivation and production of onions. With the increase of local production, it aims to save foreign exchange annually. The Covid 19 pandemic compelled the nations to restrict imports. Hence, as a remedial measure and making frugality a priority, the government set out a plan to grow 16 crops locally, in which big onion is part of (NAP,2021). According to the cabinet memorandum No. Ag 152/2020, it was decided to provide the seeds required to cultivate the 16 selected crops to the farmers at a concessionary price. Through those measures, the government was expected to reduce the importation of essential food items and encourage farmers to cultivate them in sufficient quantities within the country (NAP, 2021).

In pursuing the goals, conducting a whole value chain analysis in this sector to identify the bottlenecks and future prospects is vital.

Through this big onion VCA the following aspects are explored.

- Socio-economic and livelihood situation of the target groups
- Production situation of the target area
- Market functioning and market relationships among different chain stakeholders, including price formation, margins, trends in prices etc.
- Where and what are the obstacles?
- At which point of the chain the progress is stalled?
- What are the challenges that deserve priority attention?

Findings of this research will be useful for researchers, policymakers, and development practitioners and most importantly for actors in the big onion value chain in Sri Lanka. The study would help formulate recommendations to reduce the marketing cost of big onion, institutional constraints to solve problems in the whole big onion value chain. Value chain analysis would help to understand how to improve the farmer's performance at each value adding step while providing an in-depth understanding as to how to increase farmer's share in the big onion price while compensating the share of middlemen. Such understanding of an efficient market chain would facilitate the formulation of an action plan to ensure the country`s food security. In doing so, Sri Lanka can forge ahead with effective policies directed at protecting both farmers and consumers alike while making frugality a priority in this global crisis situation.

1.4 Objectives of the Study

The General Objective

Identifying major constraints and opportunities of production and marketing and making recommendations for intervention and improving the big onion value chain by carrying out a detailed VCA of the big onion in Sri Lanka.

The Specific Objectives:

1. To identify and map existing big onion value chains in Sri Lanka (Imported and local)

   Describe the structure and flow of the value chain with a sequence of activities, the key actors and stakeholders, their linkages (vertical and horizontal) and interactions from pre-production to consumption

2. To analyze economic performance (margins, cost, returns and efficiency) of different big onion value chains

Economic performance analysis— gross margins, net margins, cost, returns and market efficiency

3. To identify constraints and opportunities persisting along the value chain

Strengths, Weaknesses, Opportunities and Threats (SWOT Analysis) impacting the onion value chain to identify the opportunities and threats along the big onion value chain

CHAPTER TWO

Literature Review

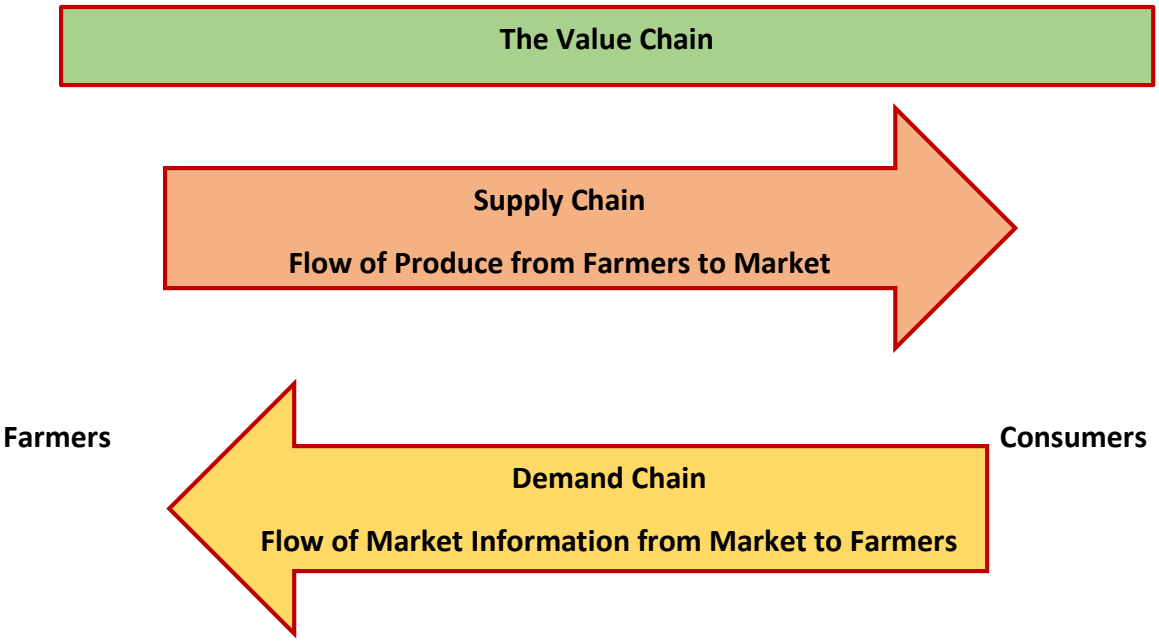
2.1 Importance of the Agricultural Value Chain

2.1.1 What is a Value Chain?

In general, value chains describe the full range of activities required to bring a product or service through all phases from initial producer to final consumer (incl. communication of market information to everybody involved in the chain).

An agricultural value chain consists of two parts:

1. The supply chain: links the steps that produce goes through from the farmer to the consumer
2. The demand chain: the flow of market information from consumers to farmers

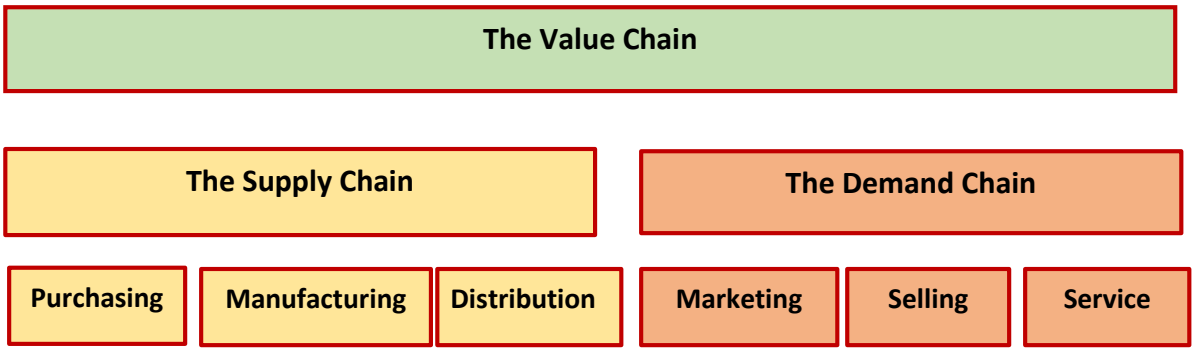


Source: VSO ICS Report, 2015

Figure 2.1: Value Chain Flows

Supply chain activities consist of buying the produce (purchasing), making changes to the produce to upgrade its value (processing e.g. packaging and/or sorting) and transporting it to the location of demand (distribution).

The demand chain consists of activities to stimulate demand for produce (marketing), facilitating transactions to enable people to buy the produce (sales) and providing any 'after-sales' service such as dealing with returns or unsold perishable goods (service):



Source: VSO ICS Report,2015

Figure 2.2: Value Chain Functional Model

Agriculture Value Chain refers to a range of goods and services needed for an agricultural product to move from farm to consumers (farm to fork). Various actors and activities are involved from the production process to delivery of product to the market and finally to the end consumer. The whole idea of a value chain is to generate value for all the actors while analyzing how the various actors in the chain exchange knowledge to enter the market. Under Value Chain Finance Approach, the decisions about financing are based on the health of the entire value chain, including market demand, and not just on the financial health of the individual borrower. In studying agriculture value chain, two possible approaches can be used: Supply chain management approach and Agriculture++ (Agriculture Plus Plus) strategy (Wong, 2016).

Supply chain management approach

Unlike a general production centric approach which focuses exclusively on the production level, the supply chain management approach employs a more holistic agribusiness approach of considering the sequence of key activities and their supporting economic activities at various levels of the chain; delivery of agricultural inputs, production and processing of agricultural products, and marketing and distribution of those products. It

links agriculture with the manufacturing and services sectors of the economy along the supply/value chain and trading network.

The Agriculture++ (Agriculture Plus Plus) Strategy

Agriculture++ is a strategy based on Michael Porter's value chain analysis and cluster development. It attempts to encourage investments in the economic activities in the upstream (research and development, certified seeds, high yielding varieties, better agronomic practices and farming systems), midstream (grading, sorting, processing,), and downstream (packaging, food safety, traceability, branding, targeted markets) segments of the value chain (Wong, 2016).

We are all part of value chains in one way or the other; producers, consumers of goods and services, processors, retailers or finance providers. At one end of the agricultural value chain are the producers —the farmers who grow crops and raise animals. At the other end are the consumers who eat, drink, wear and use the final products. And in the middle are many thousands of men and women, and small and large businesses. Each person and each business perform one small step in the chain, and each adds value along the way — by growing, buying, selling, processing, transporting, storing, checking, and packaging. Other people and other businesses have important roles supporting the chain. Banks provide loans; governments establish laws and policies, and agricultural research organizations develop ways for farmers to more successfully participate in value chains. Value chains are all about human interactions. They are about linkages between people and businesses who transfer or exchange products, money, knowledge and information (Cuddeford, 2014).

In an effective value chain, people at different stages actively support each other. The mutually complementing roles lead to improved livelihood. Each person in the chain shares the common goal of satisfying consumer needs in order to increase their own profits (Cuddeford, 2014).

2.1.2 Importance of the Value Chain

Small-scale farmers lament over the low prices they receive for their produce. Typically, the produce is bought at the farm gate at a cheaper rate, leading to disputes between the trader and the farmer. Farmer is also blamed for being not honest with regard to packing the produce and weighing it. This lack of mutual trust affects the efficiency of the value chain, denying expected benefits for each party along the chain (Cuddeford, 2014).

Small-scale farmers seldom benefit from value chains of this nature. Many farmers who grow crops or raise animals on their own have little bargaining power. They have little authority in price determination, which is created by lack of information, contacts and failure to calculate the actual cost. The reverse flow of information—consumer to

farmer—is very slow to progress; hence, the farmer is deprived of vital information on consumer demand at the time of crop selection. For all these reasons, it is difficult for African farmers to benefit fully from the value chains they are already involved in (Cuddeford, 2014).

Further, the value chain approach considers the role of existing chain actors, supporting actors, and the policy environment while revealing the challenges persisting in it and the opportunities for improving the efficiency of the value chain for fair distribution of benefits at every point (Cuddeford, 2014).

Analyzing a value chain paves way to identify not only its challenges, weaknesses and strengths but also new income-generating opportunities. Sometimes, participating in a well- functioning value chain brings farmers not higher incomes or prices, but a more stable and predictable income. Well-functioning markets and value chains can attract young people to farming as higher returns and monetary benefits are assured. Farmers may acquire new skills and adopt improved practices by participating in value chains. Further, basic processing on the farm can minimize post-harvest losses caused by unsystematic packaging and transportation, which in turn raises the farmer's returns. (Cuddeford, 2014).

Everyone who participates in a value chain adds value as the product moves from the beginning to the end-- the consumer. In return, all participants receive an economic rent Those most likely to benefit from value chains are entrepreneurial, have willingness to communicate with people in different parts of the value chain, and have site and financial resources and the knowledge to develop new markets or participate more effectively in current markets. Therefore, farmers with little land, fewer assets, limited market accessibility, poor communication skills, little irrigational resources, and who are not part of an affluent farmer body may scarcely benefit from a value chain (Cuddeford, 2014).

Agriculture value chains gained popularity with the United Nations' Sustainable Development Goals (SDGs) coming to the fore in 2015. It set out 17 objectives and 169 targets for social, environmental and economic development. In this context, agriculture value chains were considered strategic as those can adopt multiple approaches that simultaneously contribute to achieving different goals. In addition, value chains can contribute to decreasing poverty primarily by increasing productivity, adding value to products, increasing the income, generating employment opportunities, reducing transaction costs and mobilizing the economy and social capital of rural territories (Bandara, 2014). The most common intervention also focuses its attention on the empowerment of people, development of skills, and dynamization of the economy under dynamization of markets. High value chains can contribute to food security in the dimensions of access, availability and quality of food primarily by increasing the production volumes, farm diversification, generating higher incomes, reducing postharvest losses, and upgrading technologies to use natural resources and agriculture

inputs more efficiently. In the case of organic agriculture, reduction of chemical pesticides, herbicides and fertilizers lower the health risks and impacts on the environment while affecting the food security in the long term (Kafle.et.al, 2018).

2.2 Production and Marketing of Big Onion in Sri Lanka

Hewawitharana *et al*. (2010) who studied the financial feasibility of big onion production using domestically produced true seeds at farmer level in the Matale district found that the yield with local true seeds was 1.32 times higher than that was obtained from imported true seeds. The profitability of big onion cultivation with local true seeds and imported true seeds was Rs. 27.69/kg and 12.95/kg, respectively, in *Yala* 2009. The profitability of local true seed production was Rs. 4,497/kg in *Maha* 2008/09. These results indicate that true seed production is financially feasible at the farmer level and commercial big onion production that uses local true seed is more lucrative when compared to that of imported true seeds.

Congruent with the above findings it has also been revealed that the use of locally produced true seeds could effectively increase the big onion yield. However, other factors may have a role to play in increasing/reducing the expected output. The use of higher fertilizer amounts and different types of fertilizers apparently had little impact on the yield. Knowledge of the farmers about the Department of Agriculture (DOA) recommendations is poor; farmers who deviated from the DOA recommendations reported low productivity and high cost of production (Lesly et al., 2002).

Nevertheless, Sri Lanka leans towards importing the product, mainly from India. An average of 20,000mt of big onions per month is imported by large scale operators in Dambulla and Colombo, which are sold at a lower price. With Sri Lanka holding no price advantage against India and local production being insufficient to cater to the demand, analyzing the big onion value chain is vital for import substitution (TAMP, 2019).

Samantha et al. (2013) revealed that there is high risk in production of big onion seeds; hence farmers have tendency to cultivate small plots. Cultivation in *Yala* is more profitable than in *Maha*, but the storage of mother bulbs until *Yala* is a major problem in the area. Only a limited number of seed producers have registered under the Seed Act. There is a high demand for local true seed and its price is five times higher than that of the imported seeds. Fewer private companies are engaged in big onion seed production and the major problem they face is lack of foundation seeds of recommended varieties and the skilled labour shortage.

2.3 Big Onion Value Chain in Other Countries

According to the FAO project with regard to Onion Value Chain Analysis in Northern Belize, the following findings have been revealed. The illegal importation of onions is a

major hindrance to the sustainable development of the onion industry. With respect to production, major problems are related to establishment of the crop, fertilization, planting technology, planting practices, moisture management and pest and disease control. Major losses have been experienced due to the lack of post-harvest technology, mainly the curing and storage of the fresh produce. This has also resulted in less acreage being planted and farmers' participation throughout the years. The lack of organized farmers and farmer groups has an adverse impact on the industry. Working collectively is one of the best ways to get support for the introduction of the most needed post-harvest technology for curing and storage of fresh onions. This technology will assist in alleviating the problems in production, longer period of availability of locally-produced onions and marketing activities, thus leading to better quality and prices (Carballo, 2016).

There are various challenges and critical gaps in the Onion Value Chain, which prevent the farmers from getting a fair price across India. Low productivity low and high storage losses, and the resultant volatility in onion prices are reported to be the main evils. In addition, poor quality seeds and low seed replacement ratio are among the major factors contributing to low onion productivity. NHRDF officials revealed that seed replacement ratio in onion is less than 20% in India. High labour costs add up substantially to the cost of production. Shrinking family sizes, and the farmers' children's turning away from farming has increased the dependence on external labour. One of the prime reasons behind high volatility in onion prices stems from the lack of storage facilities that have not kept pace with rising production (Setiya et al., 2018).

Shah (2017) assesses the relationship of prices of onion at the farm level as well as at wholesale, retail and export level with a view to understand price mechanism involved in the marketing of onion as well as the hurdles in marketing the produce. The study showed that the producer's share in consumer's rupee for onion varied from 49 percent to 52 percent in domestic market for various varieties, and this share in export channel varied from 30 percent to 35 percent. Further, the study revealed that onion prices remained at lower ebb during harvesting/peak period and high during lean period. One of the major factors responsible for the lower share of producer in retail and export prices was the higher cumulative marketing margins cornered by various market functionaries. The situation is unlikely to be altered unless various regulative measures are brought in place to check practices of these functionaries involved in the marketing of high value crops. Akalu (2007) in his study of vegetable market chain analysis identified variables that affect the marketable supply. According to him, the production quantity and total area owned were significant for onion supply but the sign of the coefficient for total area of land was Negative.

According to Agidew (2018), understanding problems and opportunities with priorities was very important for both research and development initiatives. Production and marketing problems identified in this study were poor product handling, pest and disease, unorganized input delivery, imperfect pricing system, absence of law enforcement on

standards, lack of coordination among producers and lack of improvement for other actors in the channel.

Kaskuste (2020) who studied the onion market chain and power relations in a major onion farming area in India, Maharasta, found that the average land holding of the sample farmers is 7 acres, which is categorized as a small and marginal land holder and the land possessed is mostly of self- owned. Average yield of onion per hectare ranges from 200 to 300 quintals which is higher than the predicted national average of 170.30 quintals per hectare by 2020.

The cost of cultivation for onion crop varies from INRs. 150,000 – 200,000 per hectare depending on the season in which the crop is cultivated and the cultivation practices adopted by the farmers. Seed and labour constitute a major share in the production cost of onion; however, quality of seed always remained a subject of contention pertaining to low productivity of the crop.

Crop insurance is provided by private and government entities. However, in this study, majority of the farmers have not opted for this option. Of the reasons cited for not choosing it are: the claims not being settled in time, inability to pay the premium, delayed crop cutting experiments and the claim amount being neither sufficient nor realized in time. Hence, the insurance schemes were never found beneficial to the farmers.

According to the NHRDF (2016) research on value chain study of onion crop in Chikmagalur in Karnataka, the farmers are compelled to take their bulk produce to Bangalore APMC due to unavailability of storage or processing infrastructure in the vicinity. The farmers pool their produce, rent vehicles (mostly trucks – 10 MT each) and share the expenses. The average transport cost per kilo to Bangalore comes to as high as Rs. 0.90. Also, in spite of the onion produce from Karnataka in good stead in the market due to high demand (as a result of shortage from other areas especially Gujarat and Maharashtra) the farmers are unaware of this and indulge in panic selling. A large number of sellers trying to sell to a limited number of buyers weakens their bargaining power. There is negligible access to price information of local and other markets or arrival patterns.

CHAPTER THREE

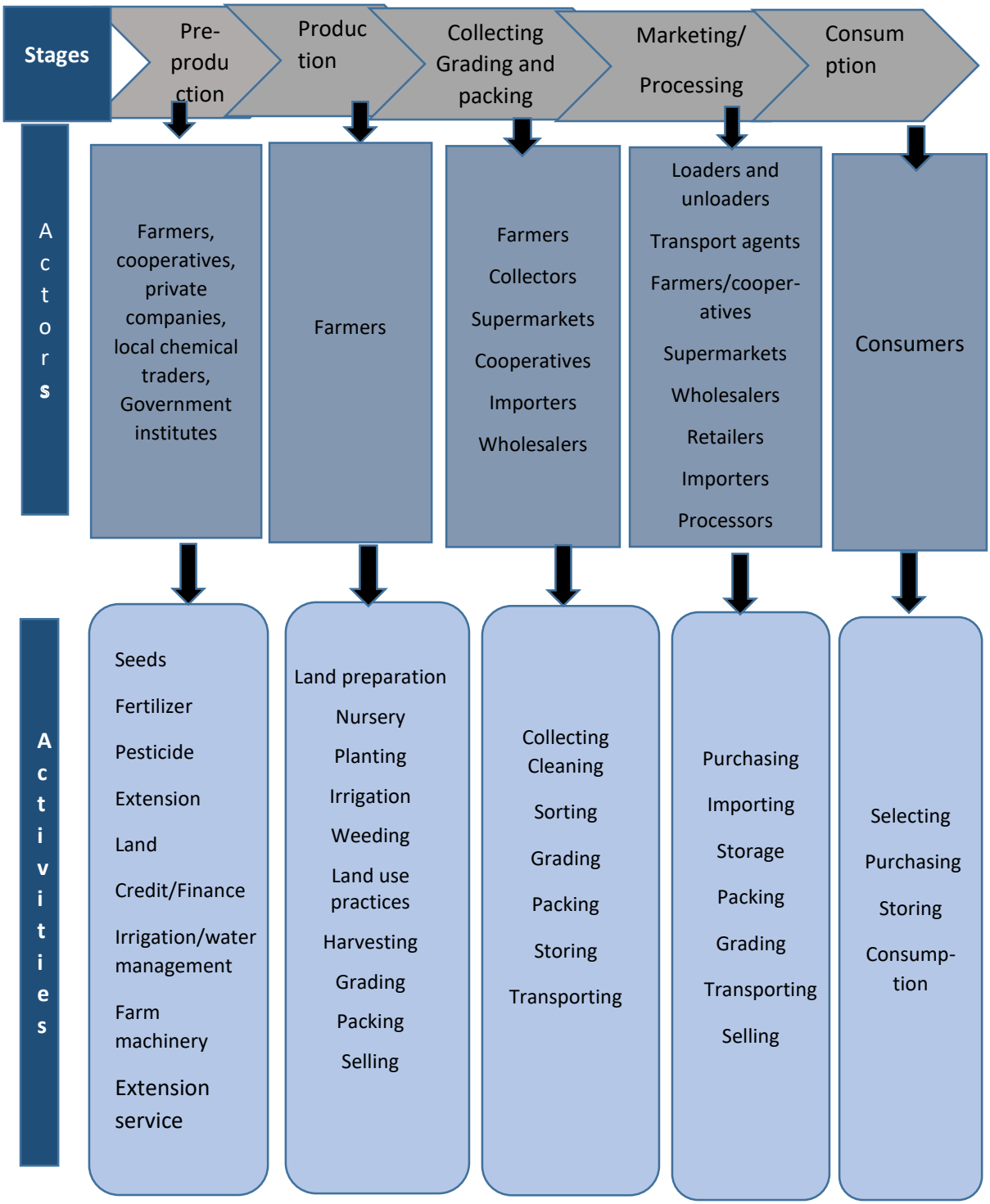
Material and Methods

3.1 Conceptual Framework of Agricultural Value Chain

A value chain consists of all stages of a production process as well as of the interaction between these stages. The production process starts at the stage of pre-production (input supply), then moves along the whole logistical process; production, collecting, grading and packing, processing and marketing and consumption. The conceptual framework of big onion value chain views as a network of horizontal and vertically integrated value chain actors that are jointly aimed towards providing products to a market. The value chain includes direct actors who are commercially involved in the chain (input suppliers, producers, importers, collector, wholesalers, retailers, consumers) and indirect actors who provide services or support the functioning of value chain. These include financial or non-financial service providers such as bankers and credit agencies, business service providers, public research, crop insurers, extension agents, transporters and NGOs. Figure 3.1 below depicts the conceptual framework of the study which reflects the possible order of analysis of the big onion value chain.

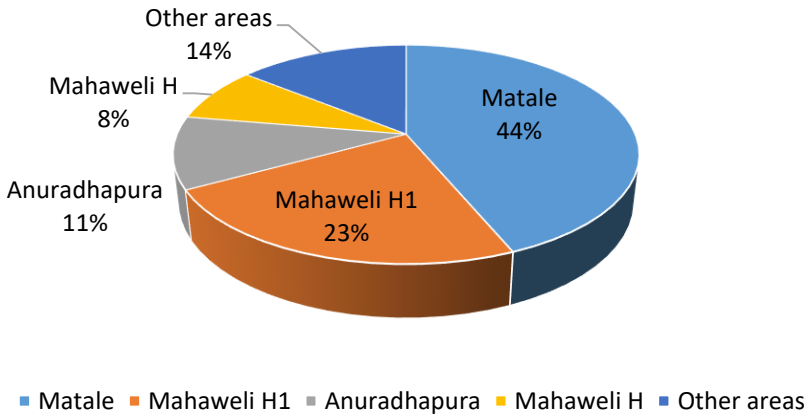
3.2 Description of the Study Area

Locally produced big onions mainly come from the Matale and Anuradhapura districts, including the Mahaweli H region. According to the Crop Forecast in *Yala* 2019 of Department of Agriculture, 78% of the cultivated extents were recorded in Matale, Mahaweli H1 area and Anuradhapura. Hence, Anuradhapura and Mahaweli H1 areas were selected for the farmer survey.



Source: Crop forecast, Crop forecast unit, Department of Agriculture

Figure 3.1: Conceptual Framework of Big Onion Value Chain



Source: VSO ICS Report, 2015

Figure 3.2: Big Onion Cultivated Areas in 2019 *Yala*

The following (Table 3.1) depicts the major agrarian service centers of big onion cultivation in selected areas. According to the cultivated extent, Dambulla, Sigiriya, Galewela, Devahuwa and Kongahawela were selected from the Matale district and Milagaswewa and Andiyagala were selected from the Anuradhapura district. Both Galkiriyagama and Madatugama were selected from Mahaweli H1 areas according to the highest cultivated extent of big onion.

Table 3. 1: Agrarian Service Centers which Mainly Cultivated Big Onions

Matale	Anuradhapura	Mahaweli H1
Dambulla	*Milagaswewa*	*Galkiriyagama*
Sigiriya	*Andiyagala*	*Madatugama*
Galewela	Ipalogama	
Devahuwa	Palugaswewa	
Kongahawela	Muriyankadawala	
Naula		

Source: Field data, MFPAD

3.3 Sampling Procedure

The sample was drawn from all the actors involved along the onion value chain such as producers, importers, collectors, wholesalers, retailers and consumers. However, with the outbreak of Covid – 19, the survey did not progress as planned. Hence, only 40 farmers from Matale and Anuradhapura and Thambutthegama areas were randomly selected; they were interviewed over the telephone. Besides producers 10 seed producing farmers, 10 farmers who gave up the big onion cultivation, five local collectors, five major importers, 10 retailers (five from Colombo and suburb markets and five from Dambulla

and other producing areas), 10 wholesalers (five from the Dambulla Dedicated Economic Center, five from the Colombo wholesale market) were interviewed via telephone as well interviewed face- to- face (Table 3.2).

Table 3.2: Value Chain Actors and Sample Size

Value Chain Actor	Sample Size
Farmers	40
Seed producing farmers	10
Farmers who gave up big onion cultivation	10
Collectors	05
Major Importers	05
Wholesalers in Dambulla DEC	05
Wholesalers in Colombo	05
Retailers (Colombo and Dambulla Areas)	10

3.4 Sources of Data and Method of Collection

To achieve the objectives, both primary and secondary data sources were used.

Primary Data

Both qualitative and quantitative methods were used for data collection.

1. Key informant interviews using semi structured questionnaires for big onion importers, big onion seed importers, other input suppliers, collectors, commission agents, wholesalers and retailers were held.
2. Key informant interviews were conducted with officers attached to the following institutions.
   - ❑ Field Crop Research and Development Institute
   - ❑ Seed and Planting Material Division
   - ❑ Seed Importers
   - ❑ The Department of Agriculture
3. A structured questionnaire survey was conducted with big onion farmers via telephone.
4. Field observations
5. Market assessment

A market survey was conducted both informally and formally to identify existing markets, supply chains and to key actors in the value chain of big onion.

Secondary Data

Secondary data and information were collected from the Department of Census and Statistics, the Department of the Agriculture, the Department of Customs, the Central Bank, published and unpublished reports, bulletins and websites.

3.5 Methods of Data Analysis

Value chain analysis is a process that requires four interconnected steps:

- Data collection
- Value chain mapping
- Analysis of opportunities and constraints
- Vetting of findings with stakeholders and recommendations for future actions.

Descriptive statistics such as frequency, mean, percentage and standard deviation was used to summarize the data and present it in the tabular form. For identifying the existing supply chain descriptive analysis was performed.

Qualitative analysis tools such as chain mapping and SWOT analysis were employed for this study. Analysis of quantitative and qualitative data and information flow was conducted. Opportunities and constraints prevailing in the chain were also identified and described. This process led to the identification of the main problems affecting the big onion farmers in Sri Lanka.

Value chain analysis

Value chain analysis is the process of breaking a chain into its constituent parts in order study its structure and functioning. The analysis consists of identifying chain actors at each stage and discerning their functions and relationships; determining the chain governance, or leadership, to facilitate chain formation and strengthening; and identifying value adding activities in the chain and assigning costs and added value to each of those activities (UNIDO, 2009).

To understand the characteristics of the chain actors of big onion and the relationships that exist between them, including the identification of all actors in the chain; the flow of product through the chain; the work features and the destination; information was extracted by conducting interviews, conducting focus group discussions and by collecting secondary data from various sources. The study employed value chain analysis which is very effective in tracing product flows, showing the physical value adding stages, qualitative and quantitative flow of product along the chain with identified key actors, their relationships with other actors in the chain. Later, distribution of their benefits was measured by mapping the value chain. Mapping the chain facilitates understanding of sequence of activities, key actors and relationship involved in the value chain. This analysis was undertaken in qualitative terms.

The following steps of value chain analysis was applied to this study;

- ***Mapping a Value Chain***

Mapping a value chain facilitates a clear understanding of the sequence of activities and key actors and relationships involved in the value chain. This exercise is carried out in qualitative and quantitative terms through graphs that represent the various actors of the chain, their linkages and all operations of the chain from pre-production (supply of inputs) to industrial processing and marketing (UNIDO, 2009). The two major value chains; imported big onion value chain and local big onion value chain; were considered for this study. According to the FAO guidelines, value chains can be mapped and analysed using Value Chain Analysis (VCA) which can include qualitative and/or quantitative tools. There are no rigid standards in selecting the research approach; however, there are strong grounds to use a qualitative approach, supplemented with quantitative analysis. Channel mapping methodology; a process of tracing a product flow through an entire channel from the point of conception to the end market; was employed to analyse the value chain. Smooth functioning of interactions in the vertical linkages of an agricultural value chain depends on the quality of the products and services provided by horizontal linkages to a large extent. Therefore, the study mapped all horizontal linkages; input supplies, extension, packing, transporting services of selected value chains. The mapping methodology adopted will be followed the steps in Figure 4. The study took on the UNIDO concepts of Value Chain Analysis.

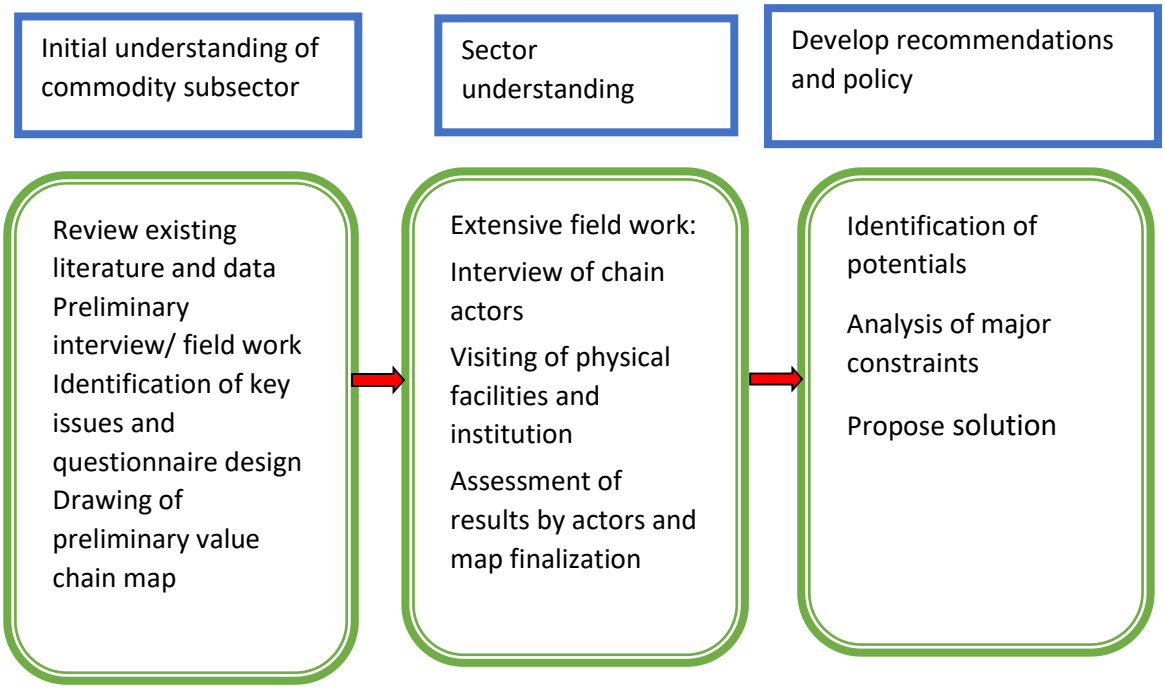


Figure 3.3: The Approach Developed by Kaplinsky and Morris (2001) and the Guidelines Developed by the UNIDO (2009)

Special emphasis was given to the importation process of big onions. Sri Lanka imports an average 20,000mt per month, mainly by large scale importers. Information provided by them is essential to the scenario: the value distribution of locally produced big onions and imported big onions.

- **Calculating Efficiencies in Big Onion Value Chain (VC)**

Quantitative analysis such as gross margins, market margins and value addition percentage will be calculated to find out the efficiencies in each VC actor (Acharya and Agarwal, 2001).

Gross Margin Analysis (GM)
GM is used to determine the returns realized by the farmers, collectors, importers, processors and traders.

$GM = TR_i - TVC_i$
Where,
GM= Gross margin of farmers, collectors, transporters, importers, wholesalers and retailers (Rs/Kg)
TR = Average total revenue of farmers, collectors, transporters, importers, wholesalers and retailers (Rs/Kg)
TVC = Average total variable cost of farmers, collectors, importers, wholesalers and retailers (Rs/Kg)
i= 1-n^{th} farmers, collectors, importers, wholesalers and retailers

Market Efficiency (ME)
The marketing efficiency calculated by deploying

$$\mathbf{MME} = \frac{\mathbf{FP}}{\mathbf{(MC+MM)}} -$$

Where,
MME = Modified measure of marketing efficiency
FP = Price received by the farmer
MC = Marketing costs
MM = Marketing margins

Market Efficiency will be calculated for each actor (collector, importer, wholesaler and retailer) along the value chain.

Value and Profit Share

To compute the value and profit share of actors along the chain actors profit per kilogram in big onion, the following formula will be used.

TC = Purchase Price + Marketing Cost (1)

Value Added = SP – Purchasing Price (2)

$$\text{Share of VA} = \frac{\text{Actor's Value Added}}{\text{Total Value Added along the Chain}} \quad (3)$$

Actor's Profit = SP – (PP + Marketing Cost) (4)

$$\text{Profit Share} = \frac{\text{Actor's Profit}}{\text{Total Profit along the Chain}} \quad (5)$$

Where,

TC – Total Cost
VA – Value Added
SP – Selling Price
PP – Purchase Price

- ***Market Margins***

According to Ghorbani (2008), marketing margin is an important indice in evaluating value chain performance. It is the difference in the price paid by consumers and that is received by producers. Marketing margins are also calculated at different points along the value chain and then compared with consumer price. Once the basic structure of a marketing channel is established it is relatively easy to collect information on the price at which the product is bought and sold at each stage in the production process (Smith, 1992). Estimates of marketing margin are the best tools to analyze the performance of market. The cost and price information was used to construct marketing cost and margin, which was gathered from big onion value chain actors such as, producers, collectors, retailers, wholesalers and consumers. Computing the total gross marketing margin (TGMM) is always related to the final price paid by the end buyer, which is given as a percentage (Mendoza, 1995). In short, market margin is a price charged for providing a mix of marketing services such as assembling, transportation, handling, packing, sorting, storage and profit. Marketing margins for the big onion traders was estimated using the following formulas.

$$TGMM = \frac{\text{Retailing Price – Farm gate price}}{\text{Retailing price (consumer price)}} \times 100 \quad (6)$$

The terms "producer participation", "framer's portion" or "producer's gross marketing margin" (GMM) refer to the portion of the price paid by the end consumer that belongs to the farmer as a producer. It should be emphasized that growers, as middlemen, also receive an additional marketing margin. The producer's margin or share in the consumer price (GMMp) was calculated as:

$$GMM_p = \frac{\text{Retailing price – Marketing Gross Margin}}{\text{Retailing Price}} X100 \quad (7)$$

$$GMM_P = 1 - TGMM$$

$$GMM_B = \frac{\text{Broker Price – Farm gate Price}}{\text{Retailing price}} \times 100 \quad (8)$$

$$GMM_{FT} = \frac{\text{Farmer Trader Price – Brokers Price}}{\text{Retailing Price}} \times 100 \quad (9)$$

$$GMM_{DW} = \frac{\text{DW Price – Farmer Trader Price}}{\text{Retailing Price}} \times 100 \quad (10)$$

$$GMM_{CW} = \frac{\text{CW Price – DW Price}}{\text{Retailing Price}} \times 100 \quad (11)$$

$$GMM_R = \frac{\text{Retailing Price – Wholesale Price}}{\text{Retailing Price}} \times 100 \quad (12)$$

Where,

TGMM = Total Gross Marketing Margin.
GMMp = Gross Marketing Margin of Producer (the producer's share in consumer price).
GMM_B = Gross Marketing Margin of Brokers (gross market margin received by brokers).
GMM_{FT} = Gross Marketing Margin of farmer-traders (gross market margin received by farmer - traders).
GMM_{DW} = Gross Marketing Margin of District Wholesalers (gross market margin received by district wholesalers).
GMM_{CW} = Gross Marketing Margin of Central Wholesalers (gross market margin received by central wholesalers).
GMM_R = Gross Marketing Margin of Retailers (gross market margin received by Retailers)

The Net Marketing Margin (NMM) is the percentage of the final price earned by the intermediaries as their net income which is remaining after deducting their marketing costs. Thus, the Net Marketing Margin was calculated as:

$$NMM = \frac{\text{Gross Marketing Margin} - \text{Marketing Costs}}{\text{Consumer Price.}} \times 100 \qquad (13)$$

- Qualitative analysis tools (SWOT) were carried out on big onion value chain in order to map the Strengths, Weaknesses, Opportunities and Threats throughout the chain. It focuses on both internal and external factors.

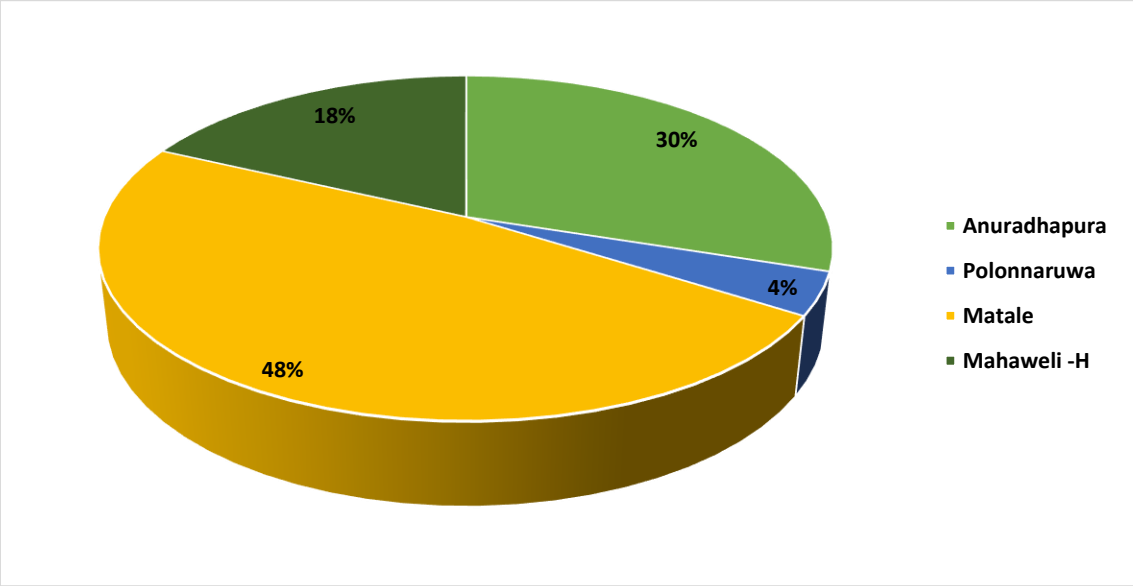
CHAPTER FOUR

The Supply Situation

4.1 Local Supply

4.1.1 Production Areas and Cultivated Extent

Big onion, mainly cultivated during *Yala* season, is commercially grown in Matale, Anuradhapura, Mahaweli – H region and Polonnaruwa under rain-fed cultivations. The areas are: Matale district: Kimbissa, Galewela, Sigiriya and Dambulla; Anuradhapura district: Ipalogama and Maradankadawala; and in Mahaweli – H region: Eppawala, Thalawa, Thambuththegama, Galnewa, Nochchiyagama and Meegalewa. However, big onion cultivation is highly concentrated in Matale and Anuradhapura.



Source: Agricultural and Environment Statistics Division, Department of Census and Statistics

Figure 4.1: Average Extent of Big Onion Cultivation in Major Producing Districts (2010 – 2020)

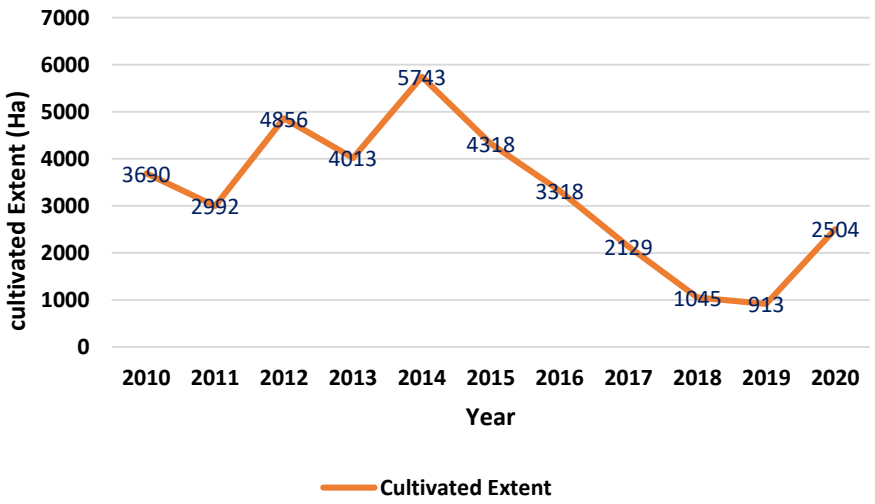
Considering the total average cultivated extent recorded during the last 11 years (2010 – 2020) (Figure 4.1), 48 percent of the extent under big onion cultivation was recorded in the Matale district while 30 percent in the Anuradhapura district. Of the other producing areas mainly Mahaweli – H area and Polonnaruwa district accounted for 18 percent and four percent respectively.

According to Table 4.1, many of the years during the period from 2010 to 2020, Matale district was recorded the highest cultivated extent of big onion—half of the total big onion cultivated lands in Sri Lanka. Sigiriya, Dambulla, Galewela, Dewahuwa and Naula are the major producing localities in the district while Galenbindunuwewa, Ipalogama, Palagala, Palugaswewa, Thirappane, and Kahatagasdigiliya are the major producing areas in the Anuradhapura district.

Table 4.1: Cultivated Extent of Big Onion 2010 – 2020 (Hectares)

Year	Anuradhapura		Polonnarauwa		Matale		Mahaweli-H		**National Total (ha)**
	Ext(ha)	**% of national total**	**Ext(ha)**	**% of national total**	**Ext(ha)**	**% of national total**	**Ext(ha)**	**% of national total**	
2010	1189	32	49	2	1889	51	563	15	3690
2011	916	30	30	1	1611	54	435	15	2992
2012	1253	26	134	2	2800	58	669	14	4856
2013	1369	34	66	2	1926	48	652	16	4013
2014	1444	25	226	4	2366	41	1707	30	5743
2015	1342	31	234	5	1802	42	940	22	4318
2016	997	30	146	4	1446	44	729	22	3318
2017	486	23	72	3	1056	50	515	24	2129
2018	282	27	104	10	462	44	197	19	1045
2019	347	38	63	7	472	52	31	3	913
2020	985	39	205	8	1251	50	63	3	2504

Source: Agricultural and Environment Statistics Division, the Department of Statistics



Source: Agricultural and Environment Statistics Division, Department of Census and Statistics

Figure 4.2: Total Extent of Big Onion Cultivation in Sri Lanka (2010 – 2020)

Big onion cultivation is primarily determined by the state import policy. The extent cultivated has decreased after 2014, recording a sharp decline in 2019. Adverse climatic conditions mainly led to this situation. However, in 2020 the cultivated extent of big onion increased. Prior to 2010, the highest cultivated extent was recorded in 2007(6988ha) followed by 6841ha 2006. *Maha* season cultivation was mostly directed at seed production; hence, the national requirement is fully met by *Yala* season cultivation.

4.1.2 Big Onion Varieties

Big onion was introduced to Sri Lanka in early 1960s. *Poona red* was the first locally adaptable variety. In 1970s to 1980s locally produced *Poona red* was cultivated commercially. In 1980s, *Pusa Red, Rampur, N53, Rough de Tana, Agrifound Light Red, Nasik Red* were recommended for local cultivation. However, *N53* and *Nasik Red* have shown high storage losses. Locally produced *Poona Red, Pusa Red* and *Rampur* produced higher yield compared to imported varieties. *Pusa Red MI* (later released as Dambulla Selection) produced similar bulb yield (42 t/ha) to tested superior hybrids *Grano F1 2000* and *ARAD* (37-46 t/ha). Kalpitiya Selection was the first locally developed big onion variety in late 1980s. Due to low yield and small bulb size, this selection was not popular; hence, the seed production discontinued. *Dambulla Selection* and *MIBO 1* were released in 2009 and 2014, respectively, for local cultivation and seed production is progressing. It is the most adaptable high yielding variety (38 t/ha) with short duration yield with better keeping qualities and low severity of thirps damage. It was conditionally released as *MIBO 1* for local cultivation (DOA, 2015).

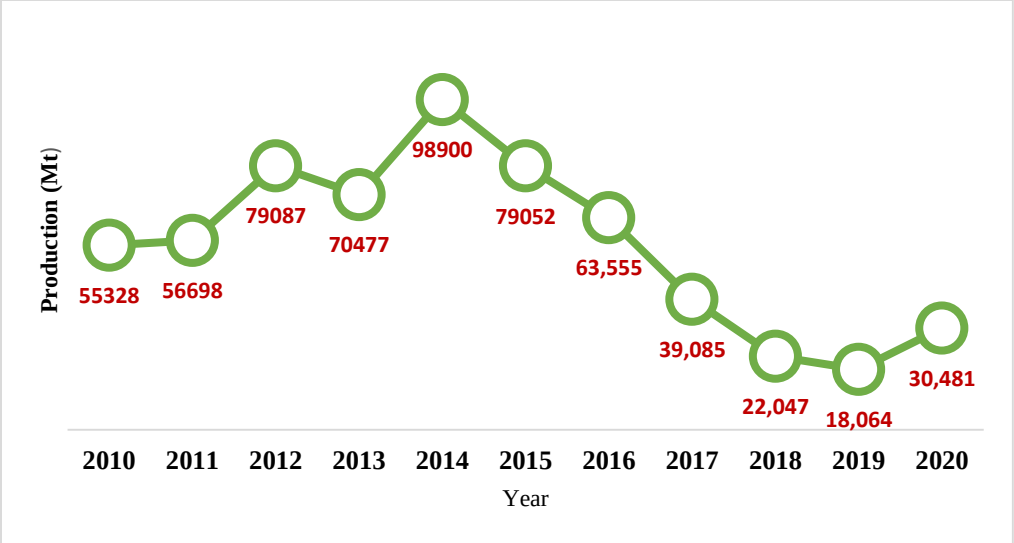
4.1.3 Production

Big onion is a highly seasonal crop which is limited to the *Yala* season in paddy fields. Therefore, the main production takes place from August to October. As shown in Table 4.2 and Figure 4.3, the big onion production has decreased gradually from 2014 on par with the cultivated extent of the dwindling cultivated extent was the main cause for low production. However, in 2020 *Yala* season, big onion production increased by 12417 mt compared to the previous *yala* season due to increased cultivated extent in the *yala* season in 2020.

Table 4.2: Production of Big onion 2010 – 2020 (Metric Tons)

Year	Anuradhapura		Polonnarauwa		Matale		Mahaweli-H		National Total (mt)
	Production (Mt)	% of national total	Production (Mt)	% of national total	Production (Mt)	% of national total	Production (Mt)	% of national total	
2010	18912	34	577	1	26931	49	8908	16	55,328
2011	12223	21	332	1	34573	61	9570	17	56,698
2012	24135	31	2449	3	41992	53	10511	13	79,087
2013	21274	30	835	1	37382	53	10986	16	70,477
2014	21660	22	2938	3	46137	47	28165	28	98,900
2015	22816	29	3276	4	36040	46	16920	21	79,052
2016	20,960	33	2,450	4	27,608	43	12,537	20	63,555
2017	7,834	20	1,443	3	20,972	54	8,836	23	39,085
2018	6,486	29	2,184	10	9,240	42	4,137	19	22,047
2019	4,070	23	1,068	5	9,023	50	3,903	22	18,064
2020						50	2,829	10	30,481

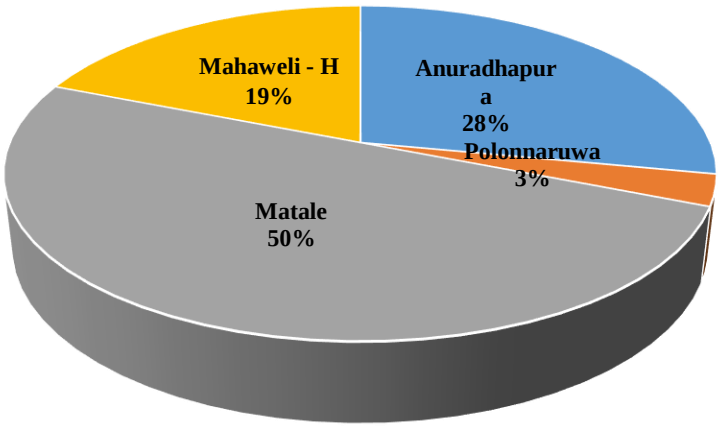
Source: Agricultural and Environment Statistics Division, Department of Statistics



Source: Agricultural and Environment Statistics Division, Department of Census and Statistics

Figure 4.3: Total Production of Big Onion in Sri Lanka (2010 – 2020)

When studying the data (2010 – 2020), half of the total production was reported in the Matale district (Figure 4.4). As a whole, almost the total (97%) t of the production reached the market from Matale, Anuradhapura and Mahaweli – H areas. As illustrated, the local production heavily concentrates on the *Yala* season, from August to October and bulk of the production reaches the markets during the months of September or October. Big onion production accounted for seven percent to 40 percent of the local requirement during the last 11 years (2010 – 2020), with the lowest share being reported in 2019.



Source: Agricultural and Environment Statistics Division, Department of Census and Statistics

Figure 4.4: Average Production of Big Onion in Major Producing Districts (2010 – 2020)

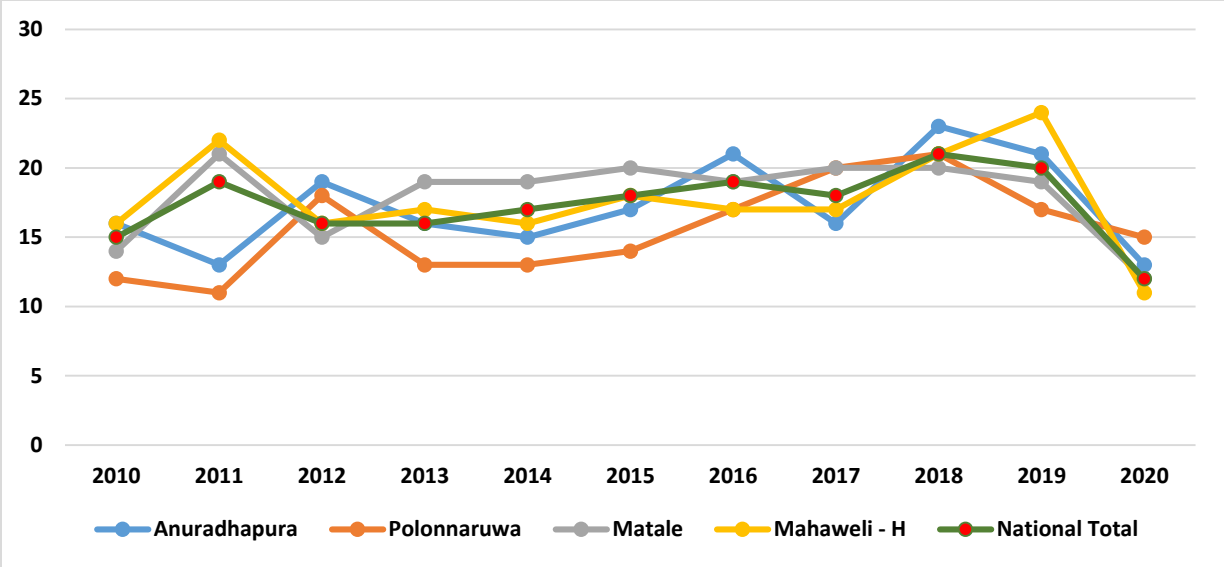
4.1.4 Average Yield

The main factor that determines the yield of big onion is the quality of seeds. Mainly the private sector imports the big onion seeds in unofficial means without relying on potential local yields. The national average yield was around 15 mt/ha which increased to about 20 mt/ha in 2019. However, considering the last eleven years, the lowest national average yield of 13 mt/ha was recorded in the 2020 due to damage caused by the bad weather condition.

Table 4.3: Average Yield of Big onion 2010 – 2020 (MT/Hec)

Year	Anuradhapura	Polonnaruwa	Matale	Mahaweli- H	National Total
2010	16	12	14	16	15
2011	13	11	21	22	19
2012	19	18	15	16	16
2013	16	13	19	17	16
2014	15	13	19	16	17
2015	17	14	20	18	18
2016	21	17	19	17	19
2017	16	20	20	17	18
2018	23	21	20	21	21
2019	21	17	19	24	20
2020	13	15	12	11	13

Source: Agricultural and Environment Statistics Division, Department of Statistics



Source: Agricultural and Environment Statistics Division, Department of Census and Statistics

Figure 4.5: Average Yield of Big Onion in Major Producing Districts (2010 – 2020)

Productivity increase was achieved by the country in big onion using different strategies laid out in the Onion Crop Development Programme. Except for the drop in 2010 and 2020, the average productivity has shown an increasing trend. Decrease in productivity during 2010 and 2020 was due to high disease incidence associated with extreme weather conditions.

India is the second largest producer of onion in the world, next to China. However, in terms of productivity India lags behind. As illustrated below, the productivity is higher in Sri Lanka than that of India in most of the year, and not much lower than the China, which is indicative of its potential to increase the production in future.

Table 4.4: Average Yield of Big Onion in China, India and Sri Lanka (2010 – 2020)

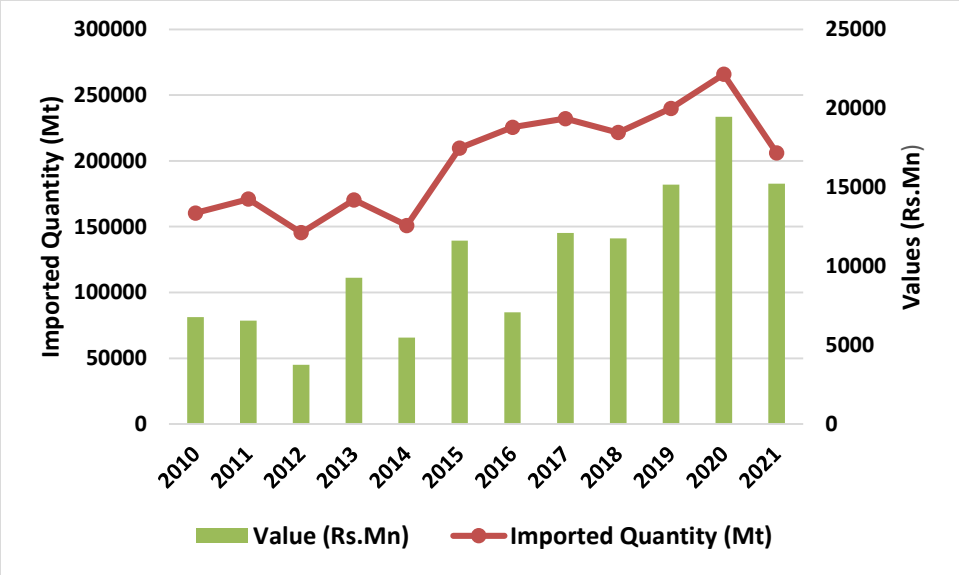
Year	Country		
	China (Mt/ha)	India (Mt/ha)	Sri Lanka (Mt/ha)
2010	22.19	14.21	15
2011	21.73	16.11	19
2012	21.78	15.98	16
2013	21.78	15.86	16
2014	21.85	16.12	17
2015	21.92	16.13	18
2016	22.94	15.86	19
2017	22.01	17.17	18
2018	21.70	18.10	21
2019	21.88	18.70	20
2020	21.86	18.65	13

Source: Food and Agriculture Organization of the United Nations

4.2 Imports

4.2.1 Imported Quantities and Values

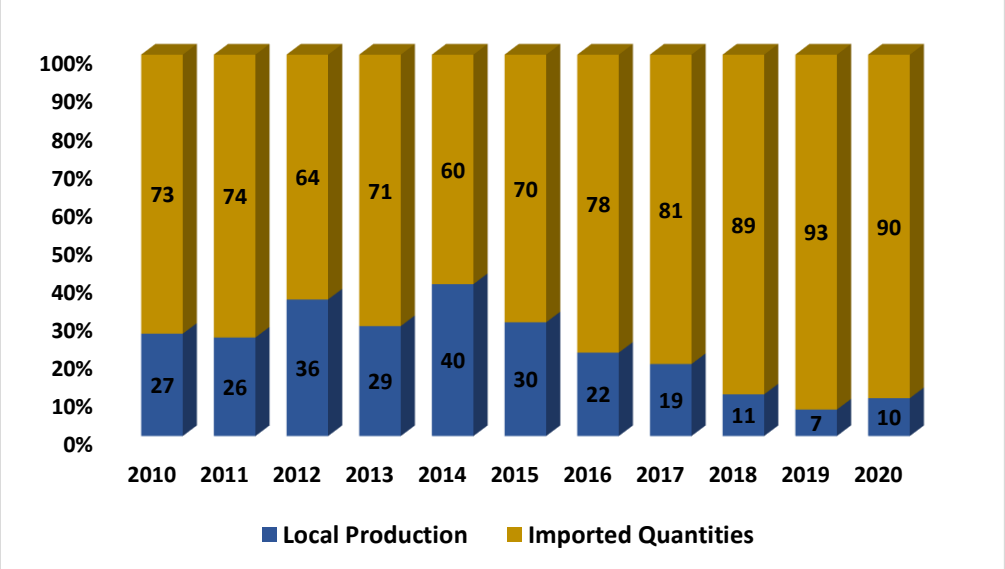
The market mainly comprises imports, except during the local production period (August to October). Over the years, imported quantities varied with the degree of the state intervention and trade policies of the respective countries. For instance, when the demand for Indian onion surged in the international market, Government of India came up with a policy of Minimum Export Price (MEP) for promoting and regulating exports of onion (Gummagolmath et al., 2020). However, Figure 4.6 shows a gradual increase in the imports of big onion over the last decennium with the highest imported quantity being recorded in 2020 (265,863 Mt).



Source: Department of Customs

Figure 4.6: Annual Imported Quantities and Values (2010 – 2021) *2021 up to August

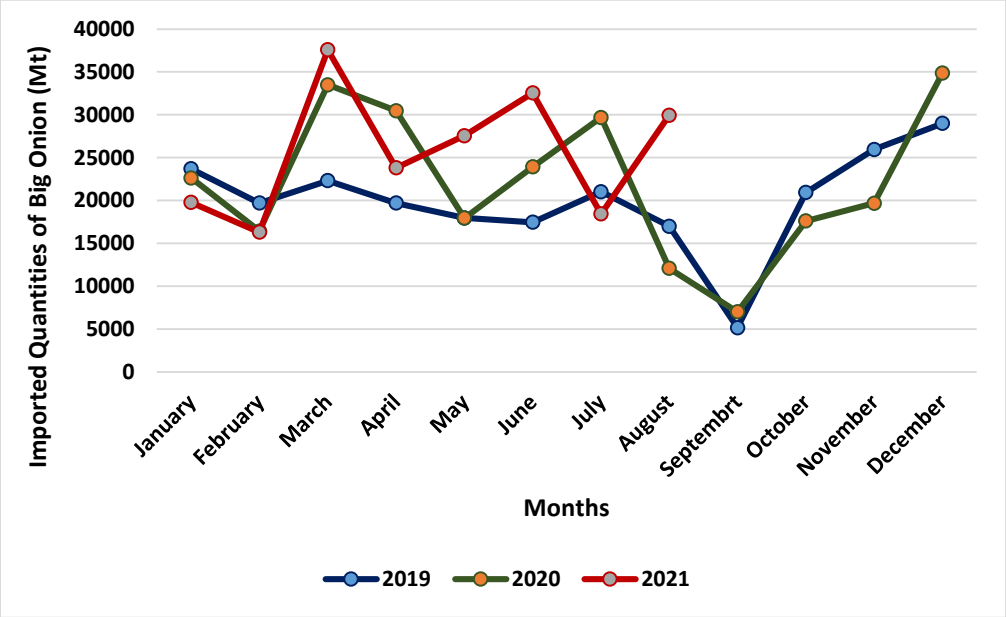
The share of imports has exceeded 70 percent of the country's requirement from 2010 to 2020 except in 2012 and 2014. With the increase of local production in 2012 and 2014, the imported share dropped to 64 percent and 60 percent respectively. After 2015, the share of local production has dropped significantly with the highest drop (7%) being recorded in 2019 due to decreased local production and high imports. Figure 4.7 depicts the share of local production and imported big onion out of the total availability.



Source: Department of Census & Statistics, Department of Customs

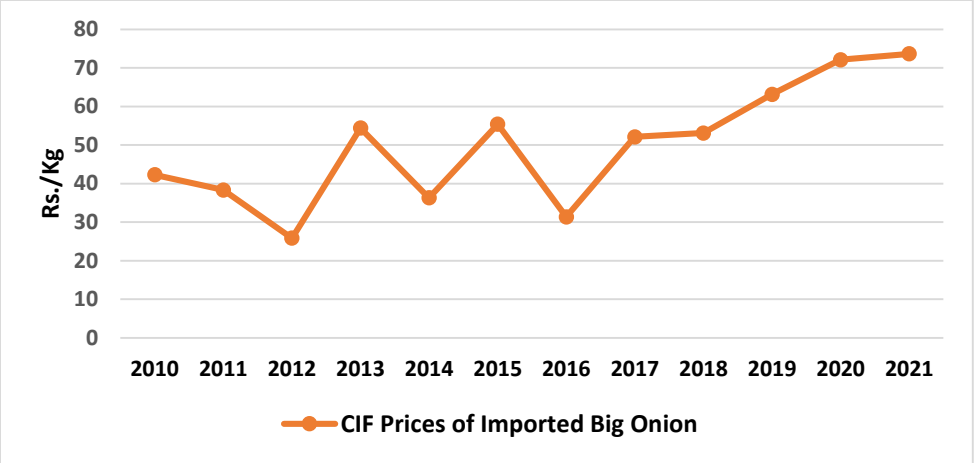
Figure 4.7: Total Availability of Big Onion

Figure 4.8 shows the monthly figures of imported quantities of big onion in 2019, 2020 and 2021. Accordingly, there is a decrease in imported quantities from August to October with a sharp decline in September due to availability of local harvest at the market. However, after October it has risen steadily. It has fallen again in January and February due to high import price during that period. In India, big onion arrives in the months of January, February, May, October and December, coinciding with the harvesting season. On the contrary, prices peak in January and February and then drop in rest of the year in India. However, a surge in the prices can be observed during January to February despite increased arrivals, probably owing to higher Minimum Export Price (MEP) during these months. It might have compelled the traders to make large scale purchases (Gummagolmath et al., 2020).



Source: Department of Customs

Figure 4.8: Imported Quantities of Big onion by Month (2019, 2020, 2021) *2021 Up to August

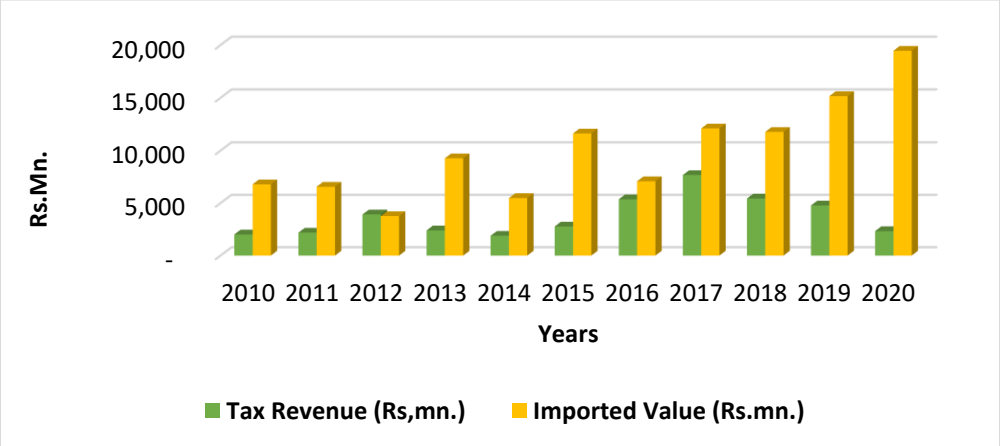


**2021 up to August
Source: Department of Customs

Figure 4.9: CIF Prices of Imported Big Onion

4.2.2 Imported Value and Tax Revenue

Every year the government expends a large sum of foreign exchange on big onion imports. Moreover, the government earns tax revenue from imported big onion by revising its tax policy on the product. However, almost every year the imports value overrides the tax revenue. For example, in 2020, the government spent around Rs.19 million on big onion importation while earning only Rs.2 million as tax revenue. Similarly, in 2019, the total import value of big onion was in the range of Rs.15 million whereas the tax income was only Rs.5 million. Hence, a clear mismatch prevails between the imported value of big onion and its tax revenue. Following figure illustrates this situation.



Source: Department of Customs

Figure 4.10: Imported Vlues and Tax Revenue (2010 – 2020)

4.2.3 Imported Countries

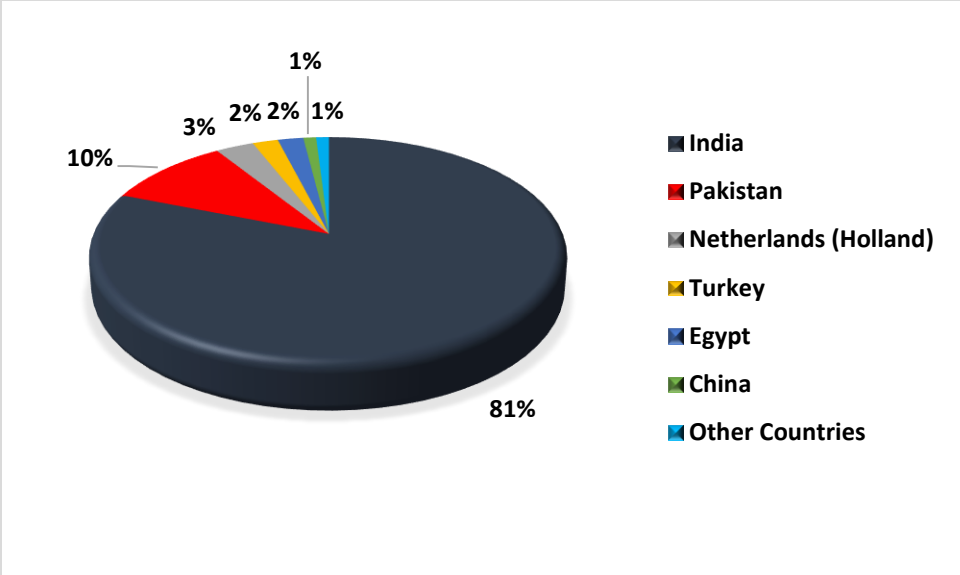
The global production of big onion is 93,226,400 tons per year. The world's top producer of onion is China who produces over 20 million tons annually, accounting for the largest percentage (one fourth) of the total production. India is the second largest producer and exporter and its share is around 23 percent (http://www.thedailyrecords.com). The following table depicts the world's top ten producers in 2019.

Table 4.5: World Top Ten Big Onion Producing Countries

Country	Production (Tons)	Yield (kg/ha)
China	23,907,509	21,999.9
India	19,415,425	16,181.5
Egypt	3,115,482	36,705.4
USA	3,025,700	56,397.0
Iran	2,345,768	37,951.9
Turkey	2,120,581	32,322.6
Russia	2,023,271	22,845.6
Pakistan	1,739,054	12,795.5
Bangladesh	1,735,334	9,777.0
Brazil	1,657,441	28,843.1

Source: https://www.atlasbig.com (2021/08/5)

In terms of the imported quantity during 2015 to 2020, India ranked in the first position (Figure 4.10) by suppling over 80 percent, followed by Pakistan that accounted for 10 percent. Though China is the world's largest producer, its share in the local market is negligible (1%). Due to India's dominant position in the trade any changes to its policies and cultivation patterns have a direct impact on the availability of big onion in the Sri Lankan market.



Source: Department of Customs, (2015-2020)

Figure 4.11: Share of Imported Quantity of Big onion by Country (2015 - 2020)

CHAPTER FIVE

Market Situation and Value Chain Analysis

5.1 Characteristics of Market

Mainly two types of big onions are available at the Sri Lankan market namely imported and local big onion. The onion market is considered to be simple and unsophisticated, as the product is mainly sold as a fresh product through existing market channels. Three main characteristics can be identified;

- **Perishability** - As onion is highly perishable, its quality begins to wane right after being harvested. For protecting against this extensive marketing channels as well as facilities and equipment is vital.

- **Price/Quality risk** - The crops are subjected to high price and quantity risk with changing consumer demands and production conditions. Unusual production or harvesting weather or major crop diseases can affect the marketing system.

- **Seasonality** - Onions have seasonal production that directly influences their marketing. Usually, they have limited period harvest and more or less a year-round demand.

- **Product bulkiness** – Onion has a high-water content which makes the crop bulky. Moreover, it is costlier to transport in the fresh form. This attribute also leads to post- harvest losses at the farm itself.

5.2 Size of the Market

In analyzing the food situation of a country, an important marker is the imported quantity and the home production. Imports Dependency Ratio (IDR) and Self Sufficiency Ratio (SSR) are significant indices to measure the food situation in a country. The SSR expresses the magnitude of production in relation to domestic utilization. The IDR and SSR of big onion are calculated as follows.

$$IDR = \frac{\text{Imports}}{\text{Production + Imports – Exports}} \text{ X } 100$$

$$SSR = \frac{\text{Production}}{\text{Production + Imports - Exports}} \times 100$$

Table 5.1 illustrates the IDR and SSR and per capita availability of big onion from 2010 to 2020. Accordingly, big onion market in Sri Lanka largely consists of imports with higher IDR. It has shown an increasing trend after 2015 with the higher IDR reported in 2019. SSR of big onion was satisfactory to a certain degree in 2014, 2012 and 2015 with the highest SSR being reported in 2014 due to higher cultivated extent.

Table 5.1: Total Availability, IDR, SSR and per Capita Availability of Big Onion in Sri Lanka

Year	Imports		Production		Total Availability ("000"Kg)	Per capita Availability (kg/year)
	Quantity ("000"kg)	IDR	Quantity ("000"Kg)	SSR		
2010	158086	73	58930	27	217016	10.71
2011	170947	74	61037	26	231984	11.37
2012	145418	64	83561	36	228979	11.21
2013	170310	71	69635	29	239945	11.66
2014	150967	60	101166	40	252133	12.13
2015	214321	70	89767	30	304088	14.50
2016	225522	78	65222	22	290744	13.71
2017	232109	81	53603	19	285712	13.32
2018	221510	89	28047	11	249557	11.52
2019	239970	93	18064	7	258034	11.83
2020	265863	90	30481	10	296344	13.84

Source: Calculations are based on the data of Department of Customs and Department Census & Statistics

Onion consumption per capita reached 15.8 kg in 2018 in Sri Lanka. The growth is 5.21 % than the previous year. When compared with its neighbours it is at a moderate level: India - 13.8 kg, Malaysia-16.6 kg, Maldives - 21.2 kg and Myanmar- 17.2 kg in 2018. Sri Lanka has been ranked 30th within the group of 147 countries in terms of per capita onion consumption (www.helgillibrary.com,a- April/9/2021).

According to the Household Income and Expenditure Survey (HIES) of the Department of Census and Statistics, per capita consumption of big onion was 682.15 grams/month. Based on that, the total monthly and annual consumption of big onion (2016 to 2020) can be depicted as follows.

Table 5.2: Onion Consumption Analysis

Year	Monthly per Capita Consumption (grams)	Yearly per Capita Consumption (grams)	Mid Year population	Total Yearly Consumption (kg)
2016	682.15	8,185.8	21203000	173,563,517.4
2017	682.15	8,185.8	21444000	175,536,295.2
2018	682.15	8,185.8	21670000	177,386,286.0
2019	682.15	8,185.8	21803000	178,474,997.4
2020	682.15	8,185.8	21413000	174,704,384.4

Source: Calculated by the author based on the data from Department of Census and Statistics

The estimate of total yearly consumption was calculated based on the Household Income and Expenditure Survey (HIES) of the Department of Census and Statistics, in 2016. We assumed that the per capita consumption of big onion in 2016 was the same in the following years, since being the latest official survey. According to the HIES survey in 2016, the average monthly household consumption of big onion was 2.6 kg. In urban areas it was recorded as 3.2kg, rural areas it was 2.5 and in the estate sector it was 2.3 kg. The following table depicts the total domestic supply and total domestic utilization of big onion in Sri Lanka.

Table 5.3: Domestic Supply and Domestic Utilization of Big Onion

Year	Domestic Supply (Mt)					Domestic Utilization (Mt)					
	Production	Imports	Stock Change	Export	Total Domestic Supply	Feed	Seed 2.5%	Processing 0.5%	Wastage 2%	Other	Food
2015	89767	214321	-	-	304088	-	2244	1500	6000	-	294344
2016	65222	225522	-	-	290744	-	1630	1400	5800	-	281914
2017	53603	232109	-	-	285712	-	1340	1400	5700	-	277272
2018	28047	221510	-	-	249557	-	701	1200	5000	-	242656
2019	18064	239970	-	-	258034	-	452	1300	5100	-	251182
2020	30481	265863	-	-	296344	-	762	1500	5900	-	288102

* Domestic utilization was calculated by the author following a discussion with Crop leader. Utilization for seed, processing and wastage was roughly estimated. Maximum possible percentage is considered here.

Source: Calculated by the author based on the data from the Department of Census and Statistics, Department of Customs

According to the figures, total domestic market supply of big onion consisted of both local production and imports. When considering the domestic utilization, 97% of the big onion supply was utilized as food. Out of the local production around 2.5% has been used as

seeds and the maximum wastage is around 2%. Utilization of big onion in the processing industry was at a very low level (less than 1%).

Pertaining to the total requirement and availability of big onion per year, it is evident that the total availability has exceeded the total requirements of the year. Unrestricted imports have mainly triggered this situation. The table below depicts the situation.

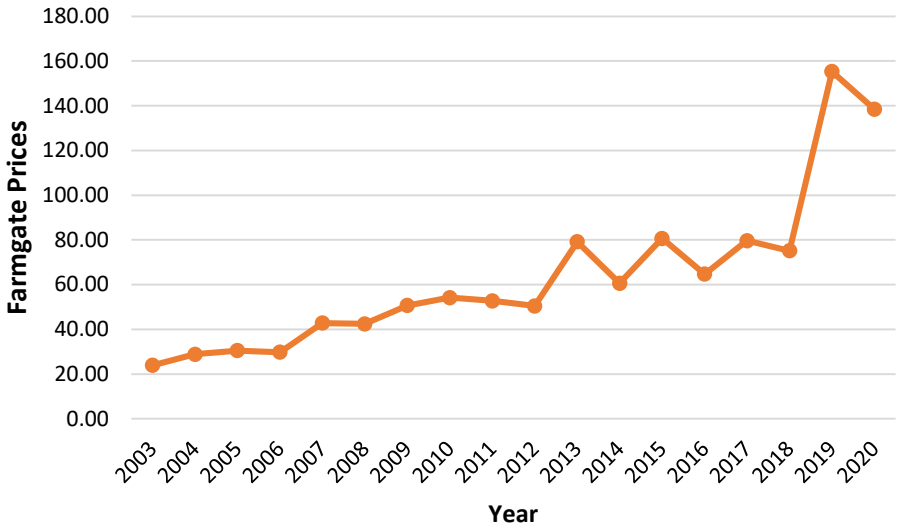
Table 5.4: Total Availability and Total Requirement of Big Onion Per Year

Year	Total Requirement (Mt)	Total Availability (Mt)	Excess Quantity (Mt)
2016	173,563	290,744	117,181
2017	175,536	285,712	110,176
2018	177,386	249,557	72,171
2019	178,474	258,034	79,560
2020	174,704	296,344	121,640

Source: Calculated by the author based on the data from Department of Census and Statistics, Department of Customs

5.3 Price Behavior

The 'Vistas of prosperity and splendour' envisages to implement a new programme for production of crops such as big onions and divert the outbound cash flow on imports towards the local farmers who cultivate those crops. It has been identified that an appropriate programme to utilize lands for those crops with the highest productivity should be in place while increasing the government certified price for big onions and encouraging them by granting a fair price to the farmers' harvest. Hence the minimum certified price for a kilo of big onion was increased to Rs.80.00 from Rs.60.00 in 2020. Besides, the government raises the Special Commodity Levey imposed on the crop every year during the local harvesting season to shield the big onion producers. Prior to year 2019, the average farmgate prices of big onion were less than Rs.100.00/kg but in 2019 it went beyond Rs.150.00/kg and it was Rs.138.00/kg in 2020. The highest farmgate price was recorded in 2019, due to low availability of local big onion stocks at the market as well as due to the lowest cultivated extent during that period.



Source: HARTI Data (2003 – 2020)

Figure 5.1: Average Farmgate prices of Big Onion

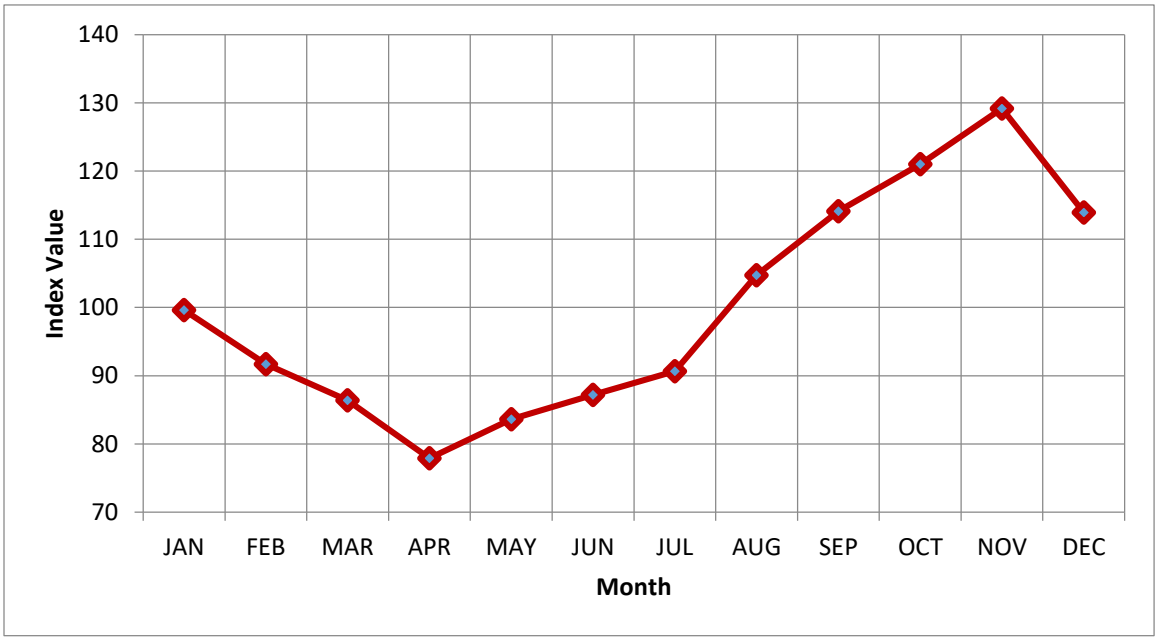
Price behaviour of big onion is mainly determined by the market forces. Since imports constitute a major proportion, price behaviour mainly depends on the CIF price, the import duty and the quantity of imports. With the outbreak of Covid – 19, policy decisions of the government and other major importing countries affect the price variations in the big onion market. The Colombo wholesale market is the main price determining point at the wholesale level. However, during the local production period, the prices are mainly determined at the Dambulla Dedicated Economic Centre (DDEC). The price determined at the Dambulla DEC is passed down to the producer level on a commission basis.

The price of locally produced big onions also depends on their grading. Grading is based on the size and usually there are three grades:

Grade 1 - Bigger than 1.4 inches in diameter
Grade 2 – It is between 0.5 and 1.5 inches in diameter
Grade 3 – It is less than 0.5 inches in diameter

Farmers use a sieve to measure the sizes. Grade 3 —called “Soopins” —fetches the lowest price. There is a significant price difference between the three grades. In 2021 *Yala* season, grade 1 big onions were traded at Rs.100.00 – 170.00/kg, while grade 2 was priced at Rs. 70.00 – 90.00/kg. Grade 3 was in the range of Rs.40.00 – 55.00/kg. Although the grade system is operational at the wholesale level it has no applicability in the retail market. In the latter all grades are in a mix. Meanwhile, a bulk price is fixed when importing and no grading takes place, even at the wholesale level. During some years, a government minimum price scheme operated with the intervention of the CWE.

According to the seasonal price index, generally the prices peak during November and December with the local production coming to a close and relatively low imports. On the other hand, the demand for big onion also heightens towards the end of the year. In general, another peak is recorded during January and August. On the other hand, the prices reach the minimum during September and October due to the harvest coming from the peak producing season. Retail market prices had also dropped to a minimum during March, April, May and June, according to the Seasonal Price Index. However, when considering the following seasonal price variation from 2011 to 2020, the retail price of big onion has shown an increasing trend even in the local harvesting season due to gradual decrease of extent and production of local big onion after the year 2015. The average farmgate price and as well as the average CIF prices of imported big onion have also increased significantly in 2019 and 2020 due to the impact of Covid -19 outbreak. As mentioned above, prices of big onion recorded maximum in January and February in India, a major big onion importing country. It forced the retail price to go up in the Sri Lankan market as no local stocks were available at the market during that time.



Source: Marketing Food Policy and Agribusiness Division - HARTI

Figure 5.2: Seasonal Price Index of Big Onion (2011 – 2020 =100)

Table 5.5 illustrates the wholesale and retail prices for two months of the year during the period 2015 to 2020. March generally records a high importation with April having a high consumer demand due to the New Year festival. October generally records the lowest importation with increased special commodity levy and peak harvest of local production arrives to the market. Big onion market only consists of imported big onion in March and in October big onion market mainly comprises of local production. From 2015, except for

2016 and 2018, margins between the wholesale market and retail market in March are lower than in October. When imported onions are traded the margins are lower; it results in a lower consumer price. Since 2015, local production shows a decreasing trend and the 2019 recorded the lowest levels of production. However, with a significant consistent demand, there is a need for more importation despite being the season for local production. Importation data suggests an increase in imports since 2015. Also, in 2018 during the local production seasons, the trade was mostly in imported onions. This resulted in lower margins between wholesale and retail markets.

Table 5.5: Price Comparison for Big Onions between Local Production Season and High Import Season (Rs/kg)

Year	March		Difference	October		Difference
	Wholesale	Retail		Wholesale	Retail	
2015	61.69	85.73	24.04	97.55	126.02	28.47
2016	57.70	81.58	23.88	70.03	92.51	22.48
2017	71.37	95.60	24.23	110.13	147.13	37.00
2018	52.13	88.58	36.45	79.10	111.28	32.18
2019	52.95	78.17	25.22	212.94	264.42	51.48
2020	137.75	182.10	44.35	N. A	*269.18	-
2021	81.27	123.19	41.92	157.72	*204.13	46.41

Source: *Department of Census & Statistics and Information Division, HARTI

Table 5.6 presents the producer's share, wholesaler's gross margin and retailers' gross margins for Matale big onion during 2015 – 2020 periods. As a result of farmer protection programme, tariff rate was increased during the harvesting season by facilitating the farmers to earn a higher income. Producer price, wholesale price and the retail price are the key issues in the system of big onion production and marketing. During the period of 2015 – 2020, the producer's share of local big onions (Matale district) ranged between 46 -62 percent. The lowest margin was reported at the wholesale level and it is ranged between 4 -27 percent during that period. Based on the analysis from 2015 to 2020, farmer obtains more than or nearly half of the total of the retail price.

Table 5.6: Producer's Share and Gross Price Margin of Local Big Onion (Matale)

Year	Average Farmgate price 1	Average Wholesale Price 2	Average Retail Price 3	Price Margin				
				Farmer 1/3*100	Wholesaler (2-1)/3*100	Retailer (3-2)/3*100	3/1	2/1
2015	80.64	102.1	138.18	58	16	26	1.7	1.3
2016	64.71	78.08	104.65	62	13	25	1.6	1.2
2017	79.64	126.36	173.35	46	27	27	2.2	1.6
2018	75.12	79.42	157.05	48	3	49	2.1	1.1
2019	155.32	172.41	253.55	61	7	32	1.6	1.1
2020	138.51	147.47	242.57	57	4	39	1.8	1.1

Source: Calculated using the data from*Department of Census & Statistics and Information Division, HARTI

5.4 The Product Flow

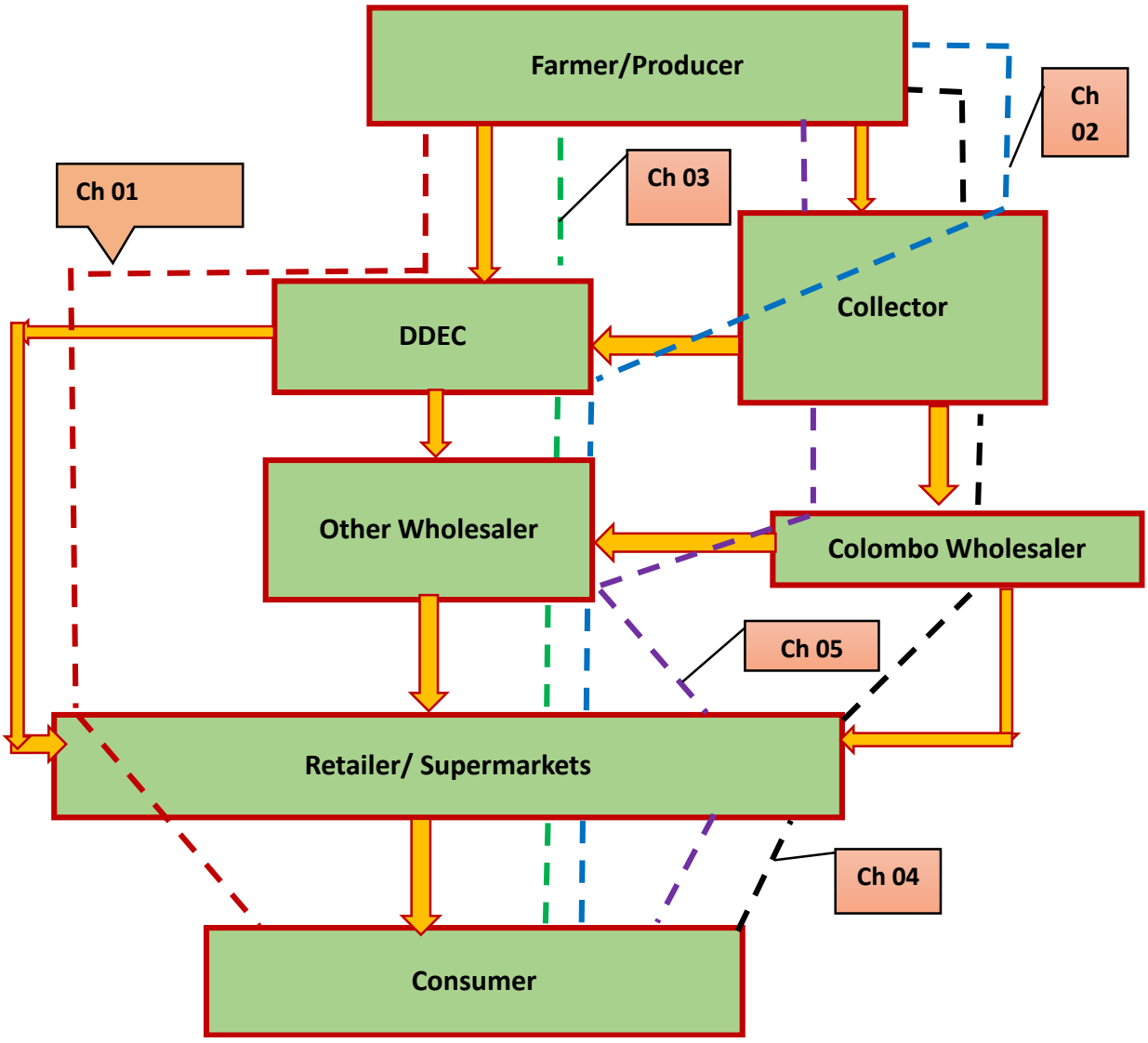
The monthly demand for big onion in Sri Lanka is about 20,000 MT. Local productions is inadequate to cater to this requirement. For example, during 2018 and 2019 only about 22,000 MT and 18,000 MT was produced locally during the whole year. The highest production of 98,900 MT of big onion was recorded in 2014 and even that year the local production is not adequate to cater to the demand. Local big onion supply flows to the market from mid-August to end – October. Additionally, a small quantity was available during November. Hence, it is evident that importation is essential to fulfill the local demand.

Hence, two major marketing channels can be identified in the big onion sector;

- Marketing channels for locally produced big onion
- Marketing channel for imported big onion

5.4.1 Value Chain Network Map for Local Big Onion

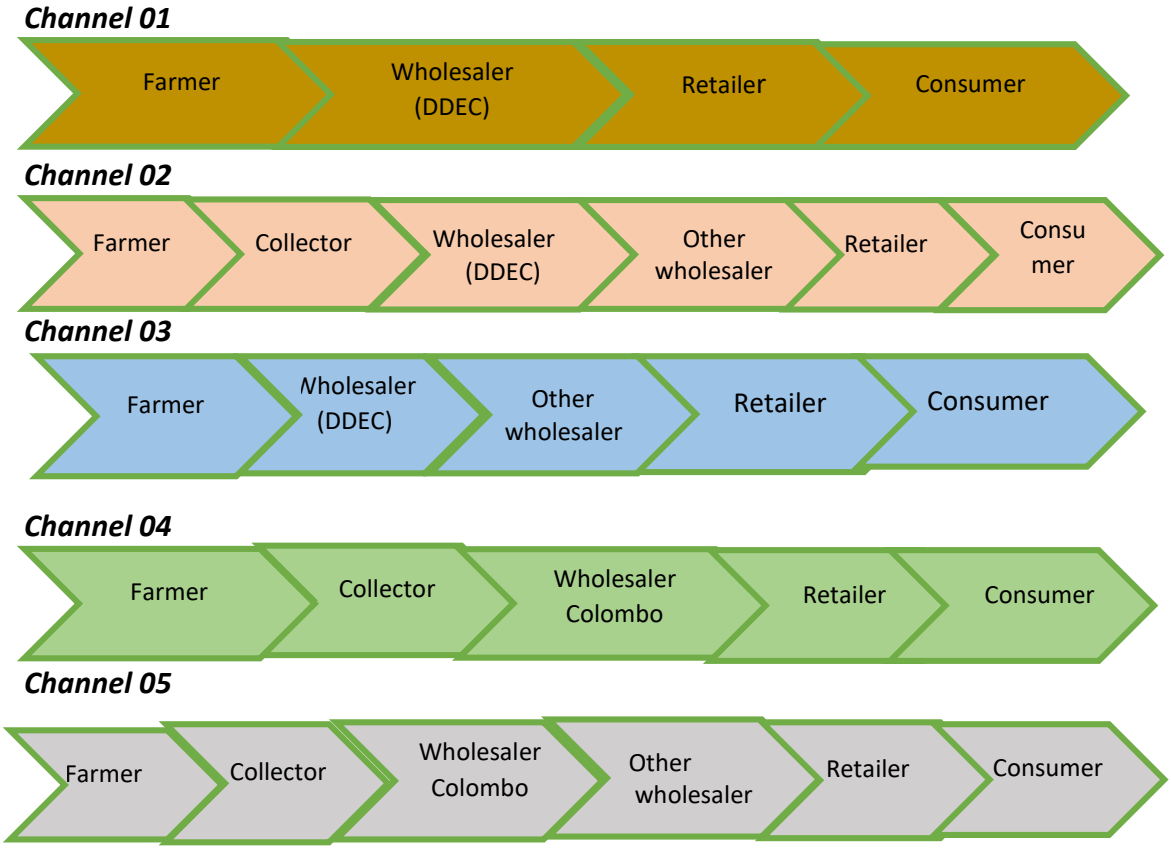
Dambulla is the main market center for big onions in Sri Lanka, where the producers/collectors, the wholesalers and the retailers converge on. Thambuththegama is also an important market for the farmers in the Anuradhapura district. Fourth Cross Street in Pettah also plays a pivotal role as a market for producers/collectors arriving from some of the main producing areas. Figure 5.3 depicts the major channel of the locally produced big onion.



Source: HARTI Survey Data, 2021

Figure 5.3: Market Trading Channels of Local Big Onion in Matale District

Five main channels can be identified for local big onion in the Matale district. Locally produced big onions come to the Dambulla Dedicated Economic Centre (DDEC) via large scale collectors and traders, or are brought to the DDEC by individual farmers.



5.4.2 Marketing Cost, Margins and Market Efficiency of Local Big Onion Value Chain

Marketing cost, margins and efficiency in different local big onion channels have been elaborated in Table 5.7. The total marketing cost involved in Channel-One was Rs.58.57/kg, Rs.118.74/kg in Channel Two, Rs.120.64/kg in Channel Three, Rs.118.39/kg in Channel Four and Rs.67.13 in Channel Five. Similarly, market margins of different channels were, Rs.118.43/kg for Channel One, Rs.186.93/kg for Channel Two, Rs.183.18/kg for Channel Three, Rs.182.29/kg for Channel Four and Rs.116.60/kg for Channel Five. When considering the market margins and cost of each channel, the highest market efficiency was recorded for Channel One due to low marketing cost and margins. Limited market intermediaries and relatively low consumer price was the main reason for that. Since the marketing cost and marketing margin in Channel Two was higher, the marketing efficiency was very low for Channel Two. Relatively higher consumer price was also recorded in this channel (Margins was calculated by using the average prices which reported during the month of October, 2021 being the peak harvesting season).

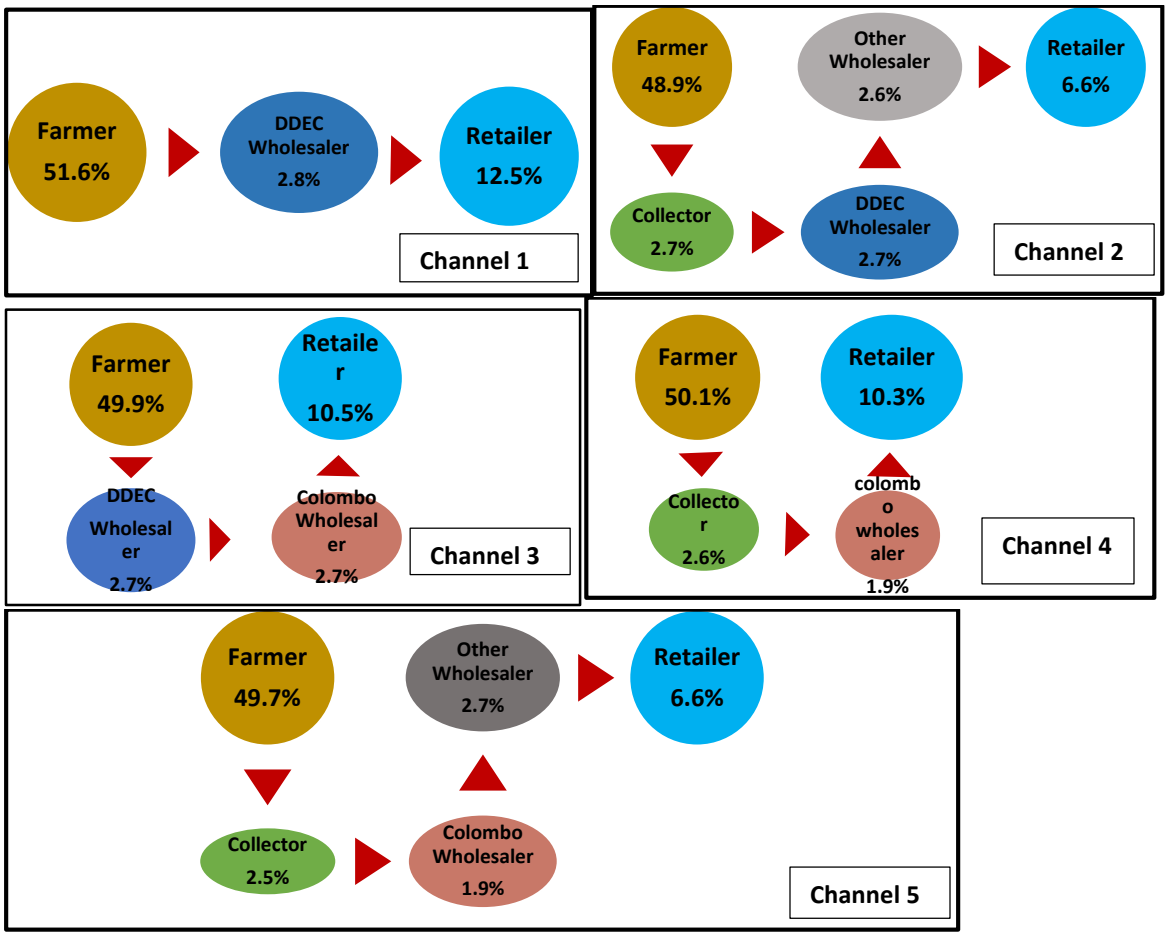
Table 5.7: Marketing Cost, Margins and Efficiency in Different Channels

Particulars	Channel 1	Channel 2	Channel 3	Channel 4	Channel 5
Price Received by Farmers (Rs/kg)	145.00	145.00	145.00	145.00	145.00
Marketing Cost and Margin (Rs/kg)					
Farmer/Producer	**145.00**	**145.00**	**145.00**	**145.00**	**145.00**
COP (average)	51.00	51.00	51.00	51.00	51.00
Transport and Handling Cost	1.85	1.85	1.85	1.85	1.85
Other Cost (packing, meals etc.)	0.79	0.79	0.79	0.79	0.79
Commission					
Subtotal of Farmers' Production and Marketing Cost	**53.64**	**53.64**	**53.64**	**53.64**	**53.64**
Farmer/Producer Margin	**91.36**	**91.36**	**91.36**	**91.36**	**91.36**
Collector		**155.65**		**155.00**	**155.00**
Transport and Handling Cost		5.17		5.00	5.00
Other Cost (packing, meals etc.)		0.48		0.33	0.33
Commission		5.00			
Subtotal of collectors' cost		**5.65**		**5.33**	**5.33**
Collectors' Margin		**5.00**		**4.67**	**4.67**
Wholesaler (DDEC)- Price	**150.00**	**160.65**	**150.00**		
Commission	5.00	5.00	5.00		
Wholesalers' Margin	**5.00**	**5.00**	**5.00**		
Wholesaler (Colombo)				**158.50**	**158.50**
Wholesalers' Margin				**3.50**	**3.50**
Wholesaler (Other)		**169.62**	**158.97**		**166.73**
Transport and Handling Cost		3.43	3.43		2.68
Other Cost (packing, meals etc.)		0.54	0.54		0.55
Subtotal of Wholesalers' Cost		**3.97**	**3.97**		**3.23**
Wholesalers' Margin		**5.00**	**5.00**		**5.00**
Retailer	**177.00**	**186.93**	**183.18**	**182.29**	**183.73**
Transport and Handling Cost	4.16	4.16	4.16	4.16	4.16
Other Cost (packing, meals etc.)	0.77	0.77	0.77	0.77	0.77
Subtotal of Retailers' Cost	4.93	4.93	4.93	4.93	4.93
Retailers' Margin	**22.07**	**12.38**	**19.28**	**18.86**	**12.07**
Grand Total of Cost	58.57	68.19	62.54	63.9	67.13
Total of Margins	118.43	118.74	120.64	118.39	116.6
Grand Total of MC + MM	177.00	186.93	183.18	182.29	183.73
Market Efficiency	**0.819**	**0.775**	**0.791**	**0.795**	**0.789**

Source: HARTI Survey Data

When farmers' cost of production is at Rs.51.00/kg they keep average margin of Rs.91.36/kg on trading. The Dambulla DEC works on commission basis. A commission of Rs.2.00/kg is charged on prices below Rs.80.00/kg. For this analysis we have taken

Rs.5.00/kg for the commission. Big onions are transported in gunny and nylon bags. They are stacked in lorries haphazardly, without using crates; hence the cost of transportation per 1/kg of onion is lower than in the case of most other vegetables. In terms of the margin of each actor, obtained out of the consumer price along the considered value chains for local big onion, farmer obtained the highest margin followed by retailer. Wholesalers and collectors received comparatively lower margins. The following figure illustrates the situation.



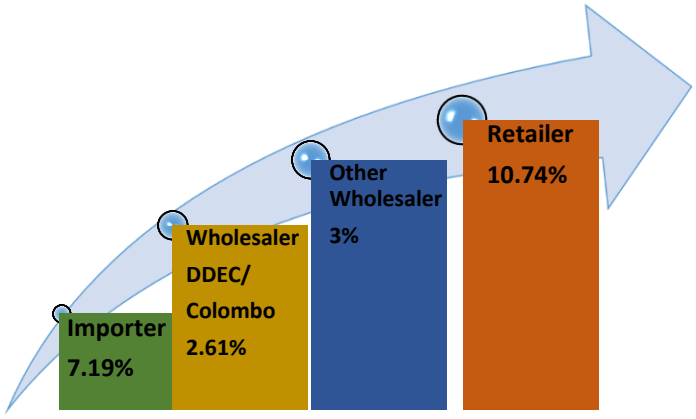
Source: HARTI Survey Data

Figure 5.4: Value Chain Actors' Margin (Percentage)

5.4.3 Market Channel for Imported Big Onion

Nearly half of the consignments of imported onions are transported to Dambulla. From there the product is traded through the Dambulla DEC as well as the Colombo wholesale markets. The balance is traded in the Colombo wholesale market. The Colombo wholesale market for big onions is located outside the Colombo Manning Market, in the Fourth Cross Street and Fifth Cross Street in Colombo 01. These big onions traded at wholesale rate

are supplied mainly to the Southern, Northern and Central Provinces of Sri Lanka, directly to dedicated economic centres in those regions. The rest of the imported stock goes directly to larger storages in Dambulla from where then larger distribution takes place, as same as the locally produced big onions. CIF price of big onions was taken as the starting price for the trading channel of imported big onions in the Dambulla market or the Colombo wholesale market. However, imported big onions also go through the same trading channel to reach the consumer. The following table depicts the margins and price flow of imported big onions traded through the Dambulla Wholesale Market. Generally, imported big onion gives lower margins between wholesale and retail markets. Nowadays during the season for local big onions, the imported stocks dominate the market and suppress the margins. In the import- economic centre trading channel, the importer retains a low net margin compared to supply obtained from local farmers. (Margins was calculated by using the average prices which were reported during the month of October, 2021 - the peak harvesting season). According to Table 5.8, the Channel One represented the product flow through the Colombo wholesale market while the Channel Two started from Dambulla DEC. When compared, the former is the most efficient. The following figure depicts the margin percentage of each actor in the imported channel. However, the margins are largely similar in both channels under the imported big onion product flow. Thus, the retailer receives the highest margin (10.74%) followed by the importer (7.91%). When compared to the local channel, the farmer receive higher margins followed by the retailer. However, wholesalers and collectors obtained the least margins in both imported and local channels.



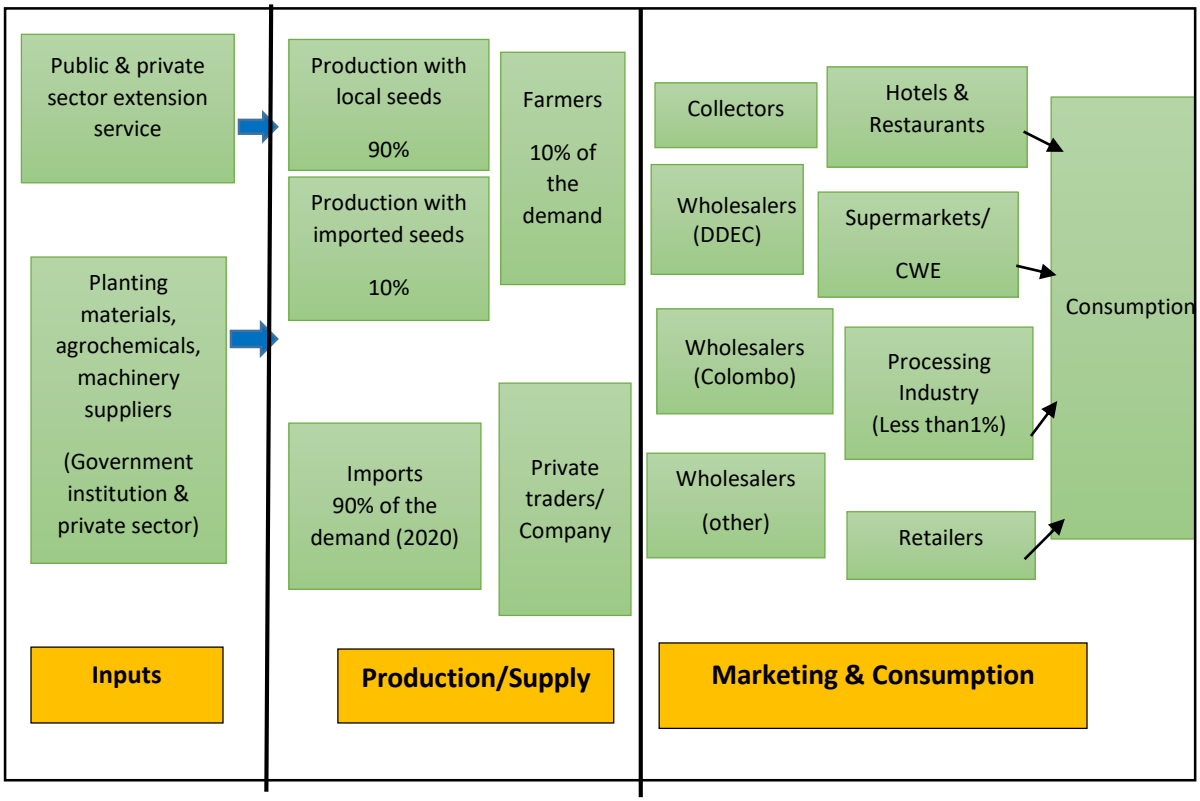
Source: HARTI Survey Data

Figure 5.5: Value Chain Actors' Margin (Percentage)

Table 5.8: Margins and Price Flow of Imported Big Onions Traded Through the DDEC and Colombo Wholesale Market

Description	Channel 1	Channel 2
Marketing Cost and Margin (Rs/kg)		
Importer/Trader – Price	**151.94**	**151.67**
CIF Price (Rs/Kg)	93.17	93.14
Transport and handling cost	3.00	3.00
Other cost (packing, meals etc.)	2.00	2.00
Tax (Rs/Kg))	40.00	40.00
Subtotal of Importer/Trader's Marketing cost	**5.00**	**5.00**
Importer/Trader Margin	**13.77**	**13.53**
Wholesaler (DDEC)- Price		**156.67**
Commission		5.00
Subtotal of wholesalers' cost		
Wholesalers' Margin		**5.00**
Wholesaler (Colombo)	**156.94**	
Commission	5.00	
Subtotal of wholesalers' cost		
Wholesalers' Margin	**5.00**	
Wholesaler (Other)	**165.91**	**165.64**
Transport and handling cost	3.43	3.43
Other cost (packing, meals etc.)	0.54	0.54
Subtotal of wholesalers' cost	**3.97**	**3.97**
Wholesalers' Margin	**5.00**	**5.00**
Retailer	**191.39**	**191.13**
Transport and handling cost	4.16	4.16
Other cost (packing, meals etc.)	0.77	0.77
Subtotal of retailers' cost	**4.93**	**4.93**
Retailers' Margin	**20.55**	**20.56**
Grand Total of cost	58.57	68.19
Total of Margins	44.32	44.09
Grand Total of MC + MM	102.89	112.28
Price paid by Consumer	191.39	191.13
Market Efficiency	**1.477**	**0.793**

Source: HARTI Survey Data



Source: HARTI Survey Data

Figure 5.6: Value Chain Network Map for Big Onions (Local & Imports)

5.5 Cost of Production

The total cost of cultivation of big onion in Dambulla area for the 2020 *Yala* season and 2021 *Yala* season under irrigated condition is depicted in Table 5.10. As per the data the total cost of cultivation was Rs.349,193.00/ac in 2020 *Yala* season and Rs.463,482.00/ac in 2021 *Yala* season. A 33 percent surge when compared to the 2020 *Yala* season can be attributed to increased local seed prices. Major components of the total cost of cultivation under irrigated condition have been categorized as, labour, material and power (machinery) that is illustrated in Figure 5.7. In 2020 *Yala* season, labour cost as a percentage of total cost was 66% for big onion in Matale while the material cost as a percentage of total cost was 18% and 9% for machinery cost for big onion. When scrutinizing the distribution of costs, the value has changed in each component in the following year. Though labour remains dominant in 2021 *Yal*a in terms of cost it has dropped to 47% while the share of the material cost has increased to 31% following an increase in local seed prices. The seed price has increased from Rs.9,000/2.5kg to Rs.30,000/2.52kg in 2021 due to scarcity of quality seeds (both local and imported). A ban

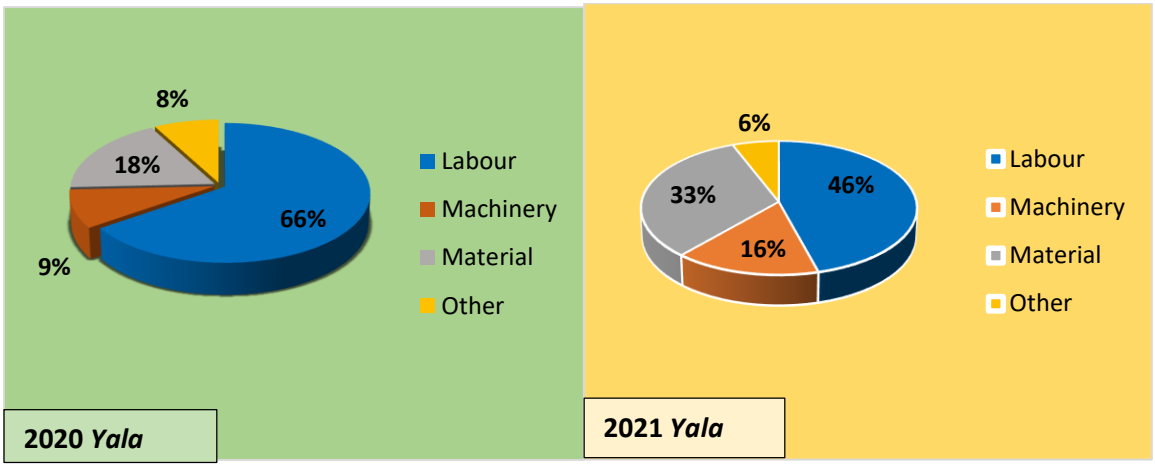
that came into force in 2020 in India on export of onion seeds saw a sharp decline in imported big onion seeds, accompanied by a dip in local production as well as an escalation of seed prices. Cost of fertilizer and pesticide have also increased exorbitantly (by 66 percent and 274 percent respectively) in 2021 *Yala* season when compared to the 202 0 *Yala* season.

Table 5.9: Big Onion Production Cost per Acre, 2020 *Yala* and 2021 *Yala*

Operation	**Cost (Rs/Ac) 2020 Yala**				
	Labour	**Machinery**	**Material**	**Other**	**Total**
Land rent (1ac = 15000)	-	-	-	15,000	15,000
Seeds (local) (2.5kgx 9000)	-	-	22,500		22,500
Nursery Activities Land preparation and maintenance Removing weeds and cleaning drains	17,400 10,200	1,500 -	- 1,248	- -	18,900 11,448
Land preparation	8,000	8,500	-	-	16,500
Preparing beds	45,000	-	-	-	45,000
Transplanting	39,000	-	-	-	39,000
Application of herbicide	1,500	-	4,808	-	6,308
Removing weeds	9,000	-	-	-	9,000
Input transport cost	-	-	-	2,000	2,000
Fertilizer	-	-	14,800	-	14,800
Insecticide	9,000	-	8.360	-	17,360
Fungicide	-	-	8,910	-	8,910
Water management	40,500	11,517	-	-	52,017
Machinery maintenance cost	-	4,000	-	-	4,000
Harvesting and cutting & transport	33,000	4,500	-		37,500
Preparation of harvest	9,000	-	-		9,000
Packaging (Bags 160x15)	-	-	2,400	-	2,400
Additional labour cost	7,550	-	-	-	7,550
Transport cost	-	-	-	10,000	10,000
Total Cost (Rs)	**229,110**	**30,017**	**63,026**	**27,000**	**349,193**
Average Production kg / 1ac					**8,000**
Production Cost Rs/1 kg					**43.64**
Cost (Rs/Ac) 2021 Yala					
Land rent (1ac = 15000)	-	-	-	15,000	15,000
Seeds (local) (2.5kgx 30,000)	-	-	75,000	-	75,000
Nursery Activities Land preparation and maintenance Removing weeds and cleaning drains	16,000 9,000	2,500 -	- 2,285	- -	18,500 11,285
Land preparation	-	24,000	-	-	24,000
Preparing beds	45,000	-	-	-	45,000

Transplanting	43,000	-	-	-	43,000
Application of herbicide	1,500	-	8,500	-	10,000
Removing weeds	10,000	-	-	-	10,000
Input transport cost	-	-	-	2,000	2,000
Fertilizer	-	-	24,500	-	24,500
Insecticide	12,000	-	31,300	-	43,300
Fungicide	-	-	6,190	-	6,190
Water management	45,000	15,317	-	-	60,317
Machinery maintenance cost	-	4,000	-	-	4,000
Harvesting and cutting & transport	14,000	27,000	-	-	41,000
Preparation of harvest	9,000	-	-	-	9,000
Packaging (Bags 180x18)	-	-	3,240	-	3,240
Additional labour cost	7,650	-	-	-	7,650
Transport cost	-	-	-	10,500	10,500
Total Cost	**212,150**	**72,817**	**151,015**	**27,500**	**463,482**
Average Production kg / 1ac					**9,000**
Production Cost Rs/1 kg					**51.49**

Source: HARTI survey Data, 2021



Source: HARTI survey Data, 2021

Figure 5.7: Cost Distribution of Big Onion Production in 2020 and 2021 *Yala*

Big onion cultivation is labour intensive and requires diversification such as nursery management (establishing nursery ground, establishing seeds, watering, weeding and main cost component in nursery management), land preparation, planting, fertilizer application, watering, manual weeding, chemical weeding, pesticide applications, harvesting, cutting (big onion leaves need to be removed) and packing. Among those listed planting, watering and harvesting are considered to be the most labour-intensive stages. Table 5.10 presents the total labour cost for each activity for the 2020 *Yala* season and 2021 *Yala* season.

Table 5.10: Labour Cost for Different Activities of Big Onion Production

Activity	2020 Yala (Rs)	2021 Yala (Rs)
Land Preparation	62000.00	61000.00
Crop Establishment	39000.00	43000.00
Fertilizer Application		
Water Management	40500.00	45000.00
Weed Management	20700.00	20500.00
Pest and Disease Control	9000.00	12000.00
Harvesting and Processing	42000.00	45000.00
Other	7550.00	7650.00
Total Labour Cost (Including imputed cost)	189600.00	199500.00
Total Labour Cost (Excluding imputed cost)	121200.00	121500.00

Source: HARTI survey Data, 2021

5.6 Summary of the Gross Margin Analysis for Big Onions

Gross margin analysis was performed to analyze the cost of production, total revenues and profits, and to assess break-even prices and quantities. All the farmers in the sample work with locally produced true seeds. The table below presents a comparison of the gross margin analysis for big onions in the 2020/2021 *Yala* seasons and a surge in every aspect, apart from the average price and gross margins, can be observed. The average price faced by farmers in Dambulla is Rs.138.51/kg in 2020 *yala* season and Rs.132.12/kg in 2021 *yala* season. The average variable cost of big onion for 2021 *yala* season is Rs.463,482 per acre and total revenue per acre is on average Rs.1,189,100 in 2021 *yala.* Therefore, the average gross margin or profit per acre is Rs.725,618. Farmers average production per acre is 9,000kg. Break – even production quantity on average is 3,508kg per acre in 2021 *yala* while the break – even price is Rs. 51.49/kg.

Table 5.11: Summary of the Gross Margin Analysis for Big Onions - 2020 *Yala* and 2021 *Yala*

Item	2020 *Yala* Average Price (Rs.)	2021 *Yala* Average Price (Rs.)
Total Variable Cost (TVC)	349,193.00	463,482.00
Total Revenue (TR)	1,108,107.00	1,189,100.00
Average Price	138.51	132.12
Production Quantity (kg)	8000	9000
Gross Margins (TR – TVC)	758,914.00	725,618.00
Break -even Price (TVC/Production)	43.65	51.49
Break – even Quantity (TVC/Price)	2,521	3,508

Source: HARTI Survey Data, 2021

CHAPTER SIX

Value Chain Actors

6.1 Actors / Stakeholders Along the Value Chain

The onion value chain consists of long-standing actors who support its functions of input supply, production, post-harvest, transport, processing import and distribution. Actors/ stakeholders involved in the big onion value chain are input suppliers, producers/farmers, importers, collectors, wholesalers, retailers and consumers. Input suppliers are mainly seed importers (there are several major agro–chemical companies that import big onion seeds, mostly from India), seed producers, fertilizer and chemical traders, machinery traders and agriculture advisory services.

Following table illustrates each actor along the big onion value chain.

Table 6.1: The Role of Main Actors Along the Onion Value Chain

Actor	Description
Input Suppliers	Seed Importers – There are a few licensed agrochemical companies and private traders involved in this sector while the unauthorized seed imports are also observed. Seed producers – Farmers under the government seed production programme as well individual seed farmers and a few private companies are involved in seed producing. Fertilizer and chemical traders – A few private companies are involved in this sector.
Farmers	Majority of the big onion farmers are recorded in the Matale district followed by Anuradhapura and Mahaweli - H area. Around 7,500 farmers are involved in big onion cultivation in 2020 *Yala*. season. They undertake planting, harvesting and post-harvest operations.
Importers	Importation of onion is done through legal and illegal channels. Private traders are mainly involved in this sector.
Collector	A collector is a middleman who plays a major role in the distribution of onions across the entire country. In Dambulla some wholesalers in DEC act as a collector. Most of the collectors own vehicles.

Wholesalers	Wholesalers are individuals or businesses that purchase either onions produced locally or imported. They are persons who buy from farmers at the farmgate or from Dedicated Economic Centre.
Retailers	Retailers are normally found in public markets where stalls are stocked with onions as well as other items. Grocery stores which are located almost everywhere also retail onion which are obtained from wholesalers. Supermarkets and Sathosa also act as retailers.
Processors	Less than one percent of big onion is utilized for the processing industry. There are a few traders acting as processors in this sector. Onions used to make dehydrate onions rings and onion powder.
Consumers	The main consumers of onions are householders and commercial users. Commercial users include restaurants, fast food stores, hotels, etc.

Source: HARTI Survey data, 2021

6.2 Actors' Involvement and Description

6.2.1 Input Suppliers (Seed)

At this stage of the value chain many actors are involved directly or indirectly in agricultural input supply in the study area. All such actors are responsible in supplying agricultural inputs such as improved seed varieties, fertilizers, herbicides, pesticides and farm implements which are essential inputs at the production stage. Here we discuss mainly about the seed supply.

Locally produced seed are characteristic of a higher rate of germination, higher yields, higher price and low availability. The process known as vernalization — induction of the plants' flowering by exposure to the prolonged cold—has to take place, for the purpose which the mother bulbs are sent to Nuwara Eliya. This complicated process has significantly contributed to the increase in the cost of local seeds**.** Sri Lanka is expanding true seed production in onion to reach near self-sufficiency using many strategies. One of the strategies is to increase the productivity using cultivations with locally produced seeds. The land factor being highly limiting boosting production is a prudent strategy. Table 6.2 indicates the quantities of true seed production and imports during 2011- 2020. Accordingly, the share of local seed, out of the total seed requirement has increased after 2015.

Table 6.2: Big Onion Seed Requirement, Local Seed Production and Seed Imports

Year	Cultivated Extent (ha)	*Seed Requirement (kg) (Cultivated extent * 5)	Seed Imports (kg)	**Local Seed Production (kg)
2011	2,992	14,960	8,968 (60%)	5,992 (40%)
2012	4,856	24,280	23,113 (95%)	1,167 (5%)
2013	4,013	20,065	7,500 (37%)	12,565 (63%)
2014	5,743	28,715	20,597 (71%)	8,118 (19%)
2015	4,318	21,590	5990 (21%)	15600 (79%)
2016	3,318	16,590	3,250 (20%)	13,340 (80%)
2017	2,129	10,645	2,500 (23%)	8,145 (77%)
2018	1,045	5,225	950 (18%)	4,275 (82%)
2019	913	4,565	N.A.	4565
2020	2,504	12,520	4,023 (32%)	8,497(68%)

*Seed requirement was calculated based on a discussion with the officials of Department of Agriculture

**Due to the absence of a sound data base system on local seed production, this was calculated by subtracting the seed imports from the total seed requirement.

Source: NPQS, 2020 and Agricultural and Environment Statistics Division, Department of Census and Statistics

There are three categories mainly involved in the seed supply system of big onion.

1. Government Sector

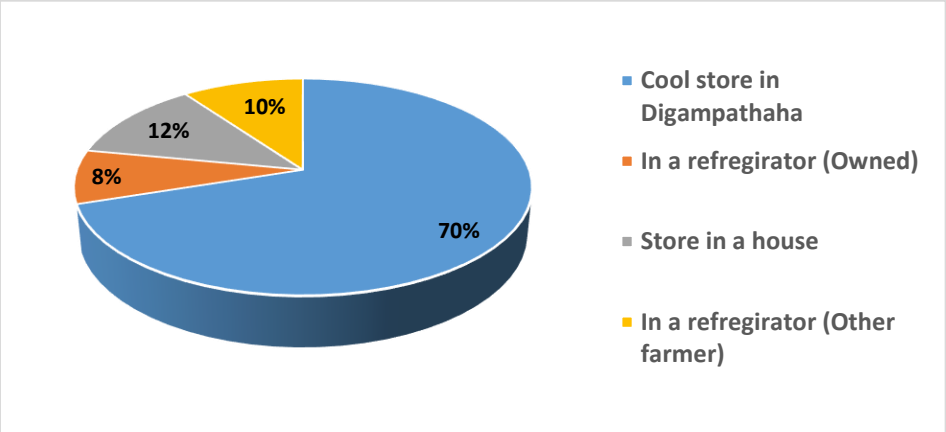
The Department of Agriculture and Provincial Agriculture Departments have taken numerous initiatives to encourage farmers and enhance the true seed production of onion such as,

- Storage facilities for small and medium scale farmers, who cultivate 120 and 1,200kg of mother bulbs, respectively have been subsidized.
- Vernalization process and coordination has been undertaken.
- Newly designed plastic crates with improved ventilation were supplied to facilitate transport and prevent physical damages when mother bulbs were transported in gunny bags and wooden boxes.
- Rain shelters were provided for selected farmers to encourage and increase the seed production.
- Separation of seeds from dried umbels is laborious and time consuming, especially in medium to large scale seed production ventures. Therefore, arrangements have been made with Farm Mechanization Centre, Mahailluppallama to design and manufacture simple threshing machinery for seed separation.

2. Seed Producers

Volunteer seed producing farmers, farmers under the seed production programme of the Ministry of Agriculture and limited private companies such as Heylese and CIC are involved in this sector. Prior to 2018 seed production of the private sector companies was at a satisfactory level, producing nearly 80 percent of the local seeds. With government intervention in the programme the former's contribution decreased gradually, which now stands at less than 10 percent of the total local seed requirement. The private sector distributed their seed production among farmers through private dealers such as "Saralanka" in Dambulla.

Of the total big onion seed requirement of the 2020 *Yala* season, 32 percent was met by the imports while the rest was produced locally. The local seed production is constituted of the contribution of private companies (10%) and largely the farmers who cultivated voluntarily and under the big onion seed production programme (90%). Of ten farmers interviewed from the Matale district, the majority (80%) had experience of more than ten years while the rest had been in seed production for at least five years. In addition, all the sample farmers have received training from the Department of Agriculture. Around 70 percent of the sample farmers used their own seed bulb for seed production while 30 percent obtained seed bulbs from neighbouring farmers. Vernalization took two to three weeks before the planting took place. According to the survey results, 90 percent of the sample farmers have sent their mother bulbs to Rahangala area for natural vernalization while the rest have stored those in cool rooms set up under the agricultural modernization project. Around 70 percent of the sample farmers had stored their seeds in a cool store in Digampathaha and 12 percent in a refrigerator (owned). This situation is depicted below.



Source: HARTI Survey Data, 2021

Figure 6.1: Method of Store Seeds

Table 6.3: Problems Faced by Farmers in Producing Big Onion True Seeds

Problem	*No.of Farmers*	*% of Total*
Damage due to bad weather	7	70
High cost of inputs	2	20
Pest and disease	1	10
Marketing	1	10
Total	10	100

Source: HARTI Survey Data, 2021

When considering marketing issues faced by big onion seed farmers, lack of channels to sell the seed is the most dominant. Earlier, they used to sell their seeds to the Department of Agriculture, but the payments were delayed. Hence, majority of the farmers sell their seed stocks directly to the farmers. According to the seed producers, a robust mechanism system should be introduced by the Department of Agriculture for purchasing and distributing the seeds at a reasonable price.

In general, farmer involvement in the seed production as well as the seed production has dropped after 2017 in the Matale district but revived again in 2021. The following table illustrates the farmer participation and seed production quantities in both *Yala* and *Maha* seasons.

Table 6.4: Farmer Participation and Production of Big Onion Seeds in Matale District

Season and Year	Number of Farmers	Quantity of Seed Production (Kg) - *Yala*	Quantity of Seed Production (Kg) – *Maha*	Total Seed Production (Kg)
2009/2009-10	1,170	2,225	4,500	6,725
2010/2010-11	1,450	3,000	3,500	6,500
2011/2011-12	1,800	2,600	11,600	14,200
2012/2012-13	1,850	6,043	9,000	15,043
2013/2013-14	2,050	4,185	11,822	16,007
2014/2014-15	1,955	4,051	11,108	15,159
2015/2015-16	1,720	5,355	7,905	13,260
2016/2016-17	2,120	5,685	7,422	13,107
2017/2017-18	723	8,931	2,033	10,964
2018/2018-19	213	2,374	712	3,086
2019/2019-20	202	1,900	1,580	3,480
2020/2020-21	619	1,355	5,778	7,133

Source: Deputy Agriculture Director Office - Matale

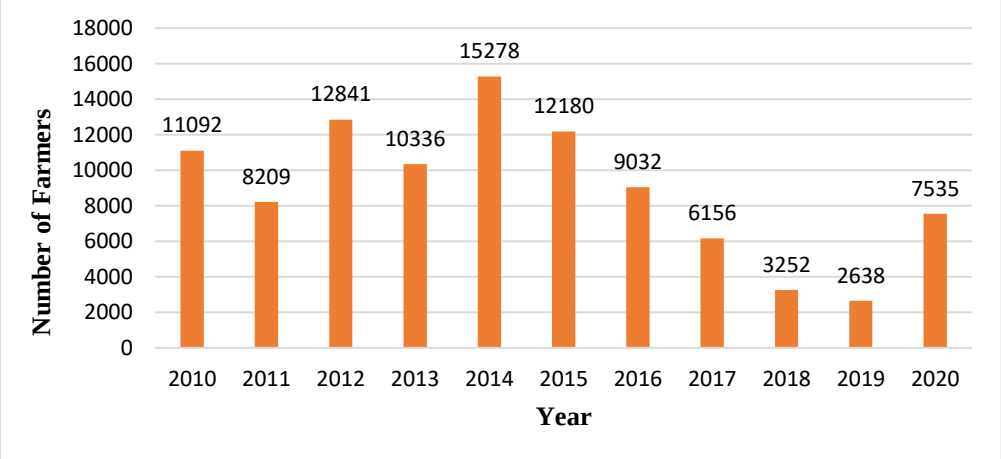
3. Seed Importers

Private traders and private companies are mainly engaged in this sector. They import seeds in both formally as well as informally. In the formal seed import system, importers were required to obtain a license or permission from the Seed and Planting Material Division of the Department of Agriculture. The Plant Quarantine Service fulfils the quarantine and phytosanitary requirements of imported seeds. According to the private seed importers, obtaining clearance from the Plant Quarantine Division is a prolonged process. Further, the ban imposed on big onion exports by the Indian government in 2020 has already created numerous challenges.

6.2.2 Producers /Farmers

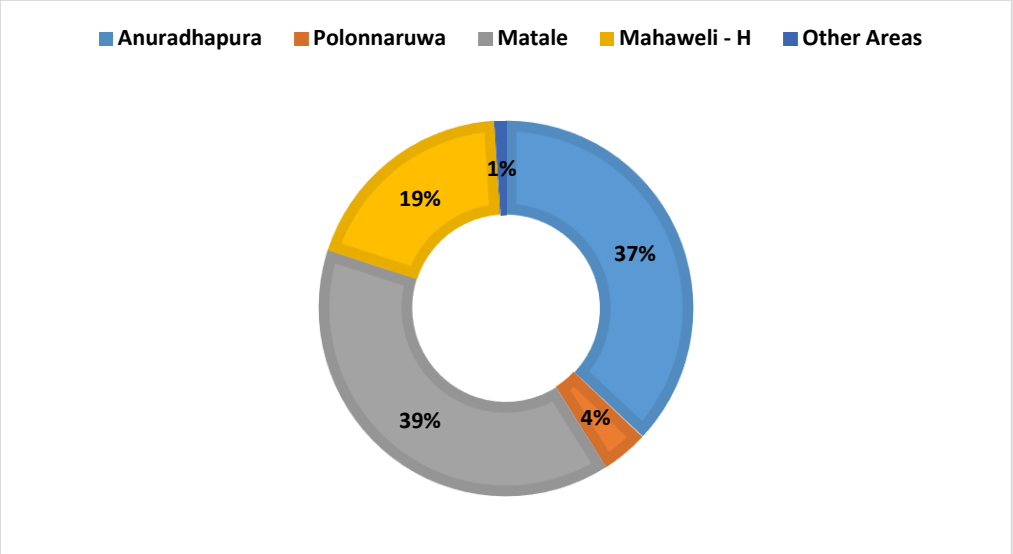
Onion growers are the major actors who perform most of the value chain functions right from farm inputs preparation on their farms or procurement of the inputs from other sources to post harvest handling and marketing. The major value chain functions that onion growers perform include ploughing, planting, fertilizing, irrigating, weeding, pest/disease controlling, harvesting and postharvest handling.

According to Figure 6.2, the highest farmer involvement was recorded in 2014 (15278). The number of farmers who cultivated big onion has decreased gradually with the lowest farmer being reported in 2019 (2638). The decrease was 83% as against 2015. Adverse weather condition is mainly responsible for the decline. Considering the district wise average farmer involvement from 2010 to 2020 (Figure 6.3), a higher participation was recorded in Matale district (39 percent) followed by Anuradhapura district (37 percent).



Source: Agricultural and Environment Statistics Division, Department of Census and Statistics

Figure 6.2: Number of Farmers Cultivated Big onion 2010 – 2020



Source: Agricultural and Environment Statistics Division, Department of Census and Statistics, (2010-2020)

Figure 6.3: Average Number of Farmers Cultivated Big Onion in Major Producing Districts (2010 – 2020)

The farmer- is the first and most complex stage in the value chain. For the farmers' survey, we have interviewed 40 big onion farmers in Dambulla, Thambutthegama and Anuradhapura areas as well as 10 big onion farmers who abandoned cultivation in Dambulla, Wewalwewa area.

The average age of the interviewed agricultural producers (N=40) in Dambulla, Thabutthegama and Anuradhapura areas, was 43, but the mean was 50. Around 95 percent of the sample farmers had more than 10 years of experience and five percent had three to five years of experience.

6.2.2.1 Production Information

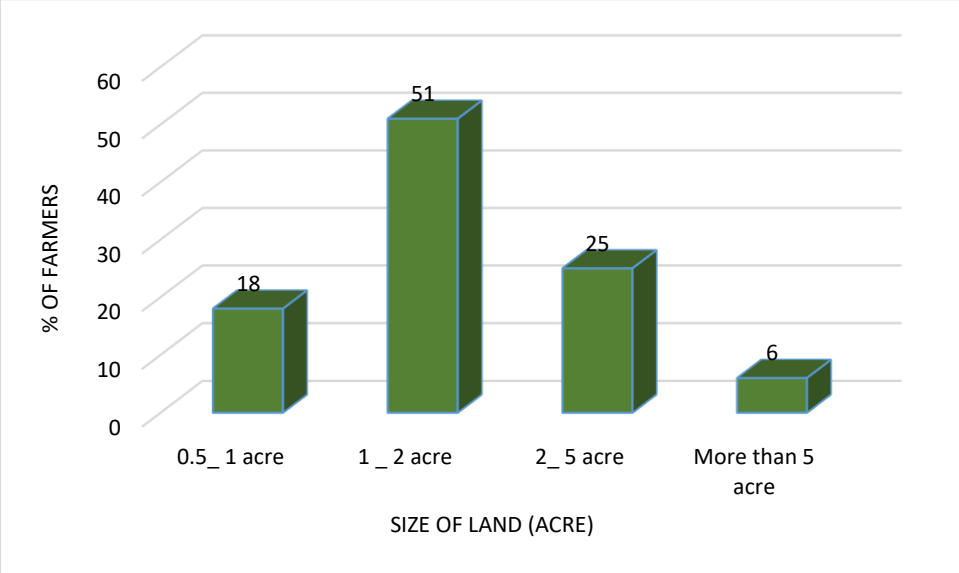
According to the data tabulated below, majority of the big onion sample farmers (51%) had single ownership of land and 30 percent were leased in farmers. Around 15 percent were tenancy - in farmers and only four percent had joint ownership.

Table 6.5: Land Ownership

Ownership	*N*	*%*
Single owner	20	51
Leased in	12	30
Tenancy – in	6	15
Jointly owned	2	4
Total	**40**	**100**

Source: HARTI Survey Data, 2021

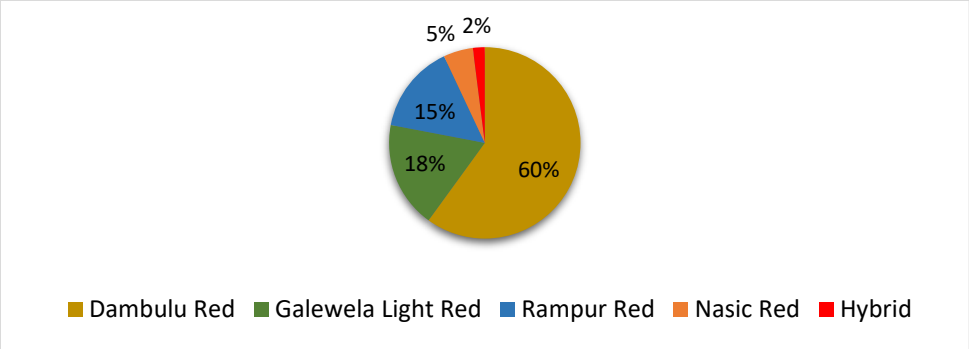
Figure 6.4 elaborates the land extent the farmers owned. The majority (51%) of the sample farmers owned one to two acres while the number of farmers operated in more than five acres is negligible.



Source: HART Survey Data, 2021

Figure 6.4: Distribution of Operators by Land Extent

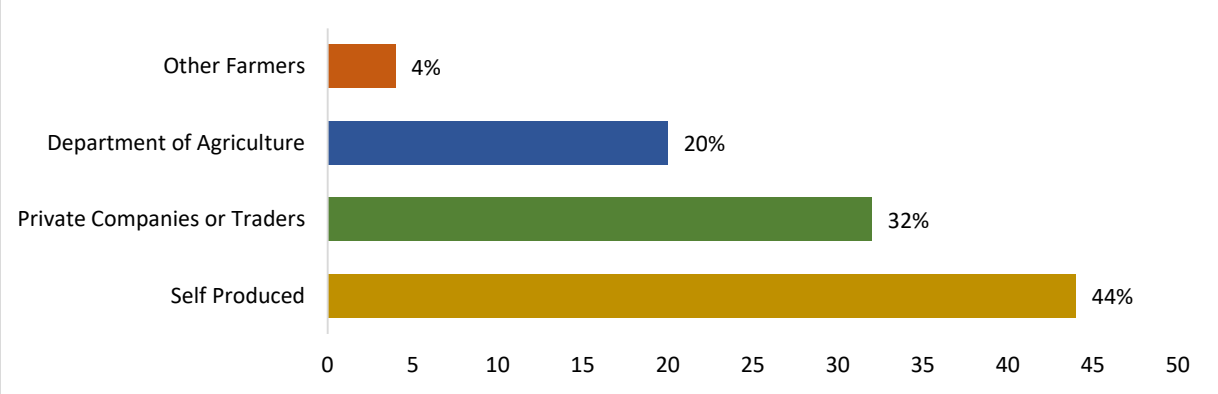
In terms of seed varieties, majority of the sample farmers (60%) in the study areas cultivated *Dambulu red* followed by *Galewela light red* (18%) Around 15 percent of the farmers used *Rampur red* seed variety for their cultivation purposes (Figure 6.5).



Source: HART Survey Data, 2021

Figure 6.5: Seed Varieties

It was observed that majority of the sample farmers used local seeds to fulfill their seed requirement while the private sector producers and the state intervention were also popular. The least number of farmers relied on other farmers (Figure 6.6).



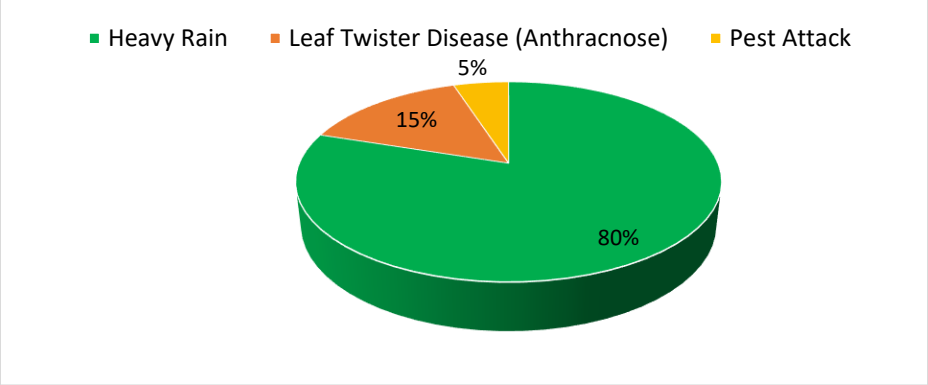
Source: HART Survey Data, 2021

Figure 6.6: Source of Seeds

Majority of the sample farmers (70%) were satisfied with the existing extension service for the big onion cultivation while the rest were not. Similarly, only around 40 percent of the sample farmers obtained loans for cultivation while almost everyone (95%) did not subscribe to the agriculture insurance coverage provided by the Agricultural and Agrarian Insurance Board.

Agriculture officials said that big onion cultivations in the Matale District are threatened by the prevailing inclement weather in the last few years. Owing to sudden changes in weather patterns, crops have been destroyed. Poor resilience to the prevailing weather conditions and excessive fertilizer application are the leading causes that have made cultivations more vulnerable to pest infestations. Therefore, they added that achieving the anticipated target would be difficult under present conditions.

Meanwhile, a large number of farmers (85%) in the study areas reported to have experienced crop damage during the last *Yala* season. Following figure illustrates the type of crop damage occurred during the 2020 *Yala* season. According to that, adverse weather was largely responsible for the predicament.



Source: HART Survey Data, 2021

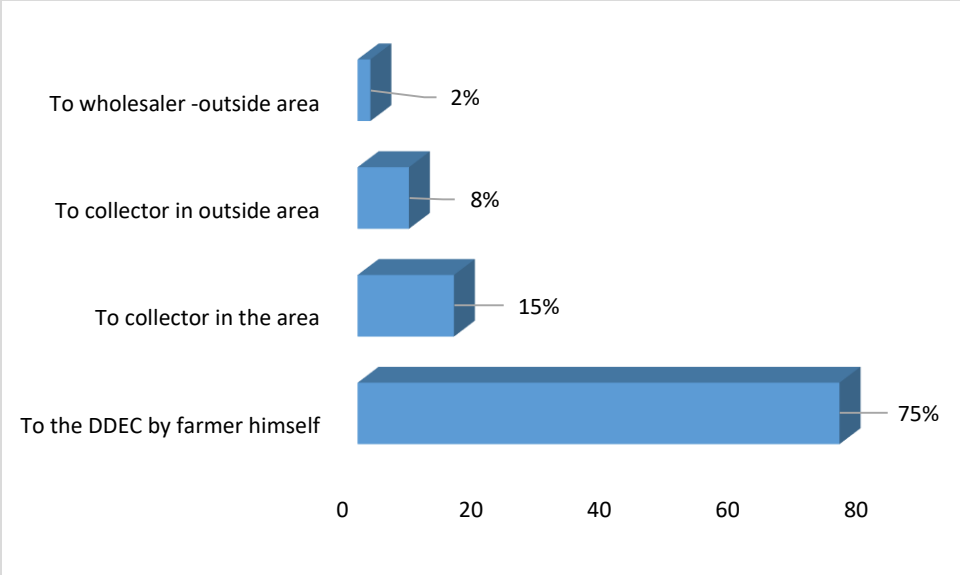
Figure 6.7: Type of Crop Damage

6.2.2.2 Harvesting and Marketing Information

All varieties grown in Sri Lanka mature around 90 – 110 days after establishment. When the crop is ready for harvesting, irrigation should be stopped, and onion tops should naturally fall. Onion is highly perishable and susceptible to heavy post-harvest losses in storage and handling; the slightest bruise can encourage rot. Maturity level at the harvest is a critical factor that determines the shelf life.

Majority of the sample farmers (85%) practiced sorting and grading after harvesting is complete before selling the harvest while only 15 percent refrained. Grading of locally produced big onions is based on the bulb size. Usually, there are three types of grading: grade 1 (bigger than 1.4 inches in diameter), grade 2 (between 0.5 – 1.5 inches in diameter) and grade 3 (less than 0.5 inches in diameter). A sieve is used for the purpose. Generally, grade 3, known as *Soopins*, attracts the lowest prices.

Figure 6.8 depicts the method of selling the harvest. Accordingly, selling directly to the DDEC seems to be the highest preferred method while a negligible number of farmers opted for selling to an outside wholesaler



Source: HART Survey Data. 2021

Figure 6.8: Method of Selling

Majority of the farmers retained their harvested stocks for more than two weeks to fetch a higher price. The time taken to sell the harvest by other farmers varied owing to numerous reasons such as the risk of perishability and market competition. Following table depicts the duration taken to sell harvest.

Table 6.6: Duration of Selling Harvest

Time	N	%
Next day after harvesting	2	5
Within 2,3 days after harvesting	6	15
One week after harvesting	8	20
More than 2 weeks after harvesting	24	60
Total	40	100

Source: HARTI Survey Data, 2021

Around 60 percent of the sample farmers store the stocks in the house itself while the rest clear the produce.

Information sharing among the farmers is at a satisfactory level. They are well aware of the price information during the harvesting time. Farmers collaborate strongly to obtain a higher price for their produce. Further, they are well informed when the government imposes the special commodity levy on imported big onion during the harvesting period. With regard to farmers' issues, two types dominate; cultivation issues and marketing issues. Table 6.7 illustrates the farmers' problems.

Table 6.7: Issues and Constraints Faced by Big Onion Farmers

Issues	N (40)	%
Production Related Issues		
Lack of agro chemicals and chemical fertilizer and its high prices	38	23
Crop damages due to extreme climate	32	19
High cost of seeds	28	17
Lack of quality seeds	25	15
High cost of other inputs	19	11
High cost of labour	15	9
Pest and disease attacks	10	6
Total *(Multiple response)*	**167**	**100**
Marketing Issues		
Availability of imported big onion at lower prices even in harvesting period	35	40
Lack of storage facilities	20	23
High transport cost	18	20
Lack of government intervention at the harvesting stage	15	17
Total *(Multiple responses)*	**88**	**100**

Source: HARTI Survey Data, 2021

According to Table 6.7, lack of chemical fertilizer and agrochemicals and its high prices seem to have affected the majority, probably owing to the newly introduced state policy to shun chemical inputs in agriculture, which led to a severe shortage in the same. This issue is specific to only years 2020 and 2021. Weather related crop damage was also significantly high. Extreme climate condition, high cost of seeds and high cost of other inputs were the other major problems faced by big onion farmers during the production stage. At the marketing phase, availability of imported stocks in the market at lower prices even during the peak harvesting season was the mostly cited constraint (40%). Lack of proper storage facility, high transport cost and poor government intervention at the harvesting period were reported by a moderate population.

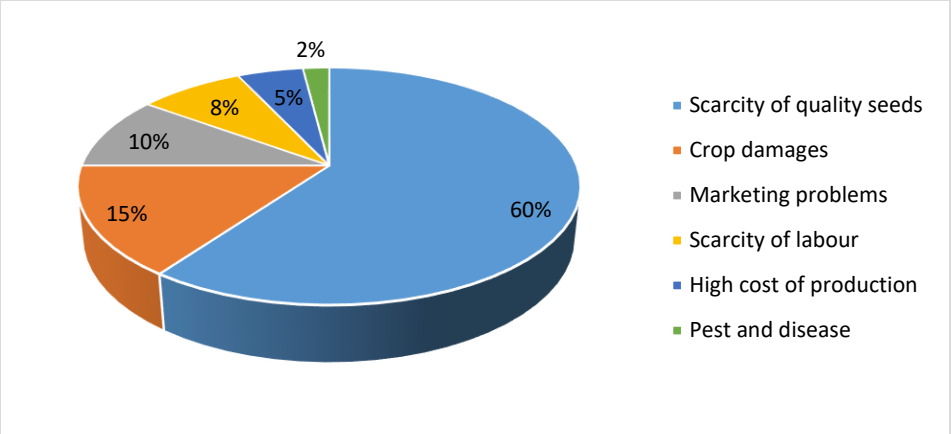
Several suggestions were made by big onion farmers: production related suggestions and marketing related suggestions. Those are presented in Table 6.8. Majority have highlighted the need for agro chemicals and fertilizers at a reasonable price in adequate quantities. Strengthening the supply of good quality seeds at an affordable price was also recommended by a fair number of farmers.

Table 6.8: Suggestions by Big Onion Farmers

Suggestions	N (40)	%
Production Related Suggestions		
Need to provide sufficient agro chemical and fertilizer at a reasonable price	28	32
Need to implement a proper mechanism to provide good quality local seeds at a reasonable price	24	28
Need to provide technical knowledge and training for the seed production	15	17
Need to provide government subsistence for inputs of big onion cultivation	12	14
Need to improve the extension service on pest and disease	8	9
Total *(Multiple response)*	**87**	**100**
Marketing Related Suggestions		
Need to implement and improve proper storage facility to store the harvest	35	42
Need for government intervention for purchasing of big onion during the peak harvesting period	28	33
Need to impose or increase the special commodity levy on big onion at the right time	21	25
Total *(Multiple response)*	**84**	**100**

Source: HARTI Survey Data, 2021

Information collected from ten farmers who gave up big onion cultivation lately in Wewalawewa area in Dambulla revealed that the cultivation was practiced mainly on imported big onion seeds in the past two decades. According to them, scarcity of imported quality seeds forced them to quit cultivation. Owing to higher cost of local seeds they opted for imported seeds. Frequent crop damages, marketing issues, scarcity of labour, high cost of production and incidence of pest and diseases were the other reasons that made them part with big onion cultivation (Figure 6.9).



Source: HARTI Survey Data, 2021

Figure 6.9: Main Reasons for Leaving Big Onion Cultivation

Fewer farmers who gave up cultivation have moved to cultivation of Tom JC mango, papaw, banana and vegetables. They have no plans to revert back to their old crop as mango cultivation is highly profitable trade rid of marketing issues.

6.2.3 Big Onion Importers

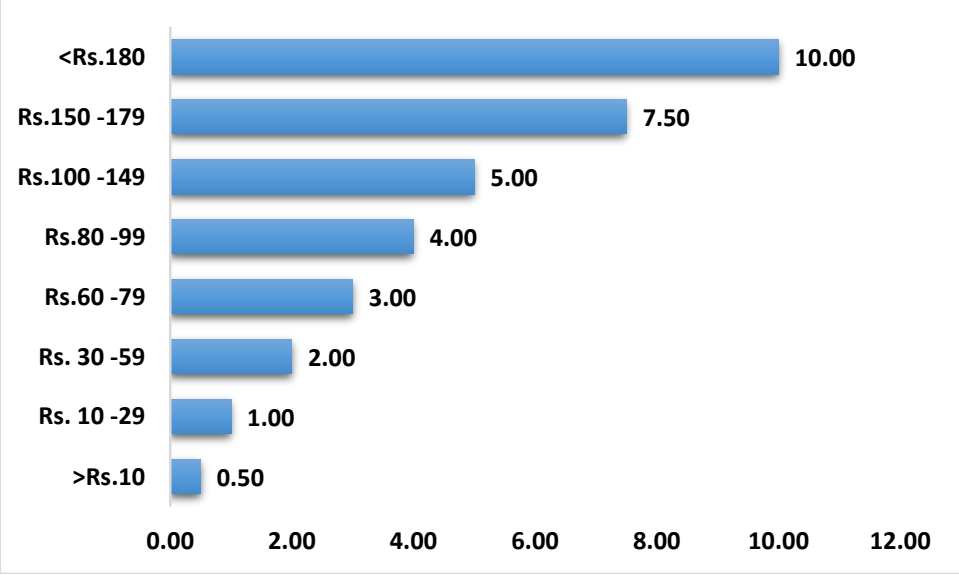
Private traders and companies are mainly involved in this sector. Five importers were interviewed for this study from both Dambulla (2) and Colombo (3) areas. According to them, there is a network of more 170 importers at present and a licensed system does not operate as in earlier. This unchecked freedom has given rise to many problems and malpractices. Evading the tax loop most of the importers import large quantities under the lowest tax rate before the government raises import tax. With the increase of tax rate, imported onions are released to the market at a higher price. Generally, the government increases or imposes special commodity levy in July or August; however, in 2021 *Yala* season it was increased in September as Rs.40.00/kg. Hence, even in the peak harvesting period imported onions are highly available at the market. Importers mainly import big onions from India, Pakistan, Iran, Egypt, Turkey and China. Big onion from all those countries, except India, come in AC containers and the quality of Indian big onion is comparatively higher. Keeping quality of imported big onions depends on the quality of the onions. However, big onion with double skin has an increased shelf life up to six months, provided it is spread out in room temperature. Other onion can be stored for two months by spreading out on gunny bags or a palette. Low quality onions can last for four months inside cool containers or cool rooms. Several big onion importers are engaged in importing throughout year while maintaining large scale storages as well. These storages are mainly located in Colombo as well as around the Dambulla Economic Centre. Non-regularized importation has led to excessive stocks flooding the market and deceitful practices. Hence, the importers stress the importance of a licensed system to achieve price stability while ensuring product availability as well as saving on foreign reserves.

6.2.4 Collectors

These are traders in assembly markets who collect onions from farmers in village for the purpose of reselling it to wholesalers, retailers or other institutions. Their role is vital as they are aware of surplus areas. Trading activities of collectors include buying, assembling, repacking, sorting, transporting and selling to wholesalers or retailers or consumers. We interviewed five collectors in Dambulla and Galewela areas. Majority of the wholesalers in DDEC are also collectors who collect big onion stocks from farmers at the field level. According to the marketing channels, the collector receives the least margin of around two to three percent.

6.2.5 Wholesalers

Wholesalers are mainly engaged in purchasing stocks from collectors and producers in large volumes than any other actor and supplying them to retailers and consumers. They also store the product, usually up to three days. During the survey, we interviewed wholesalers; five from the Dambulla market and five from Colombo and suburb markets. Locally produced big onions as well as more than 50 percent of the imported big onions flow through the Dambulla DEC. Big onions are traded in the wholesale market at a commissioned rate. Traders in both DDEC Colombo market function on commission. This rate is based on the price being traded. When a kilogram of big onion is traded at Rs.180.00/= or more than, the commission is Rs.10.00/kg. Likewise, when trading price decreases the commission also decreases accordingly. Anyway, the lowest commission was recorded as Cents 50/kg while the highest being Rs.10.00/kg (Figure 6.10).



Source: HARTI Survey Data, 2021

Figure 6.10: Price and Commission Structure at the DDEC for Big Onion

The survey results indicate that wholesale markets are the main collection centers for onion in the surrounding areas. They have improved storage, transport and communication access than other traders.

6.2.6 Retailers

Ten interviews were conducted at this stage; five from Dambulla area and five from Colombo and suburb areas. Retailer involvement in the chain includes purchasing, transporting to retail shops, displaying and selling to consumers. Retailers, being the last link between producers and consumers, are key actors in the onion value chain. They often buy from wholesalers and sell to consumers or directly buy from producers. Consumers usually buy the product from retailers as they are well informed of the requirement and purchasing power of the buyers. However, no grading system is functional at the retail level. Retailers are the second highest margin holders in the value chain after the producer. According to the analyzed value chains, retailers kept around a seven to 13 percent margin from the consumer price. According to retailers, in terms of keeping quality, Indian big onions is rated higher than the other imported varieties.

6.2.7 Onion Consumers

Consumers are those purchasing the products for consumption, directly from producers, retailers and wholesalers. Farmers also constitute an important segment of the rural consumers since they consume part of their produce. Consumers prefer onion that is medium sized, circle shaped, red colour, strong, dry and free from damage. In general consumers prefer local big onion or Indian big onion for their higher keeping quality and taste.

6.3 Government Intervention

Government intervened in several ways to promote big onion cultivation in Sri Lanka. During the last few years Sri Lanka witnessed production and productivity improvement programmes aimed at increasing the production of big onion. To achieve this, special extension, research and development programmes were launched through the Department of Agriculture with the help of the Ministry of Agriculture. The Department of Agriculture and Provincial Agriculture Departments have taken numerous initiatives to encourage farmers and enhance the true seed production. Following the outbreak of covid-19, the Sri Lankan government drew up plans to cultivate 16 selected crops--including onion. expeditiously aiming at frugality. In that respect Cabinet Memorandum No. Ag 152/2020 approved to provide the seeds to cultivate the above selected 16 crops to farmers at a concessionary price (NAP, 2021). According to the performance report of Agriculture Ministry 2020, following steps were taken to improve the big onion production;

- Set up 35 eco- controlled storage and spring units for the production of big onion seeds in the Dambulla area in the Matale district by 2021 (A unit already established in 2020 has already harvested more than 162kg of true seeds).
- The demand for true seeds in Sri Lanka is about 25000kg and this project aims at meeting about 1/3 of the national requirement.
- These units can also overlook the need to transport big onion seed growers to cooler climates for vernalization.

In addition, to shield local farmers, the government increased the Special Commodity Levy (SCL) on imported big onions during the time which local production arrives to the market. Besides protecting the local farmer, SCL was used as a mechanism to avoid price fluctuations in the market while enhancing government revenue. The following table depicts the special commodity levy for big onion from 2015 to 2021. However, in 2021 the government intervention came late by imposing it in September. It resulted in availability of large amounts of imported big onion even in the peak harvesting time.

Table 6.9: Special Commodity Levy for Big Onion (2015 -2021)

Year, Month and Date	Special Commodity Levy (Rs. /kg)
2015 January 1	10.00
2015 April 25	40.00
2015 September 8	10.00
2015 September 22	30.00
2016 July 1	25.00
2016 August 20	40.00
2017 February 17	40.00
2017 August 17	40.00
2017 November 9	1.00
2018 May 2	40.00
2018 November 2	40.00
2018 December 3	20.00
2019 March 3	20.00
2019 May 22	40.00
2019 October 3	1.00
2019 November 3	1.00
2020 February 2	1.00
2020 May 1	15.00
2020 August 1	50.00
2020 October 14	0.25
2021 September 7	40.00

Source: Annual Reports of Central Bank

Apart from that, the government intervenes in purchasing in some years to protect both farmers and consumers. Under the government's buying programme of purchasing locally produced onions, a considerable quantity is bought by "Sathosa", the government retail arm. Sathosa also sells imported big onions during the off seasons. From time to time, the government announces subsidies for consumers as well as producers through the Sathosa supermarket chain (during the harvesting period Sathosa buys at a guaranteed price and absorbs the cost of low market price). In 2020, Lanka Sathosa purchased big onions from local farmers at Rs.130.00/kg with the aim of selling them at lower prices to consumers. It also helped protecting local farmers as well.

6.4 SOWT Analysis of the Onion Value Chain

The SWOT analysis of the onion value chain presented in Table 6.10, highlights the strengths of the onion industry at the levels of producer, production areas, value chain actors, support services and enabling environment. It identified weaknesses pertaining to markets, marketing, production and post-harvest issues, as well as inadequate technical support. Opportunities are related to an unsatisfied demand and the ability to introduce new technology for production and post-harvest management. Threats identified centred on marketing, pricing, unstable weather and pests and diseases affecting the produce.

Table 6.10: SWOT Analysis of the Onion Value Chain

Strengths	Weaknesses
• Experienced farmers. • Ability to keep labour costs low by using family labour. • Government intervention in local seed production and promotion programme • Good average yield compared to India • Government intervention in protecting farmers in the peak harvesting season. • Availability of water for irrigation. • Availability of land for production. • Availability of suitable climate condition • Established local market for onions. • Acceptable standard of road network for transportation of produce.	• Inadequate knowledge in effective production technologies for onions. • Limited production season for local onions and cultivation being limited mainly to three or four areas. • High cost of inputs. • Low quality of seeds • High cost of local seeds • Limited coverage of extension officers for farm visits and advice on technical production practices. • Lack of adequate storage and packaging facilities. • Low prices to farmers due to over imported supply. • Lack of knowledge/use of grades and standards for onions. • Absence of a well-planned planting programme.

• Availability of standards / grades for onions.	• Poor organization of farmers. • Lack of effective communication among value chain actors and other stakeholders. • Mistrust along the value chain. • Prices not being competitive as in the world market • Big onion cultivation is not subsidized.
Opportunities	**Threats**
• Adoption of improved technology for onion production and post-harvest can improve yields and marketable production. • Potential to significantly increase local production to market. • Potential for organizing farmers for a well-planned planting, marketing, and distribution programme and for implementation of quality standards. • There is a good demand for local big onion • Average break-even price of imported big onion is higher than that of dry zone vegetables • Average yield of big onion being higher than most of the vegetables in major producing areas. • If government subsidizes big onion cultivation, break -even price or cost of production can reduce. • The productivity of local big onion is in a higher level when compared to India and if private sector investment is encouraged, the local seed price can drop.	• Availability of imported onions at a lower price even during the harvesting season. • Competition from legal individual importers who have access to the same market channels as local producers. • Unstable weather during crop establishment. • Adverse weather conditions during growing and harvesting seasons (drought, flooding). • Informal seed importers • Higher availability of imported onions at the market without estimating the monthly requirement.

Source: HARTI Survey Data, 2021

CHAPTER SEVEN

Summary of Findings, Conclusion and Recommendations

7.1 Summary of Findings

Locally produced big onions are available for a few months of the year and around 80 percent of the cultivation is mainly concentrated in two districts; Matale and Anuradhapura. Therefore, a large quantity of big onions (more than 80% of the total imports) is imported mainly from India.

Imports Dependency Ratio (IDR) and Self Sufficiency Ratio (SSR) are vital to measure the food situation in a country. The SSR expresses the magnitude of production in relation to domestic utilization. Big onion market in Sri Lanka largely consists of imports with higher IDR. It has shown an increasing trend after 2015 with higher IDR being reported in 2019 (93%) and 90% in 2020. SSR of big onion was at satisfactory level in 2014, 2012 and 2015 with the highest SSR being reported in 2014 due to higher cultivated extent. However, SSR dipped significantly in 2019 (7%) and 2020 (10%).

Big onion productivity in Sri Lanka is higher than that of India in most of the year and not much lower than China—the world's largest producer. It is emphasized that Sri Lanka has good potential to increase big onion production in a context where a great mismatch prevails between the imported value of big onion and its tax revenue.

Total domestic market supply of big onion consists of both local production and imports. When considering domestic utilization, a colossal amount of the supply is utilized as food. Of home production, as little as 2.5% is used for seed production. Of the total big onion supply the maximum wastage is around 2%. Utilization of big onion in the processing industry remains very low (less than 1%).

When considering the total requirement and total availability per year, it is evident that the total availability surpassed the total requirement of the year. Unrestricted imports have mainly caused this situation.

According to the seasonal price variations from 2011 to 2020, the retail price has shown an upward trend, even during the local harvesting season due to gradual decrease of extent and production of local big onion after 2015. A significant boom is noticed in terms of average farmgate price and as well as average CIF prices of imported big onion in 2019 and 2020 due to the impact of Covid -19 pandemic.

According to the analysis, farmer is at the helm in terms of monetary gain as opposed to the other actors. However, this advantage may not have a direct impact on their

profitability as other factors such as high cost of production and high availability of imported big onions at lower prices, also have a role to play.

During the period 2015 – 2020, the producer's share of local big onions (Matale district) ranged between 46 - 62 percent. The lowest margin was reported at the wholesale level, which ranged between four to 27 percent during that period. Based on the analysis from 2015 to 2020, farmer obtains more than or nearly half of the total of the retail price. When considering the market margins and cost of each different channel, the highest market efficiency was recorded for Channel One due to low marketing cost and margins. Limited market intermediaries and relatively low consumer price were the main reasons. Since the marketing cost and marketing margin in Channel - Two was higher, marketing efficiency was very low for the same. A relatively higher consumer price was also recorded in this channel.

In evaluating the margin of each actor which is based on the consumer price along the considered value chains for local big onion, farmer obtained the highest margin (around 50%) followed by retailer (around 75 – 12%). Wholesalers and collectors received comparatively lower margins. Along the imported big onion value chain, retailer received the highest margin (10.74%) followed by importer (7.91%). However, wholesalers and collectors obtained the least margins in both imported and local channels.

The total cost of cultivation in 2021 *Yala* has increased by considerably when compared to the 2020 *Yala* season manly due to increased local seed prices. In 2020 Yala season, labour cost as a percentage of the total cost was 66% for big onion in Matale . The distribution of cost in each item has changed in 2021 *Yala* season when compared to the 2020 *Yala* season. Although labour continues to be the dominant cost component, even in 2021 *Yala*, the share has dropped significantly and the share of the material cost has surged noticeably with the increase of local seed prices. The scarcity of quality seeds (both local and imported) resulted in a greater price hike (from Rs.9,000/2.5kg to Rs.30,000/2.52kg) in 2021. In 2020, Indian government banned export of onion seeds; it was the main cause of escalated seed price, accompanied by a consistent drop in the local production. The latter can be attributed to the decrease in local seed availability. Cost of fertilizer and other chemical inputs surged unprecedentedly in the 2021 *Yala* season when compared to the previous year.

The average variable cost of big onion for 2021 *Yala* season is Rs.463,482 per acre and total revenue per acre is Rs.1,189,100 in 2021 *Yala*. Therefore, the average gross margin or profit per acre is Rs.725,618. Farmers' average production per acre is 9,000kg. Break – even production quantity on average is 3,508kg per acre in 2021 *Yala* while the break – even price is Rs. 51.49/kg.

Contribution of local seed, of the total seed requirement, has increased after 2015 (80%). Seed production of private sector companies was at a satisfactory level before 2018 and

they produced nearly 80 percent of the local seeds. After the state intervention seed production promotion programme, the share has decreased gradually and now they produce less than 10 percent of the total local seed requirement.

In general, farmer participation in big onion seed production and the quantity of seed production in the Matale district have dropped following 2017 to revive again in 2021. The number of farmers who cultivated big onion has decreased gradually with the lowest farmer population being recorded in 2019 (2638). It was an 83 percent decrease when compared to 2015. Adverse weather condition is known to be the main reason. Lack of a reliable data base on locally produced seed as well as on illegal seed imports are the major constraints identified in the seed sector.

In terms of seed varieties, majority of the sample farmers (60%) in the study areas cultivated *Dambulu red* followed by *Galewela light red* (18%). Around 15 percent of the farmers cultivated *Rampur red* seed variety.

Lack of chemical fertilizer and agrochemicals and its high prices was the major production related issue reported by big onion farmers in the study areas. Extreme climate condition, high cost of seeds and high cost of other inputs were the other obstacles that emerge during production stage. Similarly, when farmers market their produce lack of availability of imported big onion at comparatively lower prices in the market even in the peak harvesting season was a main problem faced by farmers (40%). Lack of advanced storage facility, high transport cost and lack of government intervention during harvesting were other stumbling blocks. Climate change impacts affect big onion cultivation to a great extent. Delay in nursery preparation as well as harvest getting affected by heavy rainfall are other serious issues that farmers encounter in recent times.

According to the farmers who gave up big onion cultivation, the main reason cited was, scarcity of imported quality seeds. Due to higher cost of local seeds, they had opted for imported seeds. Frequent crop damages, marketing issues, scarcity of labour, high cost of production and pest and disease incidence also forced them to quit cultivation.

Private traders and private companies play an important part in big onion importing and there are over 170 importers operate in a non-licensed system. as prevailed in earlier. This situation has led to many problems and malpractices.

It has been revealed that large quantities are imported during the harvesting season under the lowest tax rate, before the levy is imposed/increased. Once the tax comes into force the imported stocks are released to the market at a higher price.

7.2 Conclusion

Big onion is among one of the most important cash crops in Sri Lanka, which was introduced in early 1960. Big onion cultivation is highly concentrated in two districts; Matale and Anuradhapura; the highest cultivation recorded from Matale. The Sri Lankan government attempts to promote big onion cultivation in many ways time to- time as it is an important cash crop as well as a frugality measure. In the last ten years, the highest cultivated extent and production was recorded in 2014, and after 2015 this sector experienced certain setbacks. Big onion cultivation, the farmer population and production has drastically come down in the recent past. In turn, the imported quantity has increased steadily. This situation has driven a wedge between domestic requirement and local production, which has forced the government to import big onion on a regular basis. Big onion market in Sri Lanka largely consists of imports with higher IDR. SSR of big onion was in somewhat satisfactory in 2014, 2012 and 2015 with highest SSR being reported in 2014 due to higher cultivated extent. Even in the highest SSR recorded year (2014), local production fulfilled only 40 percent of the total national requirement. It is evident that achieving total self-sufficiency is not plausible in the present scenario, despite with higher productivity than that of India, having go good quality seed varieties and a favourable climate condition.

Along the value chain big onion farmers receive the highest share (around 50%) out of the retail price, which is a boost to popularize the cultivation. Hence, if the policymakers and lawmakers address the obstacles prevailing in the local big onion sector, a competitive market can be set up. Further, government intervention at the right time will also put an end to malpractices centered on big onion importation while achieving SSR goals.

7.3 Recommendations

At the moment, locally produced big onions are not price competitive. To reach at level, production needs to be increased or the cost of production needs to decrease. Programmes aimed at increasing the production of big onion in other areas have not been effective. The production is confined to the present cultivating areas due to limited land resources. Thus, as a remedial measure the government needs to heavily subsidize big onion cultivation, aiming at decreasing the cost of production. It will also help increase the farmer participation in big onion cultivation to a certain extent.

As it is difficult to increase the area under cultivation substantially, there is a need to focus on increasing the yield while meeting the requirement. Productivity of big onion in Sri Lanka is higher than that of India and not much lower than that of China, as per the statistics. Hence the government should pay attention to encourage the private sector to invest in the seed production. In return, it will help boost the productivity. Further, concerted efforts are required to enhance productivity and to minimize the post-harvest losses by ensuring quality production with increased input use efficiency.

With proper storage facilities, big onions can be stored for about six months. More research and government intervention are needed to set up advanced storage facilities. An effective and efficient mechanism should be in place to document data/information in the sector by adopting an integrated approach among all relevant institutions and stakeholders.

The study found that, the quantity of imported big onions exceeded the total monthly and yearly requirement. It has exhausted a significant amount of foreign reserves while causing a high wastage. Hence, a license-based system should be in place for importing big onions accompanied by a monthly assessment of the requirement.

The government tries to assist the big onion farmers by imposing taxes but with little effect. Strict monitoring and regulation should be effective in rein in the importing while preventing the malpractices taking place in the process.

Seed treatment and selection of the variety are the important technical practices for increasing the yield of onion, which are not realized by agricultural producers. Hence, the extension officers should provide training on these aspects to agricultural producers. Training on onion cultivation and harvesting should be organized by government and non-government organizations to develop technical knowledge of the agricultural producers, which will help the agricultural producers to use the inputs in an efficient way.

However, it is suggested that more research is needed to study the big onion seed production and marketing.

These are the summary of leverage points of big onion value chain where policy interventions are needed;

- Pre-production Stage – Government should pay more attention to seed sector development to achieve self-sufficiency level of local true seed production by setting up a mechanism to manage relevant data and information. Government should subsidize some inputs of big onion cultivation as in India, aiming at decreasing the COP.
- Production Stage – Effective extension services and training programmes should be implemented to impart technical knowledge to farmers in efficient input use with recommendations of the Department of Agriculture (DOA). It will help reduce the cost of production and higher productivity. Further, extension officers should educate the farmers about the importance of the crop insurance as weather related damages frequently affect the big onion cultivation.
- Post– production Stage – Government should intervene to revise the tax at the appropriate time to curb malpractices and to set up a mechanism to import onions in a licensed system, after assessing the monthly requirement. More research and government intervention are needed to implement advanced storage facilities.

REFERENCES

Acharya, S.S. and N.L. Agarwal, (2001), Agricultural Marketing in India, New Delhi: Oxford and IBH Publishing Co.

Agidew. A., (2018), Review on Onion Value Chain Analysis in Ethiopia. Nutri Food Sci Int J.; 6(5)

Akalu. A., (2007), Vegetable Market Chain Analysis in Amhara National Regional State: The Case of Fogeraworeda, South Gondar. An MSc thesis presented to the school of graduate studies of Haramaya University, Ethiopia, pp. 99.

Bandara, J., & Yiyong, C., (2014), The impact of climate change on food crop productivity, food prices and food security in South Asia. Economic Analysis and Policy. 44. 10.1016/j.eap.2014.09.005.

Carballo.E., (2016), Onion Value Chain Analysis in Northern Belize, FAO project

Cuddeford. V., (2014), An introduction to agricultural value chains, Farm Radio International. Development Institute, (2021).

Department of Agriculture, Mahailluppallama, Sri Lanka. pp. 41-50. http://www.helgillibrary.com,a\April 9 2021).

Department of Agriculture, 2015

Ghorbani, M., (2008), The efficiency of saffron's marketing channel in Iran. *World Applied Sciences Journal*, *4*(4), pp.523-527.

Gummagolmath, K.C., Ramya Lakshmi S.B., Priyanka Patra and Ronitha, A. (2020), Price instability of onion in India –An analysis. International Research Journal of Agricultural Economics and Statistics Visit us - www.researchjournal.co.in DOI: 10.15740/HAS/IRJAES/11.1/1-11 Volume 11 | Issue 1 | March, 2020 | 1-11. ISSN-2229-7278.

Hewavitharana, H.V.C., Weerahewa.J., Warnakulasooriya, H.U., (2010). An Assessment of Financial Viability of Big Onion Seed Production in Matale District. Tropical Agricultural Research Vol.22(1): 107-112.

HIES (2005 -2016). Department of Census and Statistics. Sri Lanka.

Kafle, K., Krah, K. and Songsermsawas, T., (2018), IFAD IMPACT ASSESSMENT-High value agriculture project in hill and mountain areas (HVAP): Nepal.

Kaplinsk, R., and Morris, M., (2001), A Hand Book for Value Chain Research (Vol.113), Brighton, University of Sussex, Institute of Development Studies.

Kaskuste, J., (2020), Onion Market Chain and Power Relations There In: A Study of Nashik District in Maharashtra, India, International Institute of Social Studies.

Lesly, W.D., Malaviarachchi, M.A.P.W.K., Jayawardena. S.N., and Kumararathne, .M.J.M.P., (2002). Farmer Management Practices on the Productivity of Big Onion Cultivation in the Dry Zone of Sri Lanka. Annals of the Sri Lankan Department of Agriculture;385-392.

Mendoza, G., (1995), A primer on marketing channels and margins. *Prices, Products, and People: Analyzing Agricultural Markets in Developing Countries*, *257*.

NAP (National Agricultural Policy Document), 2021. Ministry of Agriculture. Sri Lanka.

NHRDF (2016), Value Chain Study of Onion Crop in Chikmagalur, Karnataka.

Pankaj Setiya, E.R., Muthuselvan, (2018), A Report on the study of Onion Value Chain, COLLEGE OF AGRICULTURAL BANKING, RESERVE BANK OF INDIA PUNE.

Priyadarshani, T.M.T.G.C., and Wickramasinghe, Y.M., (2016), Efficiency in Big Onion Marketing System in Sri Lanka.

Samantha. N.P.G., Vidanapathirana, R. and Rambukwella, R., (2013), Issues of big Onion Seed Production and Marketing. Hector Kobbekaduwa Agrarian Research and Training Institute.

Setiya. P., and Muthuselvan E.R., (2018), A Report on the Study of onion Value Chain. College of Agricultural Banking.

Shah. D., (2017). An Empirical Assessment of Onion Value Chain in India for Domestic and Export Market. The 9th ASAE International Conference: Transformation in Agricultural and Food Economy in Asia, Bangkok, Thailand.

Smith, L.D., (1992), Costs, margins and returns in agricultural marketing. FAO.

Technical Assistance to the Modernization of Agriculture Programme in Sri Lanka (TAMP), (2019), Value chain Development Study – Vegetables.

Value Chain Analysis of the Fruit and Vegetable Market for Smallholder Farmers in Zanzibar VSO ICS Report April 2015.

Wong, L., (2016), Agrofood Value Chains Management for Agricultural and Rural Development, Food Security, and Regional/Global Integration. Presentation at Enabling Agro Food Value Chains: A Capacity Building Workshop. Tokyo: Asian Development Bank Institute.

https;// www.economynext.com, 2020.

https;//www.helgillibrary.com. April,9.2021

http://www.thedailyrecords.com 2021/10/20

http://www.unido.org/sites/default/files/2009/Agro-value-chain-analysis and development