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CGIAR RESEARCH PROGRAM ON Water, Land and Ecosystems

CITY REGION FOOD SYSTEM SITUATIONAL ANALYSIS

Colombo, Sri Lanka

FAO - Food for the Cities Programme

- WORKING DOCUMENT -

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ABOUT THIS REPORT

City region food systems (CRFS) encompass the complex network of actors, processes and relationships involved in food production, processing, marketing and consumption in a given geographical region. The CRFS approach advocates for strengthened connectivity between urban centres and surrounding areas –whether peri-urban or rural– for a fair rural development and well-managed urbanisation. At the same time, it fosters the development of resilient and sustainable food systems, smallholder agriculture, sustainable rural and urban production, employment, improved livelihoods, and food and nutrition security for all.

The Food for the Cities Programme aims at building more resilient and sustainable food systems within city regions by strengthening rural-urban linkages. The programme builds on the demand to better understand and operationalize the concept of city region food systems. It analyzes and assesses CRFS. The results will serve as a basis for further planning and informed decision-making, prioritizing investments and designing food policies and strategies, which aim at improving the resilience and sustainability of the entire food system, through a continuous participatory multi-stakeholder dialogue.

In collaboration with the RUAF Foundation, projects are carried out in eight city regions: Colombo (Sri Lanka), Dakar (Senegal), Kitwe and Lusaka (Zambia), Medellin (Colombia), Quito (Ecuador), Toronto (Canada) and Utrecht (the Netherlands).

This report describes the first phase of the city region food system (CRFS) assessment. This phase consists of a descriptive assessment and appraisal of the local context and CRFS, primarily based on the analysis of secondary data, stakeholder interviews and consultations. It provides an overview and description of the local context (including the political and institutional environment) and its CRFS. It includes a definition of the geographical boundaries of the CRFS, an overview of its overall structure and characteristics, an analysis of how it functions, stock of baseline information and identified gaps, and, to the extent possible, an indication of general trends and critical issues relevant to increase the sustainability and resilience of the specific CRFS. These key issues will be further examined in the next project phases: in-depth assessment and policy planning phases.
The situation analysis builds on secondary data. Secondary data includes information from spatial datasets, statistics, studies, institutional, policy and legal frameworks, and information obtained from local expert knowledge through stakeholder consultations, focus-group discussions and interviews.

The report was prepared by Sudarshana Fernando (International Water Management Institute (IWMI)), Christina Semasinghe (IWMI), Nilanthi Jayathilake (IWMI), Ruwan Wijayamunie (Colombo Municipal Council), Nalaka Wickramasinghe (University of Kelaniya) and Sarath Dissanayake (University of Moratuwa), with assistance and guidance from Guido Santini, Yota Nicolarea, Louison Lançon and Diana Gutiérrez from FAO's Plant Production and Protection Division (AGP), and Henk Renting and Marielle Dubbeling from the RUAF Foundation.

EXECUTIVE SUMMARY

The Colombo Municipal Council, CMC, is the oldest local authority in Sri Lanka, which celebrated its 150th anniversary this year. Historically Colombo city has been the main commercial city in Sri Lanka; however recently accelerated modernization efforts have changed the traditional outlook of Colombo municipality. During recent years, Colombo city was heavily invested for its infrastructure development to make the city an urban tourist attraction. Because of the recent developments, Colombo city was ranked as the number one fast growing city in the world in 2015. Align with this modernization, more and more people are attracted to Colombo city and its peri-urban areas for living and as well as for business. According to latest census statistics, there are 2,324,349 people living in Colombo district with a population density of 3438, which is the highest in the country. Remarkably, from the country's population, one tenth reside in Colombo district. Population in CMC and the population density are 0.65 m, 15000-18000 per sq. km respectively. Further, this population has a complex diversity with respect to their age, ethnic, religious, and income level compositions. Therefore, Colombo city probably has one of the diverse and complex food systems in Sri Lanka, which requires vastly different types of foods to feed the large population in a small and congested city. Conversely, there is hardly any agricultural farming and food production in CMC limits, which has created multiple dependencies to food system of the city.

Owing to this complexity, Colombo city food system should be viewed as a multi-facet domain with food supply, consumer perspective, food waste management, food safety, nutrient safety, food prices, and legal perspectives.

The complexity of the socio-demographic profile of the people claims many food items through multiple channels. Further, busy and complex lifestyle in the city has created high demand for catering services that supply prepared food for direct consumption. Since there is hardly any food production, Colombo city largely depends on food chains originated from agrarian districts of the country and on imported foods. Hence, changes in weather conditions, increase of fuel prices, enforcement of government taxes, and changes in currency rates have directly influenced the food system in Colombo city.

For decades, food waste disposal has been an immense problem in Colombo city. Since the land area of Colombo city and its suburbs are heavily utilized for commercial and residential purposes, an ongoing problem exist in finding suitable locations for disposing the vast amount of food wastes generated in households, restaurants, institutes, and markets. Public concerns and protests on unsustainable waste management by the CMC are common and a sustainable solution for urban waste management including food waste is still in need.

Significant disparities arise in living standards, economic wealth, and socio-cultural imbalance within CMC area. There are a substantial proportion of marginalized people and over one-half of the population in Colombo district survives with less than the prescribed calorie intake per day. Their food pattern would be drastically different from the other half of the population. An interesting point here is, despite the low poverty level in Colombo district, it is high in food insecurity. The possible reasons may be that even though higher expenditures in urban areas show households to be above the poverty line, less is being spent on food and energy-yielding staples.

Top down approach hitherto used to evaluate the food systems so far have not paid attention to micro level diversities of food patterns, and their existing and potential problems. Especially, CMC area had never received a comprehensive micro scoping attention to understand the issues relating to grassroots level food system of the city. It appears that the top down approach was unable to address the challenge of urban growth, diversity, life style, and dynamic, in view of food security and safety. Considering diversities, the CMC might have the most complex food system in Sri Lanka. Hence, the importance of bottom up approach is more pronounced in CMC food system context.

This study assumes CMC as the consumer. The initial desk review revealed the difficulty in the attempt since the available secondary data and statistics provides information mostly on district level. Hence, there is need to conduct sample primary level data collection to define the food system complexity in CMC area. By improving, supporting, and reinforcing the food system concept of the city region, it can improve the food security. In addition, protect those who are vulnerable create new opportunities for urban farming and related activities, and improve sustainability of the local food systems in many dimensions.
In particular, this report discusses on the context of CMC in Sri Lanka, but most of the facts will be applicable to many other low-income countries in Asia and Africa.

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1. INTRODUCTION

Urbanization has converted cities to massive consumption hubs, which causes an enormous pressure on conventional food production and supply to feed hungry cities. Most cities have paid attention and made efforts to improve industrial, commercial, and service activities, which can create more opportunities and income avenues suited for imbalance population growth and uncontrollable population density in cities. Hence, land and other resources are mostly in demand for high revenue generating activities and as a result, resource allocation for agriculture has drastically declined in urban areas.

Central to urbanization, there is an increasing demand for food complementing to urban life style. This claims for a vast variety of foods at different price ranges, amenable to different income levels and diverse population. This has created a system that need to satisfy the complex food demands of urban cities than other regions of the country. Apart from food processing and value additions to certain food products, the food production is not the stronghold of urban areas. In return, cities provide other products and services to semi urban and rural areas and act as the service and industrial hubs of the country.

This new development has demanded challenging food production systems, innovative rural-urban linkages, efficient transport systems, storage strategies, food processing technologies, and innovative food supply chains. It is evidenced the urbanization has made urban food systems complex, which motivates the importance of understanding the food system in urban areas and take measures to strengthen it to increase the food and nutrition safety of the people living in urban areas. The increasing demand and complex nature of the supply system has contributed to increase food prices in urban contexts. Hence, middle and low-income groups in urban settings have to face challenges in maintaining the food and nutrition security.

Through identifying the food systems, it enables to strengthen the connectivity between urban centers and surrounding peri-urban and rural areas for fair rural development and well-managed urbanization, which foster the development of resilient and sustainable food systems, stimulating smallholder agriculture, sustainable rural and urban production, employment, livelihood support and ensuring food, and nutrition security for all. As this has not been attempted in Sri Lanka in the past, the purpose is to lay the groundwork to develop a better understanding on how to define, foster, build, and improve sustainable and resilient City Region Food System (CRFS) with respect to Colombo Municipal Council (CMC) area.

Aims of this study

This study aims to achieve four specific objectives:

1. To define Colombo City Region Food System (CRFS) based on its socio demographic and food patterns
2. To understand the local institutional, stakeholder, legal, and policy context.
3. To compile relevant information on food consumption, supply, security, marketing channels, and nutrition
4. To Identify health and safety issues

Data Collection Methodology

Multiple data sources were cited to achieve these stated objectives:

Population and socio demographic data

Mainly from Department of Census and Statistics Department statistical data sets and reports on Household population census 2013 final report, Labour force survey 2014, Central Bank Annual report 2013/2014, Annual Health Survey 2006/2007 (latest available), Household Income Expenditure Survey 2012/2013 final report, District Statistical book 2013.

Legal Policy framework

Data and information were collected through comprehensive desk and internet reviews and the CMC laws and Provincial council regulations were reviewed. In addition, professionals such as Public Health Inspectors (PHIs) were interviewed in relation to CMC regulations on food security.

Food consumption

Collection of data was mainly from Household Income and Expenditure survey 2012/2013. Major food categories, annual monthly expenditure on each food category, and per capita expenditure on food item were obtained from this report, and a research report on "Food consumption patterns in Sri Lanka," published by HARTI. Case studies on food consumption were mainly received from that set of data and reports from Ministry of Health, UNICEF were referred.

Food Supply

Agricultural food items supply details were obtained from statistical database of Ministry of Agriculture. This provides district wise data for each year and the data set contains the Maha, Yala, and 3rd season data for specific crops. Apart from the secondary data source, information were collected from sellers at Dambulla dedicated economic center and Manning Market Colombo to determine the sources that supply food to Colombo. Data collected from the sources were arranged in such a way to generate GIS maps and the GIS maps of this report were mainly produced by data at HARTI (research publications, datasets regarding food consumption patterns in Sri Lanka, etc.).

Marketing Channels

Marketing channels were mainly observed by visiting major markets with a significant influence over Colombo food system. Researcher visited Dambulla, Manning, and Narahenpita economic centers and interviewed lorry drivers, commission agents, buyers, sellers, whole sellers, and importers in Fort wholesale market. These interviews assisted researcher to identify the long and short supply chains,

and establish food flows for food items. Researcher interviewed floor managers and distribution center managers of leading super market chains to discover their food supply successions.

Food safety

Food safety information were mainly collected through primary sources, namely from Dr. Ruwan Wijayamuni, Dr. Subash Mendis, and PHI officers at MOH office Kotahena. The CMC database and newspaper archives were penetrated to identify reported cases on food safety in Colombo city region while nutritional data were collected through research papers and annual health bulletin of Ministry of Health.

Natural resource management

Natural resource management and climate change are key areas of local interest. This baseline study mainly used literature, expert consultation, and secondary data. Some databases were analyzed and presented to reflect the present situation. An array of expert interviews were conducted to understand the impact of climate change.

Gap identification

Selected experts in the team analyzed collected data and compiled report, and several brainstorming sessions were conducted to identify and interpret the issues and gaps related to CRFS in Colombo.

Structure of the report

In reality, urbanization poses both challenges and opportunities for sustainable development and environmental management. Improved data on patterns and trends in consumption needs can aid researchers and policy makers to identify the steps needed for sustainable food systems for cities. For an example, the concept of city region food systems (CRFS) can use as a basis for further planning and informed decision making, prioritizing investments, and designing sustainable food policies and strategies improving local production and marketing. By identifying Colombo CRFS, it is expected to strengthen the connectivity between urban centers and surrounding peri-urban and rural areas for fair rural development and well-managed urbanization. This will foster the development of resilient and sustainable food systems, stimulating smallholder agriculture, sustainable rural and urban production, employment, livelihood support, and ensuring food and nutrition security for all. As this has not been attempted before, this preliminary study propose to lay the groundwork to develop a better understanding on how to define, foster, build, and improve sustainable, resilient CRFS in Colombo.

The first section of this report would define the Colombo city region and explain its socio-demographic profile and the inputs of the city region that would influence on its food system. The report then explains the Food system in Colombo city region by explaining the major types of consumers, their generic food patterns, and food basket items, origin of those foods, manufacturers, whole sellers, and retailer networks. Proceeding section would explore the institutional framework and enabling conditions, laws and regulations that help the CRFS in Colombo. The report briefly discuss on food waste management and food safety within MC and natural resource management aspects.

2. DEFINITION OF THE COLOMBO CITY REGION FOOD SYSTEM

2.1. CITY REGION FOOD SYSTEM APPROACH

Owing to the increasing complexities in social, economic, and demographical differences, the national level analysis would not provide much deeper insights to the local context. Hence, there is a global trend of analyzing the food systems from micro level geo-specific perspective than macro perspective (International Sustainability Unit, 2015). With the improvement of geographical information systems (GIS), socio-economic problems tend to analyze using geo-specific approach. To understand the spatial patterns and the differences, Geo-specific approach can narrow down the problem into specific geographical region, mostly to district, city, or town and do an in-depth analysis in that specific region. Especially, recent publications on food security has highlighted understanding of the issue from micro level perspective (Berry, E M; Dernini2, S; Burlingame, B; Meybeck, Alexandre; Conforti, P, 2014). Following the trend, City Region Food system approach is expected to analyze actors and relationships in food chain of certain city, in this case Colombo city, and its peri-urban and rural surroundings.

The basic activity structure may be the same in city food systems though different spatial patterns in different city-regions are expected. Across the city-region exists a flow of people, goods, and ecosystem services that are connected with more distant locations and global (food) systems. The CRFS approach advocates for a strengthened connectivity between urban centers and surrounding areas (whether peri-urban or rural) for a fair rural development and well-managed urbanization, which fosters the development of resilient and sustainable food systems, stimulating smallholder agriculture, sustainable rural and urban production, employment, livelihood support, and ensuring food and nutrition security for all (International Sustainability Unit, 2015). Therefore, the CRFS approach would provide more comprehensive understanding of food system and its inputs and outputs, while examining the social and environmental concerns related to specific City-Region.

2.2. DEFINING A CITY-REGION FOR FOOD SYSTEMS

The city region for food system is understood as a given geographical region that includes their surrounding peri-urban and rural hinterland, across which, flows of people, food, resources/inputs for food production, and ecosystem services are happening. The physical boundaries of the city region need to be determined by considering multiple dimensions. Most data may be available for district or regional levels, not for the city regions. Since the concept of City Region food system is fairly new, no clear-cut methodology has been developed to identify the city region and the city region boundaries may be needed to define in the individual city context.

2.3. DEFINITION OF THE CRFS: CRITERIA USED FOR DEFINING THE CRFS AND VISUAL REPRESENTATION

2.3.1. City Region Food System Approach (CRFS)

Owing to the increasing complexities in social, economic, demographical differences, and traditions at local level, there is a global trend of analyzing the problems from micro level geo-specific perspective than from macro perspective (International Sustainability Unit, 2015). This will allow researchers and decision makers to narrow their focus and provide location based solutions. Especially, recent publications on food security has highlighted the importance of understanding the issue from micro level perspective (Berry, E M; Dernini[2], S; Burlingame, B; Meybeck, Alexandre; Conforti, P, 2014). Following the trend, City Region Food system approach is expected to analyze actors/players, relationships in food system of a certain city, while considering its relationship with peri-urban and rural surroundings.

City region food system (CRFS) approach is rather an innovative angle to visualize the food systems than the conventional way of observing on national perspective. It seems that in many cases, the national level programs on food systems failed to cover the local expectations completely; this concept is still new and developing, but already gained attention due to its innovative approach.

CRFS is an emerging practice to understand the food systems from micro perspective, which encompass the complex network of actors, processes and relationships involved in food production, processing, marketing, and consumption in a given geographical region. A top down approach refuse to pay attention or unable to address the microscopic level diversity of food patterns, growing food waste problems, food safety, affordability, and access at a local level; i.e. main reasons for less success of top down approach may be unique identities inherited to locality, and the difficulty to address local characteristic by national level actions.

> Box: 1.1
> More importantly, national tools may be ineffective in promoting many locally needed solutions such as circular economy concepts and the role of urban and peri urban agriculture, which have to derive at a local level by considering the unique features of the local food systems, geography, and social aspects. CRFS is a concept, aimed to design a new version of the solution to food system and its problems while listening to the voices of those at the end of the food supply chain. Top of all above, Local Authorities are the political authorities linking local community to national governance. Local authorities are highly equipped to understand the expectations of the local community and draw local, valid, and practical solutions. By reinforcing CRFS with the involvement of local authorities, making improvements to the food security, creating new opportunities, and improving the sustainability of local food systems (in many dimensions), are likely to achieve successfully.

The CRFS approach advocates for a strengthened connectivity between urban centers and surrounding areas (peri-urban or rural) for a fair rural development and well-managed urbanization, which fosters the development of resilient and sustainable food systems, stimulating smallholder agriculture, sustainable rural and urban production, employment, livelihood support, and ensuring food and nutrition security for all (International Sustainability Unit, 2015). Therefore, the CRFS approach would

provide more comprehensive understanding of food system and its inputs and outputs while examining the social, economic, and environmental in the urban eye.

2.3.2. Colombo City-Region Boundaries

How to establish a boundary to a given city is one topic under discussion, and there is not a single way to define a city region food system. The city region boundary may need to adjust by considering the local context and interests. In addition, when defining a city region, many additional factors should be considered; such as, judicial boundaries already in place, administrative boundaries in govern, and data availability level (which area level). Conversely, there are various components to CRFS such as food production, process, wholesale, retail, food safety, etc. and identifying a single boundary covering most or all of the components is a challenge. Multiple boundaries depend on the study area seems to be a practical option.

It may be interesting to define the boundary by considering an area supplying a defined percentage of major or total food needs to the city. However, defining such a boundary requires appropriate data on food supply to the city, and in the case of Colombo, such data sets are not available. Data availability stands as a crucial issue, especially in a low-income country context with limited data sources. In Sri Lanka, most statistics and national data are available in district level. On the other hand, as Colombo is nurtured by most parts of the country, it results in supplying of different commodities by different parts of the Island.

Note: The maximum length and width of the island is 435km and 240km respectively; Colombo is centrally located in the western part. Hence, transporting items to Colombo from any part of the country is not a challenge, and good infrastructure facilities available to reach Colombo from almost all regions of the country.

Based on the locally applicable scenarios, few options for city region food system boundary for Colombo was considered during this study. The selected options are as follows:

1. Built up areas and population densities – The basis for this scenario is less dense areas of the region would act as suppliers to the CMC.

2. Administrative boundaries – Administrative boundary have databases to support the study.

3. Judicial boundaries – These are the governing units and data for some of the areas (coming under their authority) are available. These judicial units take policy decisions.

4. Supply areas of major nutrients – The major commodity, which supply major nutrients to the CMC; in this case, rice for carbohydrate, fish for protein, and coconut for fat.

5. Supply areas of major and minor nutrients - The major commodity, which supplies major and micro (vitamins and minerals) nutrients to the CMC. In this case, rice for carbohydrate, fish for protein, coconut for fat, and fruits and vegetables for vitamins and minerals.

6. Data availability – Almost all national survey and censes data are available at district level. Hence, most data is available in district level.

According to population distribution, more than ¼ of the population lives in Western province, the smallest province considering the land area of the country. Since it consists the commercial and legislative capitals in Colombo district, more people tend to gather into the Western province. The province is highly urbanized and declares a significant proportion of urban population (40%) compared to rest of the country (which is 15%), as presented in Table 1.

Table 1. Area, Population, and Sectorial composition by Province

	Sri Lanka & provinces			Sector		
	Area km^2	Total	%	Urban	Rural	Estate
Sri Lanka	65610	20,359,439		18.2	77.4	4.4
Western province	3593	5,851,130	28.7	38.8	60.4	0.8
Central province	5575	2,571,557	12.6	10.5	70.6	18.9
Southern province	5383	2,477,285	12.2	10.6	87.7	1.7
Northern province	8290	1,061,315	5.2	16.7	83.3	-
Eastern province	9361	1,555,510	7.6	25.1	74.9	-
North Western province	7506	2,380,861	11.7	4.1	95.5	0.4
North Central province	9741	1,266,663	6.2	4	96	0
Uva province	8335	1,266,463	6.2	5.5	81.7	12.8
Sabaragamuwa province	4921	1,928,655	9.5	6	85.9	8.1

Source: Department of Census and Statistics Sri Lanka, 2012

Table 2. Population densities according to DS divisions

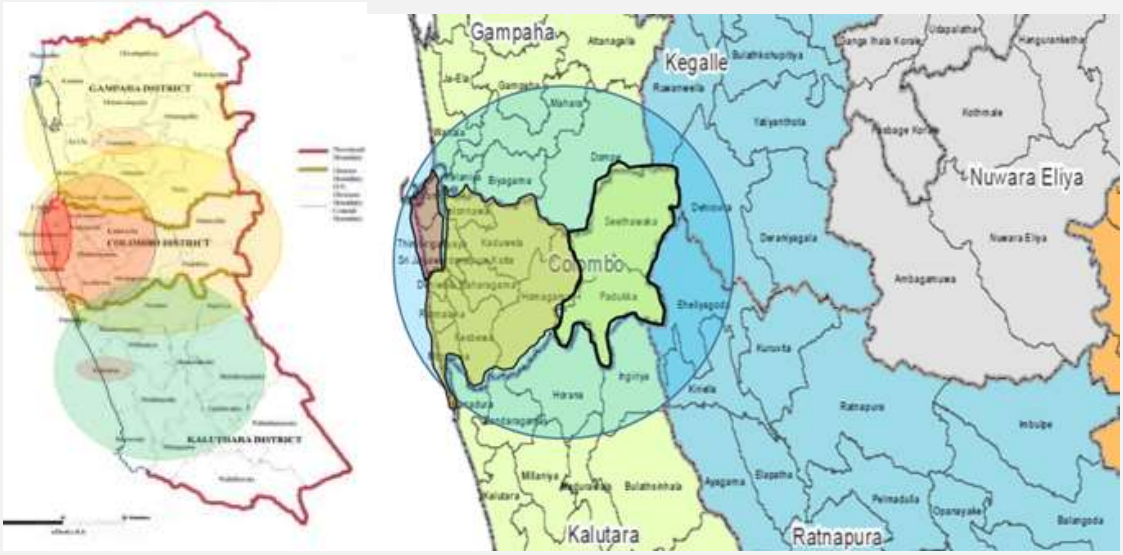
DS DIVISION	MAIN TOWN	TOTAL	POPULATION DENSITY (PER KM^2)
COLOMBO	Colombo	318,048	17,669
DEHIWALA	Dehiwala-Mount Lavinia	87,834	10,979
HOMAGAMA	Homagama	236,179	1,952
KADUWELA	Kaduwela	252,057	2,864
KESBEWA	Kesbewa	244,062	3,813
KOLONNAWA	Kolonnawa	190,817	6,815
MAHARAGAMA	Maharagama	195,355	5,141
MORATUWA	Moratuwa	167,160	8,358
PADUKKA	Padukka	65,167	592
RATMALANA	Dehiwala-Mount Lavinia	95,162	7,320
SEETHAWAKA	Avissawella	113,477	757
SRI JAYAWARDENEPURA KOTTE	Sri Jayawardenepura Kotte	107,508	6,324
THIMBIRIGASYAYA	Colombo	236,983	9,874

Source: Censes, 2012

DS divisions in Colombo have 600 - 17,600 population densities as indicated in Table 2. Therefore, urban, semi-urban, and rural segregation is clearly visible in Colombo district as illustrated in the map under population density. CMC can clearly identify as the city or the main consumer, and semi-urban and rural DS divisions can identify as production and supply regions.

Box 1.2

The peri-urban DS divisions and rural DS divisions in Colombo district make the close layer of the region while Gampaha and Kalutara districts create the secondary layer of the Colombo City-Region. Compared to other districts in Sri Lanka, Colombo is the smallest surrounded by Gampaha and Kalutara district boarders. Hence, the influence of expanding population in Colombo City-Region easily divert to closer DS divisions in Gampaha and Kalutara. Since the Southern Highway, Katunayake Highway, and Outer circle road, human and food mobility from and towards Colombo City-Region would increase drastically and boundaries of the City-region might become more volatile in future.



Colombo City Region in Western Province
Source: Department of Census and Statistics Sri Lanka

Apart from Gampaha and Kalutara districts, Kegalle and Rathnapura, which are agricultural districts, border Colombo city region from the West, as the third layer to the city region.

District boundary complies with judicial boundaries, administrative boundaries, and unit level where data is available. Alternatively, no data is available on food supplied to CMC from the Colombo district and other districts to establish the Boundary option 4 and option 5. By considering all facts above, Colombo district seems to be the best city region boundary, while considering CMC as the city as shown in**Error! Reference source not found.**.

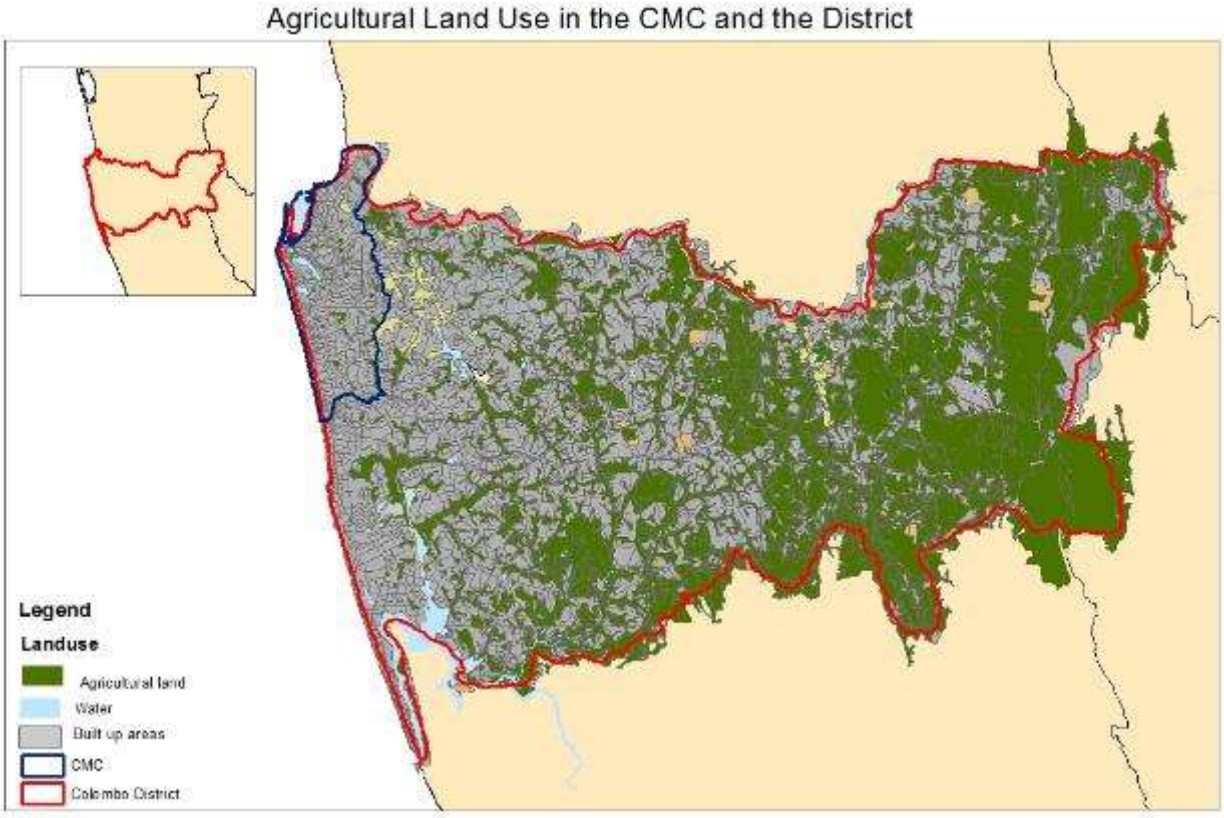


Figure 1. Colombo CRFS boundary

3. STAKEHOLDER ANALYSIS

3.1. THE BIG PICTURE

City Region Food system (CRFS) encompasses the complex network of actors, processors, and relationships involved in food production, transportation, processing, marketing, preparation, and consumption in a given geographical region. During this study, the Colombo city council (CMC) has been considered as the "Consumer" and the food print seems to expand, covering the entire country and beyond. Owing to the diverse food baskets consumed by different segments of the population and huge demand for food in Colombo, the food system is quite complex and has been influenced by international, national, provincial, and local government level actors. Therefore, stakeholders of the Colombo city food system are expected to be complex to analyze as a whole and thus will be discussed under identified categories, which are important in the context of CMC context. Four level of actors can be identified, who influences Colombo city region food system. During this study, only national, regional, and local level actors were considered.

1. National level actors – such as key ministries, departments, authorities, and institutions relevant to food, environment, and health at national level;
2. Regional level actors – such as provincial councils, provincial ministries, provincial authorities, etc. relevant to food, environment, and health at regional/provincial level;
3. Local level actors – such as CMC, DS divisions (CMC contains two DS division namely; Colombo and Thimbirigasyaya);
4. International level actors - World organizations concerned with matters related to food security, nutrient security, environment, and health (e.g. FAO).

3.2. INSTITUTIONS BASED ON THEIR FOCUSED VALUE CHAIN ACTIVITY

Vision, missions, strategic goals and objectives of the ministries, their related entities, and other organizations have indicated the level of their contribution[1] on each aspect of the food system. Depending on the stage, different entities have contributed at different level to the food system (Figure 2). There may be non-governmental organizations active in some areas in a smaller scale (e.g. Sevanatha in home composting). During this analysis, public institutes were considered.

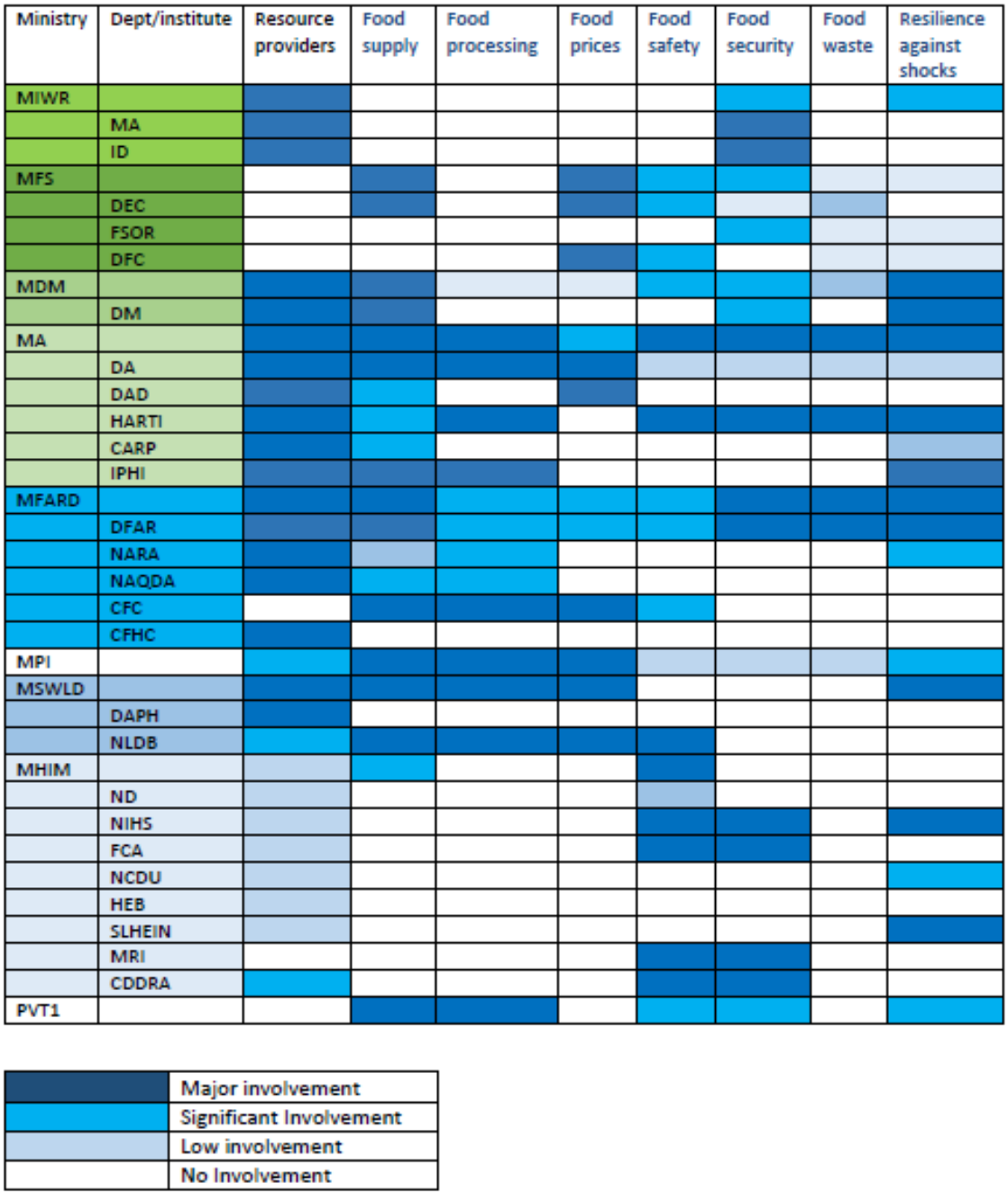


Figure 2. Relative contributions from stakeholders on Food system

[1] Level of involvement is decided based on the qualitative judgment on the priority of the stated objectives, affiliated institutions and their recent activities stated in the website and relevant report of the institution

Acronyms

i. **Ministry of Irrigation and Water Resources Management of Sri Lanka (MIWR):** Irrigation Department (ID), Mahaweli Authority (MA)
ii. **Ministry of Disaster Management (MDM):** Department of Meteorology (DM)
iii. **Ministry of Food Security (MFS):** Food Security Operational Room (FSOR), Department of Food Commissioner's (DFC), Dedicated Economic Centers (DECs)
iv. **Ministry of Agriculture (MA):** Department of Agriculture (DOA), Department of Agrarian Development (DAD), Hector Kobbekaduwa Agrarian Research and Training Institute (HARTI), Sri Lanka Council for Agricultural Research Policy (CARP), The Institute of Post-Harvest Technology (IPHT)
v. **Ministry of Fisheries and Aquatic Resources Development (MFARD):** Department of Fisheries & Aquatic Resources (DFAR), National Aquatic Resources Research and Development Agency (NARA), National Aquaculture Development Authority (NAQDA), Ceylon Fisheries Corporation (CFC), Ceylon Fishery Harbors Corporation (CFHC)
vi. **Ministry of Plantation Industries (MPI)**
vii. **Ministry of Social service, Welfare, and Livestock Development (MSWLD):** Department of Animal Production and Health (DAPH), National Livestock Development Board (NLDB)
viii. **Ministry of Health and Indigenous Medicine (MHIM):** Nutrition Division (ND), National Institute of Health Sciences (NIHS), Food Control Administration (FCA), Non Communicable Disease Unit (NCDU), Health Education Bureau (HEB), Sri Lanka Public Health Education Institutes Network (SLHEIN), Medical Research Institute of Sri Lanka (MRI), Cosmetics, Devices & Drugs Regulatory Authority (CDDRA)
ix. **PVT: Private sector Companies**

3.3. INSTITUTIONAL ANALYSIS ON ENTITY, FOOD CATEGORIES, AND FOOD VALUE CHAIN ACTIVITY

This study has identified 12-13 major food commodities in consumption. However, hundreds of food types are consumed in Sri Lanka. Since about 1/3 of the population in Sri Lanka depends on agricultural activities as their livelihood, there are considerable number of institutes involved in food system related activities. However, numerous entities such as paddy cultivation board, coconut cultivation board, Cashew Corporation, and tea development board have influence over one or few food types. Some of the institutions work on multiple food categories and some entities are involved in more than one value chain activity. Since there are many formal entities involved in regulation framework of food system in Sri Lanka, it is highly complex in nature. This make even more complex in categorizing institutional involvement matrix, where complexity becomes unavoidable.

According to the strategic goals and objectives of the ministries, departments, and private sector entities, most of them work on certain stages of the system, but some are in isolation. Even though there is no explicit connectivity between goals, objectives, and activities of different entities, they work on same system, which makes complicated network between the stakeholder entities. Without concerning farmers and consumers, the complexity of this stakeholder involvement is illustrated according to major commodities in Figure 3.

		Food Supply	Food processing	Food safety	Food security	Food prices	Food waste	Resilience against shocks
Agriculture	General	**MA** **MF**						
		DOA/ DAD						
		HARTI						**AAIB**
			IPHT	**MH/MFS**	**MDM**	**CAA**	**IPHT** **CEA**	**DM**
	Rice	MA/DOA	**PMB/ FCA**				**RED**	**MA**
		RRDI2				MF		**DOA**
	Other cereals, Pulses and Vegetables	**MA** DOA						
		HORDI3: **FCRDI:**		**CAA** **FCA**		**CAA** **DEC**	**IPHT** **CMC**	**MA** **DOA**
		SCPPC[4]:						
	Fruits					DEC	CMC	
		FRDI[5]:						
	Condiments					DEA		
		DEA						
	Coconuts	MCDJED:						
		CDB				CAA		
Livestock	General	MLRCD					CEA	AAIB
	Meat	**DAPH**					**CMC**	
	Milk & milk	**DAPH/ NLDB**				NLDB		
	Prepared food	**CMC**						MDM
Fisheries	General	**MFARD** **DFAR**						
	Fresh Fish And Dried fish	**NARA/ NAQDA/CHFC**				CFC	CMC	
		SLC	**CMC**			SLC		
	food Fats& oil	MH------SLC-----CMC				MF SLC		
		MSID						
	Sugar, Juggery & Treacle	SRI		MH SLC CMC	MA MF	MF SLC		MA

Figure 3. Matrix of relationship among Institutions, food type and value chain activities

[2] http://www.agridept.gov.lk/index.php/en/services
[3] http://www.agridept.gov.lk/index.php/en/institutes
[4] http://www.agridept.gov.lk/index.php/en/services
[5] http://www.agridept.gov.lk/index.php/en/institutes/1587

Acronyms

Paddy Marketing Board (PMB)
Coconut Development Board (CDB)
Rice Research and Development Institute (RRDI)
Fruit Research and Development Institute (FRDI)
Horticultural Crop Research and Development Institute (HORDI)
Field Crops Research and Development Institute (FCRDI)
Seed Certification and Plant Protection Service (SCPPC)
Department of Animal Production & Health (DAPH)
Department of Agrarian Development (DAD)[6]
Agricultural and Agrarian Insurance Board (AAIB)
The Institute of Post-Harvest Technology (IPHT)[7]
Hector Kobbekaduwa Agrarian Research and Training Institute (HARTI)[8]
Department of Export Agriculture (DEA)
Department of Renewable Energy (RED)
Consumer Affairs Authority (CAA)
Ministry of Coconut Development and Janatha Estate Development (MCDJED)[9]
Food Control Administration (FCA)[10]
Sugarcane Research Institute (SRI)[11]
Department of Animal Production and Health (DAPH)[12]
National Livestock Development Board (NLDB)

3.4. INTEGRATING NATIONAL ACTORS AS A SYSTEM IN COLOMBO CITY REGION FOOD SYSTEM

Apart from the international actors, numerous national actors play a key role as resource providers in Colombo city region food supply. The impact of these organizations for the Colombo city region food system is vital in terms of policymaking, human resource development, capacity building, food production, food distribution, and marketing.

Initially, it was attempted to produce a single stakeholder map for Colombo CRFS but the map was complex and less meaningful. Then the main components of the food system were identified and the stakeholder analysis was conducted under each component. During investigating the stakeholder and institutional setup in Sri Lanka, it was evident that certain components of the food system have a stronger stakeholder involvement, compared to some other components. As a major industry in the country, agriculture provide livelihood for 1/3 of the country's population, and many stakeholders engage in different aspects of agriculture and in food systems. Single stakeholder analysis on the food system reveals a complex relationship with many actors, but it cannot capture the real institutional and stakeholder gaps. More focused analysis on identified components would permit identification of strong and weak components of the food system, than viewing the food system as a whole. This study attempted to identify locally important components of the food system (i.e. in the context of Colombo city region food system) using expert consultation.

[6] http://agrariandept.gov.lk:8080/agrarian/ResearchDocuments.jsp
[7] http://ipht.lk/#
[8] http://www.harti.gov.lk/
[9]http://www.cdjedmin.gov.lk/home/index.php?option=com_content&view=article&id=91&Itemid=97&lang=en
[10] http://203.94.76.60/FOODWEB/files/ourmission.html
[11] http://sugarres.lk/
[12] http://www.daph.gov.lk/web/index.php?lang=en

The identified main components are:

- Food supply
- Food processing
- Food safety
- Food security
- Food prices
- Food waste
- Resilience against shocks

There are multiple ministries, and number of entities and institutes attached to those ministries mainly work as resource providers for the food system. However, their role has not limited as resource providers but have influence on other stages and activities in food value chain. Hence, there are complicated direct and indirect linkages between these entities (refer to Figure 3.2). Each entity has its own vision, mission, and objectives while some have direct influence between entities and some creates synergies, while some creates conflict of interests. Most importantly, even if direct or indirect link between entities at different stages of the value chain is required, explicitly in most cases, no such interactions prevail among the entities. All work within their boundaries and in rare forums, they have common discussions. Even though complex to understand at a glance, Figure 3.2 illustrate the institution overload in food systems in Sri Lanka.

During this initial assessment, in order to keep the assessment manageable, only the key stakeholders were considered and the assessment was only limited to public institutes. The institutes were categorized to national, regional, and local levels accordingly. Only the ministries were considered for national and regional level. For the local level, the relevant department of the CMC was mentioned.

Figure 4 illustrates major actors and entities that have direct influence on food supply in Colombo food system.

Box 3.1

There are multiple ministries and entities involved in certain activities in food systems. Some areas may be dominated by private sector entities such as food processing industries. The private sector has extended interests and objectives in specific activities in food value chain. As that, backend value chain activities of different food categories such as food processing, food safety, food security, and pricing tend to have direct and indirect influences from specific entities and general entities. It makes more complex regulation framework in food system in Colombo.

The food waste and resilience to shocks are common problem in each food category at each level of the value chain. Mainly, Colombo municipal council and Central Environmental Authority play a major role in handling food wastes at LA level. Considering resilience to shocks, each food item needs special attention and hence multiple agencies and entities are involved in that activity.

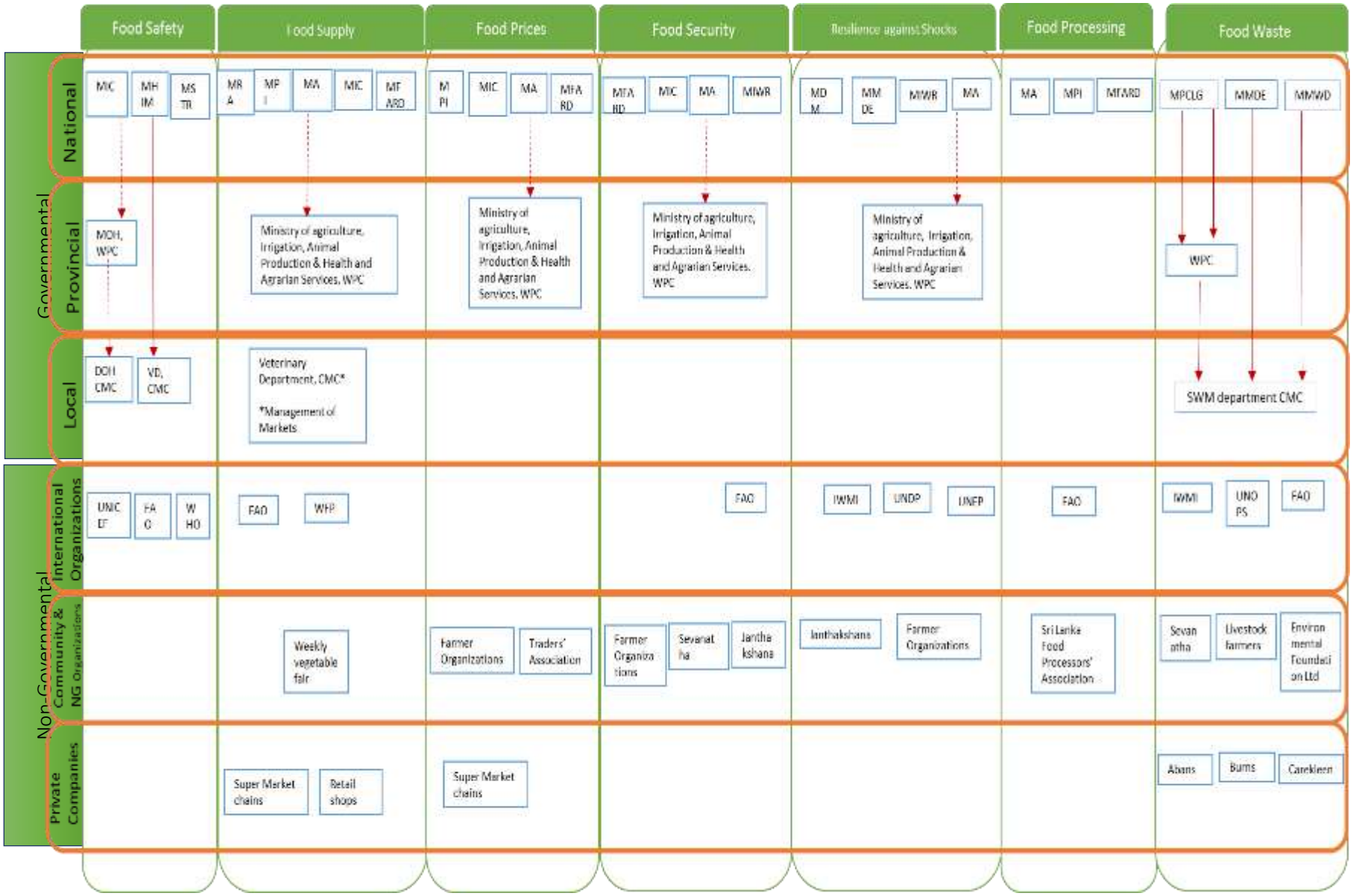


Figure 4. Stakeholder analysis

Strong relationship *Weak relationship*

Acronyms

i. MIWR : Ministry of Irrigation and Water Resources Management of Sri Lanka
ii. MDM: Ministry of Disaster Management
iii. MA: Ministry of Agriculture
iv. MFARD: Ministry of Fisheries and Aquatic Resources Development
v. MPI: Ministry of Plantation Industries
vi. MHIM: Ministry of Health and Indigenous Medicine
vii. MSTR: Ministry of Science, Technology and Research
viii. MIC: Ministry of Industry and Commerce
ix. MMDE: Ministry of Mahaweli Development and Environment
x. MPCLG: Ministry of Provincial Councils and Local Government
xi. MMWD: Ministry of Megapolis and Western Development
xii. MRA: Minister of Rural Economic Affairs
xiii. MF: Ministry of Finance
xiv. WMA: Waste Management Authority
xv. SWM-Solid Waste Management
xvi. DOH- Department of Health
xvii. VD- Veterinary Department
xviii. CMC: Colombo Municipal Council

Since the complexity of the institutional framework and objectives of each entity have multiple interests, it is irrational to list out the entities, either on food categories or value chain activities. The best approach to explain the entity would be based on the ministries and their affiliated entities with their specific roles. The initial stakeholder diagram only displays the ministries and government institutes for less complexity. Background and activities of each stakeholder (public, private, and international) are described in the section below for reference.

3.4.1. Ministry of Irrigation and Water Resources Management of Sri Lanka (MIWR)[13]

The Ministry of Irrigation and Water Resources Management of Sri Lanka remains committed to manage of the Irrigation Sector and the Water Resources of the country, maintaining the equilibrium between the trends in rapid economic development and sustainable use of water resource base. It gains from the support of the implementation agencies under the Ministry, which are manned by competent technical personnel experienced and trained in their respective disciplines. There are number of divisions under the ministry which are providing resources for agriculture development in Sri Lanka through Water Resources, Engineering Services, Planning & Plan Implementation, Mahaweli Systems and Lands & Land Development.

[13] http://www.irrigationmin.gov.lk/web/index.php?option=com_content&view=frontpage&Itemid=1&lang=en

i. Irrigation Department[14] (ID)

This is the main authority attached to ministry on water resources in Sri Lanka. The mission of the Irrigation department is to facilitate sustainable management and improve the land and water resources for food, livelihoods and environment under the frame work of government policies. The department has given up most priority to provide services to improve the agriculture in Sri Lanka. Main objectives of the departments are, first, development of land and water resources for Irrigated agriculture, Hydro power, Flood control, Domestic use, Industrial use and Agriculture development. Second, provision of Irrigation and drainage facilities for cultivable lands in Irrigation and drainage projects. Third, alleviation of poverty of the rural farming community by increasing their farm income and raising their standard of living and Management of Water for sustainable Agriculture. The Land Use Division provides the land use to conduct initial feasibility investigations, detailed economic appraisal, selection of lands for irrigation, selection of suitable crop patters, calculation of irrigation requirements, decisions regarding lay out, settlement plans and soil surveys in various intensities are carried out for collecting data to prepare land use plans.

ii. Mahawali Authority (MA)

The Mahaweli Master Plan in the Dry Zone of Sri Lanka has earmarked 365,000 ha of land for development of Agriculture in 13 Systems identified under the by the Mahaweli Development Programme. It was intended to construct a series of reservoirs and hydroelectricity plants and develop a large area of land with irrigation In order to facilitate the establishment of new settlements and development of agriculture. The implementation of the Mahaweli Development Programme is a mandate of the Mahaweli Authority of Sri Lanka established in 1979 by an Act of Parliament. The Mahaweli Development Authority's current task is to implement the envisaged project plan in the balance areas proposed by the Master plan and also Gazetted areas. This includes rehabilitating and maintenance of the irrigation network, administration of the land, enhancing the production of agriculture and the post settlement process .Further, MASL is responsible for managing irrigation water for 101,526 ha of Irrigable land in the dry zone. The objective of the Mahaweli River Development Programme besides the hydropower component are mainly related with the regional development perspective. Increased agricultural production through opening up of new lands and providing assured irrigation facilities and opening up of new employment opportunities in agricultural sector by settling landless farmers with the assurance of high standards of living conditions are main objectives of the programme. The extent of irrigated lands under the purview of Mahaweli Authority is about 90,000 hectares[15].

3.4.2. Ministry of Disaster Management (MDM)

Disasters are the major threat for food security in every society. There are predictions changes in rainfall and climate patterns in Sri Lanka which will affect the food production patterns in Sri Lanka. Tsunami in year 2004 have raised the importance of having disaster management plan in Sri Lanka and hence the ministry was established with the aim of facilitating the activities on disaster prevention, mitigation,

[14] http://www.irrigation.gov.lk/

[15] http://mahaweli.gov.lk/en/paddy.html

preparedness measures and early response for population vulnerable to disasters and the facilitation of overall coordination of post-disaster activities such as relief, rehabilitation and reconstruction.

i. Department of Meteorology[16] (DM)

Climate and Weather are the two important aspect of agriculture, livestock farming and general food production. Early identification of emerging climate changes, weather pattern changes would help the food providers and government to take measures to overcome the negative impacts of those changes. Department of Meteorology Sri Lanka is providing of meteorological and climatological services to general public and to agriculture, energy, fishery, shipping, insurance and other interested sectors.

3.4.3. Ministry of Food Security (MFS)

The mission of the Ministry of food security is to "Promotion of competitive and fair trade in the market while securing the interests of local manufacturer and consumer, promotion of co-operative services and contribution to the development of human resources in order to create a knowledge based economy." Objectives of the Ministry of Food Security are to:

- Regulate the market to protect the rights of consumers, promote setting up of institutions and fair trading;
- Implement Tariff policy as an instrument to control market behaviors in safeguarding interests of local producers and consumers;
- Implement consumer relief programmes through state organizations such as Lak Sathosa, State General Trading Corporation and, Co-operative Wholesale establishment by promoting fair trading in an open competitive market;
- Promote interaction between consumers and co-operatives by strengthening the Co-operative Movement and by empowering and modernizing sale centers;
- Establish Dedicated Economic Centers with the objective of maintaining local agricultural product prices at sustainable levels by linking agricultural producers with wholesale traders and consumers.
- Ensure implementation of measurements and standards for the benefit of business community as well as consumers.

There are number of sub-entities and institutions attached to Ministry of food security to work towards stated objectives of it.

i. Food Security Operational Room (FSOR)

Initiatives have been taken to establish a Food Security Operation Room in the Ministry of Food Security aiming at collecting, compiling and analyzing food production and imports related statistics to regulate market availability of main food items through appropriate policy interventions. The Operation Room is expected to be the focal point for dissemination of information related to strategies adopted for food security of the nation. The data and information collected by the Food Security Operation Room is shared with all stakeholders. It does facilitate discussion and decision making process at the meetings of the Cost

[16] http://www.meteo.gov.lk/index.php?lang=en

of Living Committee. As and when necessary, information be made available to the Cabinet of Ministers for discussion and appropriate action.

ii. Department of Food Commissioner's (DFC)

The mission of this department is to "Ensure continuous and adequate supply of essential food items to the people through State and Private sector participation." The main objectives of this Department are to store essential food items, especially, paddy purchased under the government procurement programme and release them to the local market to avoid shortage in the market and to control major price fluctuations.

iii. Dedicated Economic Centers (DECs)

The setting up of Dedicated Economic Centers was started in 1998, as means of implementing marketing development strategy to provide marketing facilities for producers in the rural areas.

The subject of establishing DECs which was carried out by the Ministry of Rural Employment Promotion was assigned to the Ministry of Trade, Marketing Development, Co-operatives and Consumer Services in 2007. Accordingly, coordination and supervision of operation of all DECs are done by this Ministry.

The objectives of setting up economic centers are to:

- Ensure obtaining reasonable prices for agriculture producers for their crops by providing targeted market;
- Provide opportunity to small scale producers to minimize their transport costs and wastage in transportation;
- Provide opportunities for wholesale traders to purchase fresh fruits and vegetables, directly from producers;
- Encourage business community by providing competitive marketing environment for wholesale traders;
- Create opportunity to distribute area specific agricultural products among people in all parts of the island;
- Provide facilities for consumers to purchase food items at cheaper prices.

Currently there are 12 DECs operating in various places in the island. They are Dambulla, Thambuththegama, Nuwaraeliya, Kappetipola, Kuruduwatte, Veyangoda, Welisara, Narahenpita, Ratmalana, Meegoda, Embilipitiya, Piliyandala. Objectives and their specialties are listed in

Table 3 below.

Table 3. Dedicated Economic Centers in Sri Lanka

DEC	*Objective*	*Specialized crop*
Dambulla	To establish a wholesale market for vegetables and fruits.	All types of vegetables and fruits
Thambuththegama	Establish a wholesale market for vegetables and fruits to implement as Collecting Centre	Low country vegetables specially Pumpkin, Kekiri, Ash pumpkin, Water melon, Brinjals, Long beans and Bitter gourd
Nuwaraeliya	To establish a wholesale market for vegetables and fruits, especially as a Collecting Centre.	Up country vegetables, Nuwara Eliya Potatoes, Chinese Cabbage, Bell pepper, Minchi & Salad Leaves
Kappetipola	Exchange centre of Fruits & Vegetables.	Potatoes, Beans, Cabbage
Kuruduwatte	Purchasing Facilities of other foods items. It is expected provide facilities as collecting centre of minor export crops, especially spices.	Specially caters for pepper, coffee, cardamom, cocoa and nutmeg products
Veyangoda	Distribution centre of farm products	Up country and Low country vegetables and fruits.
Welisara	Provides facilities for distribution of fresh vegetables, fruits and other food items to traders in Gampaha District.	Up country and low country vegetable
Narahenpita	Supplying of quality food and consumer items at fair prices for consumers living close to the capital city	Wholesale & retail supply of all agro products and essential food items including vegetables & fruits grown with cattle manure
Ratmalana	Supplying of quality food and Consumer items at Competitively reasonable prices for Consumers and introduce the market opportunities for local Producers and importers.	Wholesale & retail supply of all agri products and essential food items including Vegetables and fruits grown with cattle manure
Meegoda	Establish a wholesale market for vegetables and fruits to implement as Collecting Centre	Up country and Low country vegetables and fruits.
Embilipitiya	Distribution Centre - wholesale and retail trading centre provide a fair price for the produce of the farmers. This economic centre facilitates cultivators/ farmers to sell their produces directly either to the traders who permanently occupy the trade	Banana.

	centre or to the dealers who mainly visit the trade centre on Tuesdays and Saturdays.	
Piliyandala-	Supply of quality food & consumer items at fair prices for the consumers who are living close to the town	Vegetables, Rice, Fish & Meet, Dry Fish, Essential Food Items, Tea, Coconut

3.4.4. Ministry of Agriculture (MA)[17]

The mission of the ministry is "to achieve globally competitive production, processing and marketing enterprises through socially acceptable, innovative and commercially-oriented agriculture, through sustainable management of natural resources of the country."
Objectives of the Ministry of Agriculture are:

- Develop supportive agricultural policy for food and allied agricultural crops;
- Established food and nutrition security;
- Stable prices for agricultural products;
- Efficiently coordinated paddy purchasing and marketing programme;
- Timely implementation of projects;
- Increase production in selected crops;
- Efficient and effective implementation of accelerated food production programme;
- Efficient and effective use of foreign funds;
- Customer friendly and result oriented administrative system;
- Results based management in entire government sector.

The institutes operating under the Ministry of Agriculture are:

i. Department of Agriculture (DOA)[18]

The objectives of the DOA are focused on maintaining and increasing productivity and production of the food crop sector for the purpose of enhancing the income and living condition of the farmer and making food available at affordable prices to the consumer. The major functions of the DOA include research, extension, production of seed and planting material, regulatory services related to plant quarantine, soil conservation and pesticides. Main functions of the Department of agriculture are research, extension, seed and planting material production, regulatory service. DoA has three research institutes namely Rice Research and Development Institute, Field Crops Research and Development Institute, Horticultural Crops Research and Development Institute.

ii. Department of Agrarian Development (DAD)[19]

DAD is providing financial and non-financial assistance to the farming community by providing them through agriculture loans and Marketing support, Supply of Agriculture inputs, minor Irrigation

[17] http://www.agrimin.gov.lk/web/
[18] http://www.agridept.gov.lk/
[19] http://agrariandept.gov.lk:8080/agrarian/home.jsp

improvements and digging agro wells, enforcing price Control, providing Agriculture Instrument and involved in agriculture Land Management.

iii. Hector Kobbekaduwa Agrarian Research and Training Institute (HARTI)[20]

Over the years it has developed to be the premier national Institute in the field of socio-economic research relating to agrarian sector in Sri Lanka and has also developed the requisite skills and infrastructure for providing relevant training to farmers, field workers and managers in both state and non-state sectors. The institute also provides up to date market information to the farmers, traders and policy makers. The name of the Institute was changed to Hector Kobbekaduwa Agrarian Research and Training Institute in February 1995. The research and training activities are organized under five divisions based on current areas of interest. However, the multi-disciplinary research teams selected from various divisions carry out most of the research and training work. The research and training divisions of the institute are Agricultural Policy and Project Evaluation Division (APPE), Agricultural Resource Management Division (ARM), Environment and Water Resources Management Division (EWRM), Marketing, Food Policy and Agri-business Division (MFPA), Human Resources and Institutional Development Division (HRID).

iv. Sri Lanka Council for Agricultural Research Policy (CARP)[21]

The mission is to ensure agricultural research, development and innovations are directed towards national development goals through policy formulation, facilitation, coordination, monitoring and evaluation, and impact assessment. Goals of CARP are: Strengthen and consolidate the national agricultural research system, planning, funding, coordination and monitoring of competitive contract research grants, Client oriented appropriate technology dissemination, documentation and research information transfer to stakeholders and also improve administration and finance set-up for supporting research.

v. The Institute of Post-Harvest Technology (IPHT)

The Institute of Post-Harvest Technology (IPHT), operating under the Ministry of Agriculture, functions as the main Institution in Sri Lanka engaged in improving the Post-Harvest Technology of rice/other grains, field crops, fruits/vegetables and spices through research, training/extension, consultancy/advisory and other development activities.

3.4.5. Ministry of Fisheries and Aquatic Resources Development (MFARD)

Ministry of Fisheries and Aquatic Resources Development is the apex organization in Sri Lanka for the Fisheries sector. The Ministry directly engages itself with the formulation of policies, strategies and plans on sustainable utilization of fisheries resources in Sri Lanka.

The Objectives of the ministry are:

- To improve nutritional status and food security of the population of Sri Lanka by increasing the national fish production;

[20] http://www.harti.gov.lk/

[21] http://www.slcarp.lk/

- To minimize post-harvest losses and to improve quality and safety of fish products to accepted standards;
- To increase employment opportunities in fisheries and related industries, and to improve the socio-economic status of the fisher community;
- To increase foreign exchange earnings by promoting value added fish exports;
- To conserve the aquatic environment for the sustainable utilization of future generations;
- To promote fishery based recreational facilities;
- Increase the nutritional status and the food security of the people.

To increase the nutritional status and the food security of the people the ministry has initiate some activities. One is that three year fisheries development plan focus to" Avert Malnutrition Problem of Sri Lanka - "fish as cheapest Protein". High priority is given to reduce the risk of malnutrition by increasing the per- capita consumption of fish to eliminate malnutrition from the country as fish is the primary source of animal protein consumed in the country.

The ministry has taken following steps to increase the fish consumption in Sri Lanka:

a. Increase per capita consumption of fish;
b. Facilitate proper fish handling, whole sale and retail distribution of fish - State of the Art Fish Market complex;
c. Market intervention through Ceylon Fisheries Corporation - to ensure affordable prices of fish for the consumers;
d. Improve the Marketing network;
e. Minimization of post-harvest losses and improvement of quality and safety of fish products.

There are number of institutions under the ministry who are working on various specific tasks to fulfill the said objectives.

i. Department of Fisheries & Aquatic Resources (DFAR)[22]

Department of Fisheries & Aquatic Resources is operating under the purview of the Ministry. Mandate of the Department of Fisheries & Aquatic Resources is, Management, Conservation of the fisheries & Aquatic Resources in Sri Lanka. At present, the department continues its process of managing, regulating, conservation and developing of marine and brackish water fisheries in compliance with fisheries sector development strategy (2012-2013). Department of fisheries is functioning in accordance with the Fisheries & Aquatic Resources Act No: 02 of 1996 and other regulations. The objectives of the DFAR are more or less the same as this department is working as the linear department of the ministry.

ii. National Aquatic Resources Research and Development Agency (NARA)[23]

The National Aquatic Resources Research and Development Agency (NARA) is the principal National Institute charged with the responsibility of carrying out and coordinating research, development and management activities on the subject of Aquatic Resources in Sri Lanka. The National Aquatic Resources Research and Development Agency Act No. 54 of 1981 established NARA in 1981. The main objective then

[22] http://www.fisheriesdept.gov.lk/fisheries_beta/index.php/objectives-of-the-department
[23] http://www.nara.ac.lk

was to face the challenges offered by the 200 nautical miles Exclusive Economic Zone (EEZ), which Sri Lanka was endowed with, as an outcome of the third United Nations Conference on Law of the Sea. The area of EEZ represents a sea territory covering 460,000 Sq. km, which is around 08 times the land territory of Sri Lanka. With a jurisdiction over such vast sea territory, it is imperative for Sri Lanka to gear herself to proper management of this area and to integrate activities on fisheries and aquatic resources in her development plans.

iii. National Aquaculture Development Authority (NAQDA)[24]

National Aquaculture Development Authority (NAQDA) was established in 1999 under the provisions made available by the National Aquaculture Development Authority Act (No. 53 of 1998). It is the main state sponsored organization mandated for the task of development of the aquaculture and inland fisheries sector in Sri Lanka. Objectives of the NAQDA are:

- Develop aquaculture and aquaculture operations, with a view to increase fish production and fish consumption in the country;
- Promote the creation of employment opportunities through the development of inland and coastal aquaculture;
- Promote the farming of high valued fish species including ornamental fish for export;
- Facilitate optimum utilization of aquatic resources through eco- friendly aquaculture practices;
- Promote and establish small, medium and large scale private sector investments in aquaculture;
- Conserve and rehabilitate aquatic resources devastated by poor aquaculture practices.

iv. Ceylon Fisheries Corporation (CFC)

Ceylon Fisheries Corporation (CFC) was established in 1964 under the State Industrial Corporation Act No: 49 of 1957 and commenced its commercial operations in 1965. It was established in order to ensure affordable prices to consumer while securing the producer. CFC is vested with the responsibility of purchase of fish and sale of fish, provision of cold room facilities and sale of fish and fishery products.

v. Ceylon Fishery Harbours Corporation (CFHC)[25]

Ceylon Fishery Harbours Corporation (CFHC) was established in 1972 under the provision of the State Industrial Corporation Act No: 49 of 1957. The institute is responsible for construction and management of fishery harbours and anchorages.

3.4.6. Ministry of Plantation Industries (MPI)

The mission of the ministry is to enhance the productivity, profitability and sustainability of the plantation industry through economically, socially and environmentally established plantation sector
The key activities of the ministry are:

[24] http://www.naqda.gov.lk/index.php
[25] http://www.cfhc.lk/About.php

- Enhancing the productivity of cultivated lands in the plantation sector;
- Increasing the annual rate of tea and rubber replanting;
- Promoting the new planting in non-traditional areas;
- Implementing research and development programmes and promotion;
- Value addition for goods and services and promoting brand names;
- Protecting and conservation of the ecosystem through the sustainable use of the lands.

The institutions under the Ministry of Plantations Industries are Sri Lanka Tea Board, Tea Research Institute of Sri Lanka, Tea Small Holdings Development Authority, Tea Shakthi Fund, Rubber Development Department, Rubber Research Institute of Sri Lanka, National Institute of Plantation Management, Thurusaviya Fund, Kalubowitiyana Tea Factory Limited, Small Holders Plantation Entrepreneurship Development Programme, Coconut Research Institute Janatha Estates Development Board, Coconut Development Authority, Coconut Cultivation Board, Kurunegala Plantations Ltd, Chilaw Plantations Ltd, Sri Lanka State Plantation Corporation, Sri Lanka Cashew Corporation, Sugarcane Research Institute, Lanka Sugar Company (Pvt) Ltd, BCC Company Ltd, Elkaduwa Plantation Ltd, Hingurana Suger Company.

3.4.7. Ministry of Social service, Welfare and Livestock Development (MSWLD)

The vision of the ministry is to "Self - sufficiency in livestock production while enhancing the living standards of the rural community in Sri Lanka".
The aims of the ministry relating to livestock development are:

- The achievement of sustainable and equitable economic and social benefits to livestock farmers;
- Increasing the supply of domestic livestock produce at competitive prices to the consumers;
- Achieve 50% self - reliance in milk by 2015(self-reliance means through domestic sources);
- Substantial increase of current domestic production of poultry product by 2015;
- Enhance the socio economic status of unprivileged rural communities;
- Increase the income level of the rural community by providing infrastructure facilities and encouraging self-employment and livelihood development;
- Strengthening of community based organizations for rural community empowerment;
- Following are the main institutions operated under livestock development of the country.

There are two major department functioning under this ministry.

i. Department of Animal Production and Health (DAPH)

The Department of Animal Production & Health is the apex government institution responsible for providing the leadership in the technical functions of animal health, animal breeding, livestock research and human resources development for livestock development activities.

ii. National Livestock Development Board (NLDB)

The mission of the NLDB is to run a self-sustaining chain of Livestock and Crop Integrated Farms in different Agro-Ecological Zones with a satisfied workforce.
The services offer from NLDB are:

- Issue of quality breeding materials (Neat Cattle, Buffalo, Piglings, Goats, Sheep, Rabbits, Quails);
- Supply of quality farm products;
- Supply of fresh milk products;
- Supply of quality pasture cuttings.

Apart from that Milco Company is also attached to this ministry. Its mission is to improve the standard of living of the local dairy farmer and increase milk production ensuring customer satisfaction by supplying quality fresh milk and dairy products at competitive prices, through effective and efficient management, encouraging human resources development in the organization, and achieve a sustainable growth in stakeholder benefits.

3.4.8. Ministry of Health and Indigenous Medicine (MHIM)

Mission of the Ministry of health and indigenous medicine to contribute to social and economic development of Sri Lanka by achieving the highest attainable health status through promotive, preventive, curative and rehabilitative services of high quality made available and accessible to people of Sri Lanka.
Specific objectives:

- To provide technical advice in policy formulation, planning and programming on promotion of health through Advocacy, Behavior Change Communication, Social Marketing and Community Mobilization;
- To support various health programmes conducted by the Department of health services and other health related sectors through advocacy, behavior change communication and social mobilization for health actions;
- To promote, support and undertake planning, implementing, monitoring and evaluation of health promotion programmes in different settings;
- To promote health care consciousness among the masses through mass media;
- To assist and develop IEC / BCC materials required for health promotion and behavior change communication;
- To develop the capacities of manpower, both within and outside the department of health services in order to act as health promoters and change agents through advocacy, behavior change communication and social mobilization;
- To educate and empower the public on health issues, to enable them to increase control over and promote individual and community health;
- To coordinate with health related governmental, non-governmental and international agencies and organization in promoting health of people;
- To develop managerial capacities of health and health related sectors to manage health promotive programmes;
- To monitor and evaluate health promotive programmes and facilitate monitoring and evaluation of them at different levels;
- To support and undertake research related to Behavior change of the community and social mobilization.

There are few entities related to this ministry.

i. Nutrition Division (ND)

Nutrition Division is the coordinating agency across institutions within the ministry offering guidance in policy formation, planning and implementation of programs, resource development, monitoring and evaluation. Mission of the nutrition division is to be an active partner in improving nutritional wellbeing to achieve desired economic and social development.

It is geared to monitor all nutrition related activities in the country and carries out its own activities such as formation of food based guidelines. The division also focuses attention on food based approaches hospital based nutrition, adult and elderly nutrition.

ii. National Institute of Health Sciences (NIHS)

National Institute of Health Science (NIHA) is the premier public health training institute of the Ministry of Health, Sri Lanka. The institution was responsible for training and development of health manpower for primary health care (PHC) program of the country. In addition to its primary mandate of training, NIHS is responsible to provide the primary health care services to the communities of field practice area which extend over 136Km2 with a population of about 3000000. Staff of the field practice area plays a dual role of service provision and facilitation of hands on experience at field for different categories of trainees.

Mission of NIHS is to training and development of competent, independent and interdependent public health workforce for service delivery to gain MDG at national level.

Objectives of the NIHS:

- To develop health manpower in Sri Lanka and to advise the Ministry of Health in its policy relating to health manpower development;
- To co-ordinate health manpower development activities in Sri Lanka between the education and other health services agencies;
- To initiate and undertake training programmes for members of the PHC team with a view to multidisciplinary approach to training;
- To initiate and undertake continuing education of the PHC staff;
- To provide primary health care services to the community in the field practice area of the NIHS namely Kalutara and Beruwala;
- To conduct health research and research on human resource management and provide advocacy on health system research for the health workers.

iii. Food Control Administration (FCA)

The objectives of food control administration is to Ensuring human safety & Health, ensure supply of safe & wholesome food, ensure availability of food standards, regulations. Further it deals with issues related to irradiation, genetic engineering, ensuring Proper & good hygienic practices. It is also interested in preventing microbiological/chemical contamination, adulteration and fraudulent practices in sale of food. Most of the prepared food contain colors and flavors. These colors and flavors might not good for human health. Hence food control administration tries to make sure rational use of chemical additives such as

antioxidants, preservatives, emulsifiers, stabilizers, colors and flavors and tries to Eliminate wrong practices, using colors, flavors, preservatives to make stale / decayed food appear fresh or of good quality.

They have concerns in early stages of food system where they want to have adequate public health controls to ensure food is grown and harvested from safe unpolluted areas, food is protected from insects, rodents and contaminants and to protect from imports of inferior / substandard or unfit food.

iv. Non Communicable Disease Unit (NCDU)

The mission is to reduce the burden of chronic non communicable diseases through a comprehensive, country wide NCD prevention program addressing all the possible strategies implemented in effective and efficient manner by a dedicated team at well-developed central unit and the district NCD units in collaboration of all stakeholders.

v. Health Education Bureau (HEB)

Health Education Bureau (HEB) is the centre of excellence in Sri Lanka for health education, health promotion and publicity of health information. Empowering and mobilizing communities for the improvement of their quality of life through health promotion principles is the main achievement gained for last few years. National Health Promotion policy, communication strategies on nutrition and Non Communicable Diseases (NCD) prevention developed by HEB provide common objectives to be achieved by different sectors and technical guidelines to assure the standards of health promotion activities.
Services of HEB are:

- Behaviour Change Communication;
- Community mobilization & intersectoral actions for health development;
- Health Promotion;
- Counselling;
- Oral Health Promotion;
- Life Skills development;
- Publication and Communication material development;
- Mass communication and Publicity;
- Training, Monitoring, evaluation and research.

vi. Sri Lanka Public Health Education Institutes Network (SLHEIN)

The mission of Sri Lanka Public health education institutes network is to “Collaborate with Sri Lankan member Institutes in partnership to improve and sustain the quality and relevance of Public Health Education to address the increasing challenges of health improvement in the country”
Objectives of public health education institutes network are:

- To make public health education programs relevant to meet the health challenges in the country.
- To establish collaborative programs in education and training.

- To provide evidence-based and new knowledge through research within the country and to promote the use of research findings in decision making.
- To strengthen the capacity of member institute through faculty and student exchange and exchange of information, learning materials and methods.
- To facilitate the implementation of accreditation processes and quality assurance in public health education in the country.
- To assist with consultation, advocacy and provision of technical advice to improve national public health programmes in the country.
- To promote leadership development for practice and policy making in public health.
- To establish links with SEAPHEIN and other multilateral and bilateral organizations and institutions

The general strategies of the network include:

- Develop curricula and continuing education programs, reorient learning methods and conduct research to refine curricula in public health in Sri Lanka;
- Create information systems in line with education needs in Sri Lanka;
- Form partnerships and assign focal points among public health institutes and strengthen existing programs;
- Prioritize and conduct research in public health in Sri Lanka and build comprehensive capacity among stakeholders in all stages of research;
- Institutionalize programs for capacity building, inventory of available resources and learning material resources and identify needs for staff and student exchange within institutions in Sri Lanka;
- Develop institutional accreditation mechanisms by establishing a Sri Lankan accreditation council and devise strengthening strategies;
- Organize consultation meetings on priority areas of public health programs and health care in Sri Lanka;
- Promote leadership and management skills at national, provincial and district levels and generate learning organizations.

vii. Medical Research Institute of Sri Lanka (MRI)

The mission is to improve the health of Sri Lankans through world-class medical research so as to achieve the national health goals set by the Ministry of Health.

In order to achieve this, MRI support research across the biomedical spectrum, from fundamental lab-based science to clinical trials in all major disease areas. MRI work closely with the Ministry of Health, and give high priority to research that is likely to make a real difference to clinical practice and the health of the population.

viii. Cosmetics, Devices & Drugs Regulatory Authority (CDDRA)

The mission is to regulate and control the manufacture, importation, sale, storage and distribution of Cosmetics, Devices and Drugs (including nutraceuticals and borderline devices) efficiently and effectively whilst ensuring rational usage. Functions of the authority are:

- Registering new drugs / cosmetics / medical devices;
- Monitoring and approving changes/variations to those products that are already approved and granted marketing authorization;
- Monitoring and implementing Good Manufacturing Practices for Pharmaceutical products and Cosmetics;
- Licensing and monitoring of importation, manufacturing, sale, advertisements and distribution Surveillance of quality of drugs available in the market;
- Reviewing and approving of advertisements on CDD;
- Approving and monitoring of clinical trials.
- Issuing WHO-format Certificates of Pharmaceutical Products for the purposes of export;
- Recalling cosmetic, drugs and devices from the market on safety grounds;
- Human resource development programs;
- Flying squad activities and prosecutions;
- Services;
- Regulation of Cosmetics, Medical Devices and Medicinal Drugs used in Sri Lanka through a market authorization scheme and a post marketing surveillance system;
- Inspection of manufacturing premises for compliance of Good Manufacturing Practices;
- Inspection and licensing of retail and wholesale establishments of pharmaceuticals and vehicles used to transport pharmaceuticals;
- Monitoring of suspected adverse drug reactions;
- Recalling of Cosmetics, Medical Devices and Medicinal Drugs from the market on safety grounds.
- Control of advertisement on medicinal drugs;
- Control of Narcotics, Psychotropic substances, and Precursors used as medicines, industrial chemicals or used for other scientific purposes;
- Regulation of clinical trials;
- Development of guidelines and manuals on medicines and related practices;
- Training of healthcare professionals and their students with related to Cosmetics, Devices & Drugs Act and its regulations;
- Awareness programs for the general public.

3.4.9. The Presidential task force on National Food Production

It is estimated that Sri Lanka spends around Rs. 200 billion annually to import main food items including livestock and fisheries products. The Presidential task force on National Food Production is established to explore the possibility of producing most of the imported food items domestically to save the foreign exchange spent on food import. Projects are implemented through four Ministries namely Ministry of Agriculture, Ministry of Fisheries & Aquatic Resources Development, Ministry of Plantation Industries and Minister of Rural Economic Affairs in order to achieve the objectives given below:

- Make the country self-sufficient in food which can be produced locally, utilizing the lands available in optimal manner thus saving foreign exchange on food imports;

- Produce sufficient quality food for people by adopting environmentally friendly cultivation methods and using chemicals for weeds and pests to the extent of minimum possible;
- Ensure food security through proper management of buffer stocks;
- Ensure balanced development in the country through introducing and implementing a food production programme based on agro-eco zones;
- Minimize production cost and maximize productivity through application of quality inputs and appropriate technological methods;
- Establish a proper coordination among all stakeholders who are involved in the domestic food production programme and make it part and parcel of daily life of people including school children, farmer organizations and civil organizations.

3.4.10. Committee on Cost of Living

A cabinet committee has been appointed on Economic Management, presided by Hon. Prime Minister and comprises of relevant ministers in view of making recommendations on the overall economic development of the country and a Sub Committee on Cost of Living has been appointed led by Minister of Development, Strategic and International Trade in view of making recommendations on matters affecting the cost of living of people. The committee is formed to regulate prices of goods in order to reduce the cost of living and ensure smooth supply of food. The Members of this committee comprises of Minister of Finances, Minister of Industry & Commerce, Minister of Agriculture, Minister of Rural Economic Affairs, and Minister of National Policies & Economic Affairs.

3.5. PRIVATE SECTOR ACTORS AND THEIR IMPACT ON COLOMBO CITY REGION FOOD SYSTEM

The private sector of Sri Lanka plays a major role in Colombo city region food system. A large portion of food supply of Colombo city region is done by the private sector in Sri Lanka. Their main impact is coming from production, distribution and marketing of food products. The following section outline the major private sector food suppliers in Sri Lanka with the order of major food categories.

i. CIC Rice

Established in 2006, CIC Agri Produce Export (Pvt) Ltd., as a subsidiary of CIC Agri Businesses (Pvt) Ltd, which is the main holding company of CIC Agri Business. A high tech rice mill is established in Maho with the use of Japanese Satake technology. In recognition of the quality and safety of its products, CIC Rice Mill is maintained with the HACCP (Hazard Analysis Critical Control Point) certification and the relevant ISO2200 standard which requires quality management, human resource specific training programs and performances. They process red basmathi, white basmathi, nutritious rice, blended rice, samba rice, ordinary rice and traditional rice for local and overseas market.

ii. KINAM Rice mill

KINAM is a privately held, BOI approved company with a modern state of the art rice mill in Sri Lanka. It has been recently established by a group of Indian promoters and aims to expand the country's rice products industry.

One of the largest, technically advanced mills in Central Sri-Lanka, KINAM is operating with an annual capacity of 65000 MT of milling. Its high tech, automated milling line is integrated with a comprehensive quality control system ensuring consistent and high quality rice products. Installed in the small town of Kekirawa in Anuradhapura district, the integrated plant is spread over 15 acres and provides employment to over 100 people. The installation of the milling facility at Kekirawa has brought in economic prosperity to the region. A par boiling unit and a flour mill is scheduled to be installed shortly. The company currently manufactures high quality varietals of Long Grain rice, Nadu red and white, Samba and keeri Samba varieties for local and international markets. A range of bulk and retail packaging formats including 5/10/25/50 kg bag, are available. KINAM has a well-established network of distributors and retailers of rice and rice commodity products in the domestic as well as international markets.

iii. Serendib Flour Mills (Pvt) Limited (SFML).

Serendib Flour Mills (Pvt) Limited (SFML) is one of the foremost flour mills in Sri Lanka with an ultra-modern, state-of-the-art flour mill based in the Colombo Port. It has the capacity to cater to the needs of the Sri Lankan and International markets and produce the Seven Star range of flour products with uncompromising focus on quality as quality being the core value of our corporate philosophy. SFML produces many specialized types of wheat flour such as all-purpose wheat flour, whole meal flour, atta flour, semolina and cake flour for retail purpose.

iv. Prima Ceylon

The first Prima Company in Sri Lanka with a core business of wheat flour milling and related activities. It provides dynamic customer services that include the transfer of baking skills and Bakery Support. The highly strategic harbor of Trincomalee is the location of PCL's unique flour milling complex. Its milling capacity has now expanded to 3,600 MT of wheat per day and silo capacity to over 200,000 MT we have developed various flour types for baking, biscuit, cakes, noodles, string hopper and other products to suit Sri Lankan lifestyles.

v. Ceylon Grain Elevators PLC (CGE)

Ceylon Grain Elevators PLC (CGE) has focused primarily on feed milling. Through subsidiary companies of CGE has diversified from this core activity into commercial farms, processing and retailing of poultry products, import and sale of a wide range of veterinary vaccines, poultry equipment and pet food, and commercial production of ornamental fish feed and shrimp feed. Prima Chicken is manufactured to the highest quality standards to meet the diverse needs of the varied customers. The chicken product range includes Whole Chicken, Whole Chicken without Gilbet & Neck, Whole Chicken Skinless, Pre Cut Whole Chicken, Half Chicken, Quarter Chicken, Chicken Breast, chicken curry pieces, Chicken Drumsticks, Chicken Wings, Chicken Whole Leg, Chicken Precut Parts. Three Acre Farms provides selective breeding, hatching and sale of commercial day old chicks, both broiler (for chicken meat) and layer (for the production of table eggs). The company's farms produce broiler chicken and table eggs according to market demand.

vi. Asia Grain (Private) Limited

Asia Grain (Private) Limited is a Food Commodity indenting Company operating in Sri Lanka since 1997. Main activities of the company are facilitation of importing pulses, peas, beans, spices, rice, sugar, fruits, dried fish, fats and oils, potatoes, fruits (apple, pears and grapes) powdered food products and condiments for bakery industry.

vii. D.D. Milton sons

D.D. Milton sons offer and supply freshest and highest quality locally grown fruits and vegetables available in the island every time, everywhere to every occasion and every need. Premier products include Seasonal Fruit, Exotic Fruits, Green & Non-green Vegetable, Seasonal Vegetables.

vii. Saaraketha organic foods

Saaraketha Organics opened the first ever certified organic retail store for Sri Lankan consumers to enjoy the benefits of meals that are free of chemicals and poisons. More and more people are now beginning to see organic food as a long term preventative strategy for their own health, their children's health and the welfare of the environment and people impacted by the organic value chain. Comparing the cost of organic food versus the cost of ill health and choose to put real food on the table because they work so hard for it. Saaraketha will bring only dedicated third party certified organic products to its store. Their product range includes vegetables, fruits, herbs & greens, grins, spices, heirloom rice.

viii. Bairaha Farms PLC

Bairaha Farms PLC is a pioneer quality chicken producer in Sri Lanka. Bairaha Farms PLC and its subsidiary companies are engaged in integrated poultry production including the processing of chicken and value added production of meat and production of broiler day-old-chicks. Bairaha is the pioneer, large scale Halal chicken processor as well.

ix. Maxies and Company (Pvt) Ltd

Maxies and Company (Pvt) Ltd is one of the market leaders in sourcing and producing chicken meat and eggs in Sri Lanka. Their product range includes golden yolk eggs, whole chicken, chicken parts and ready to cook chicken.

x. Delmo Chicken and Agro (Pvt) Limited

Delmo Chicken and Agro (Pvt) Limited is a leading poultry production, processing and marketing company in Sri Lanka and its products are marketed island wide under the brand name of "Delmo Broiler Chicken and parts''. Delmo Chicken & Agro (Pvt) ltd has set up its chicken processing plant in Waradala, Diulapitiya which is considered to be the country's biggest processing facility with a capacity of 35000 birds per day.

xi. Keells Food Products PLC

Keells is presently Sri Lanka's market leader in the processed meat industry. Keells is the only processed meat manufacturing Company awarded SLS for its quality of product and process. Keells world class Sausages, Meat Balls, Hams, Bacons, Cold Meats and Raw Meats combine gourmet taste and nutrition while

offering superior quality. The range offers convenience to meet today's demanding lifestyles of consumers all over the world.

xii. Peliyagoda St.John Fish Market

The fish market complex will house 148 wholesale stalls and 128 retail stalls as well as a A 25 mt ice factory. Over 3,000 consumers from Colombo city and its suburbs buy fish from this market daily. Over 360,000 kilos of fish is brought to Peliyagoda fish market daily from various parts of the country. Over 75 fish lorries come to Peliyagoda fish market daily from Trincomalee, Batticaloa, Colombo, Kalutara, Kurunegala, Jaffna, Hambantota, Matara, Gampaha, Mannar, Galle and Puttalam districts.

xiii. Nel farms

Nelfarms is an integrated poultry business, with our own breeder farms and hatcheries. Nell farms are one of the largest poultry producers in the country and the Department of Animal Production and Health has awarded salmonella free status for our chicks. Nel Farms are becoming the pioneer in introducing quality packed eggs in Sri Lanka.

xiv. Lucky Lanka Milk processing company

Lucky Lanka Milk processing company currently manufacturing yoghurts and pasteurized milk. Their product portfolio includes Vanilla yoghurt, Chocolate yoghurt, Strawberry yoghurt, Treacle yoghurt, Low Fat yoghurt, Fresh Fruit yoghurt, Fruit Jelly yoghurt and pasteurized Milk bottles and Milk packets.

xv. Pelwatte Dairy Industries Ltd

Pelwatte Dairy Industries Ltd is a leading Company incorporated in Sri Lanka. Having set up in 2006 Pelwatte specializes in milk processing, animal feed and dairy products. With an investment of Rs.1.5 billion our factory was built for producing all kinds of dairy products viz. liquid milk, milk powder, yoghurt, butter, ice cream and ghee.

xvi. Kotmale Holdings Limited

Kotmale Holdings Limited is engaged in manufacturing and distribution of dairy products and packing and distribution of milk powder. Its product range includes pasteurised milk, cheese, yoghurt, ice cream, fresh cream, ghee, curd, milk powder.

xvii. Fonterra Lanka

Built in 1995, the Powder Plant produces a range of products for some of Sri Lanka's favorite dairy brands including Anchor, Ratthi, Anlene, and Pedia pro. With nine filling machines working around the clock, the plant packs and blends 5270 metric tons of milk powder every month. The plant's nine filling machines pack products into a range of different packaging types including bag-in–a-box, sachets, and chain bags. Biyagama Liquid Plant processes up to 30,000 litres of local milk every day, turning it into fresh dairy products for the Anchor Newdale brand including UHT milk packets, set yoghurt, stirred yoghurt, curd, and

stirred fruit yoghurt. Producing 10,370 tons of cultured products, 850 tons of pasteurized milk and 2460 tons of UHT products every year (the plant collects milk from about 4000 local Sri Lankan dairy farmers).

xviii. NMK Holdings (Pvt) Ltd

NMK Holdings (Pvt) Ltd operations are integrated throughout the edible oil value chain from the sourcing and processing of raw materials to the manufacturing and packing of our wide product portfolio under the brand name Marina. Their primary business focus is to supply the Sri Lankan as well as the international markets with high quality edible oils, specialty fats and margarine, catering to the requirements of consumers, hotels, restaurants, bakery trade and food industries.

xix. Bio Extracts (Pvt) Ltd.

Bio Extracts (Pvt) Ltd., is a manufacturer of Baraka range of Black Seed Herbal Products. Baraka Virgin Coconut Oil is 100% pure oil that retains the fresh taste and scent of coconuts.

xx. Finagle Lanka (Pvt) Ltd

Finagle Lanka (Pvt) Ltd which is the first and yet the only bakery to obtain the ISO 9001-2000 certification in Sri Lanka. It is a joint venture between the USA-based Finagle a Bagel, Phoenix Ventures and Ran Ovens. Finagle products includes sandwich bread, crust top bread, day breads, buns, butter cake, butter biscuits and butter rusks. The Finagle health food range features unique products such as Finagle Nutri Bread, a healthy mix of kurakkan, garlic, virgin coconut oil, red rice and curry leaves.

xxi. Perera & Sons

Perera & Sons opened in 1902, Perera & sons offers a wide range of bakery items to Sri Lankan market. It includes bread items, short eats, sweets and cakes. Also it offers restaurant service in many locations.

xxii. Ceylon Agro industries

Ceylon Agro industries the main focus of Ceylon Agro Industries Limited (CAI) is the manufacturer and supplier of a range of wheat and poultry based value added food products and selected trading products to the Sri Lankan market while supporting the growing agricultural sector. Core business is divided into four main areas such as Wheat based products, Poultry based products, Trading products and agricultural products. Their product range includes noodles, bread, Swiss rolls, wheat flour, chicken and value added products.

xxiii. Freelan Enterprises

Freelan Enterprises (Pvt) Ltd is one of the prominent consumer goods manufacturing company in southern Sri Lanka. The company enjoys a significant market share in the Whole Island & majority in Southern Province. The product range includes spices, salt, flour, pasta, vinegar, coconut oil.

xxiv. Harischandra Mills

'Harischandra mills' was established over 70 years ago in Matara. Harischandra has been renowned for its coffee, noodles, papadam, pickle, spices, gingerly rolls, soaps and more.

xxv. Royal Food Marketing

The Royal Food Marketing company has much experience in Cashew Nut Processing industry and Packaging Industry. Their product range includes cashew and value added products.

xxvi. Edinborough products (pvt) ltd

Edinborough Product (Pvt) Ltd. is a leading Sri Lankan food company. Their product range include sauce, jam, cordial, fruit drinks, bottled water, chutney, cream, pickle, syrup and toppings, treacle and honey, vinegar, seasoning and dressing, canned fruits, canned vegetables etc.

xxvii. CIC Agri Foods

CIC Agri Foods is equipped to offer both thermally sterilized and frozen products. They process jam, cordial, sauce, chutney and species.

xxviii. Cargills Ceylon Plc

Cargills Kist is manufactured & marketed by subsidiary companies of Cargills (Ceylon) PLC. Cargills Kist offers a range of delectable juices, jam, sauces, cordials & accompaniments made from fresh products directly handpicked from orchards.

xxix. Lanka Canneries Limited

Lanka Canneries Limited was established in 1930s. Selection of fruits come under close inspection, ensuring that the manufacturing process extracts the most from the pure fruits and vegetable Their products includes jam, cordial, chutney and pickle.

xxx. Ceylon Cold stores

Ceylon ice and Storage Company was renamed as Ceylon cold stores in 1941. Now it produces the famous brand of elephant house products. Elephant house carbonated soft drinks include elephant house ginger beer, cream soda, necto, orange crush, orange barley, lemonade soda, apple soda.

3.6. SYSTEM ACTORS AND THEIR IMPACT ON FOOD SYSTEM IN COLOMBO CITY REGION

System actors are the executors of the law and order of the food system in Colombo. Colombo Municipal Council (CMC) is the main system actor who plays multiple roles in the food system in Colombo. Virtually they are the owners of major food markets in Colombo and also the executors of the requirements of Sri Lankan food at practical level. Food control unit of the Colombo Municipal Council is responsible for executing the requirements stated mainly in Sri Lanka food act and other policy and provincial level legislations. There are number of layers in the staff who ensure the execution of the requirements to ensure food security and health in Colombo city area. Further all whole sale and retail markets in Colombo municipality are governed by CMC and hence food safety has been their major concerns. Further CMC is responsible for handling solid waste in Colombo which comprise of high volumes of commercial and

consumer food waste. There was a dump yard at Bloemandhal road, but it was abundant due to health issues. Currently there is dumping yard governed by the CMC at Meethotamulla which is the dumping site of food and other organic waste. Further they are responsible of handing water and sanitary facilities in Colombo.

3.6.1. International standard organization (ISO)

The standards which are implemented by International Standard Organization (ISO) has an impact on the organizations' process. The ISO 9000 family addresses the quality management where organizations have to fulfill customer quality requirements and regulatory requirements. The ISO 14000 family addresses the environmental management in which organizations should minimize harmful effects on the environment caused by its activities and achieve continual improvement of its environmental performance. The ISO 22000 family addresses the food safety management of the organizations while ISO 26000 address their social responsibility.

3.6.2. Sri Lanka Standards Institution (SLSI)

Sri Lanka Standards Institution (SLSI) is the National Standards Body of Sri Lanka; it is responsible for disseminating information on standards, technical regulations and standards related activities to the community at national level. SLSI by virtue of being the National Standards Body in Sri Lanka is a member of the International Organization for Standardization (ISO). SLSI is providing system certificates to the organizations for its compliance with the ISO standards. SLSI provides SLS certificates the either Sri Lankan or abroad products which signify that the commodity or product is consistently manufactured in accordance with the relevant Sri Lanka Standard Specification and could be purchased with a reasonable assurance of quality.
The organizations which supply food to Colombo city region should adhere to the guidelines set by ISO or SLSI if they want to use those certificates in their products.

3.7. INTERNATIONAL ACTORS AND THEIR IMPACT ON COLOMBO CITY REGION FOOD SYSTEM

There are several international agencies which contributes directly and indirectly for the Colombo region food system. Among them the most influential organization are the world Bank, world food Programme, Asian Development Bank, World Organizations for animal Health (OIE), United Nations International Children's Emergency Fund, Food and Agricultural Organization of the United Nations and United Nation's Environmental Programme. The background and main functions with relating to world and Colombo city region food supply of each of these organizations are briefed as follows.

3.7.1. The World Bank

The World Bank identified that by 2050 the world needs 50% more food than now. When trying to increase the food production it should in line with the food nutrition and food security and same time with less impact for the environmental including global warming. For this purpose The World Bank has introduced "Agriculture action Plan 2013-2015'. The objective of this to raising agricultural productivity and resilience, especially for smallholder farmers.
The World Bank is also doing a continuous analysis on international food prices called 'food price watch' and analysis the reasons for the changes in food prices and the impact on poverty and inequality. Under the World Bank group International Finance Corporation (IFC) is provides investment and advisory services to help the private sector to help to address the soaring demand for food in environmentally sustainable and socially inclusive way.

The Global Food Safety Partnership under World back is a public-private initiative dedicated to improving the safety of food in middle-income and developing countries. This program brings together fishers and farmers, business and industry, governments, regulatory bodies, international development organizations, and civil society to drive a globally-coordinated and locally-driven food safety approach. It combines food safety training and technical support so developing countries can improve their food safety systems and benefit from better compliance with food safety standards.

The World Bank has developed ADePT-Food Security Module (ADePT-FSM) to produce food security indicators from food consumption data collected in household surveys (HS). These indicators include the consumption of calories and macronutrients, the availability of micronutrients and amino acids, the distribution of calories and the proportion of people undernourished. The food security indicators are derived at the national and subnational levels such as by region, area of residence or household heads' characteristics. ADePT-FSM also produces statistics by group of food items and at the food item level.

The World Bank Board has approved a $165 million credit for Sri Lanka to increase access to piped water services and improved sanitation in the Mulaithivu, Kilinochchi, Nuwara Eliya, Badulla, Monoregala, Kegalle and Ratnapura Districts. Around 450,000 people are expected to benefit under the project from improved access to safe piped water, contributing to the Government's national target of increasing piped water coverage from the current 45 percent to 60 percent by 2020. The project comes at a time when Sri Lanka also faces the challenge of a new disease, known as CKDu (Chronic Kidney Disease of uncertain etiology). Communities where CKDu incidence is high will also benefit from improved access to safe drinking water.

3.7.2. World Food Programme (WFP)

The World Food Programme is the world's largest humanitarian agency fighting hunger worldwide. WFP is part of the United Nations system and is voluntarily funded. The vision of WFP is to ensure every man, woman and child in the world has access at all times to the food needed for an active and healthy life.

WFP supports national, local and regional food security and nutrition plans. It partners with other United Nations agencies, international organizations, non-governmental organizations, civil society and the private sector to enable people, communities and countries to meet their own food needs.

WFP's Strategic Plan for 2014-2017 provides the framework for WFP's operations and its role in achieving a world with zero hunger. It continues WFP's focus on food assistance for the poorest and most vulnerable women, men, boys and girls.
The Plan lays out four objectives:

- Save lives and protect livelihoods in emergencies;
- Support food security and nutrition and (re)build livelihoods in fragile settings and following emergencies;
- Reduce risk and enable people, communities and countries to meet their own food and nutrition needs;
- Reduce under nutrition and break the intergenerational cycle of hunger.

WFP's activities in Sri Lanka continue to focus on meeting the food and nutrition needs of the most vulnerable especially returnees as they attempt to regain their livelihoods, thus promoting food security and peace and reconciliation. The main components of WFP interventions in Sri Lanka are:

- Emergency Support to IDPs returning and resettled IDPS as well as those remaining in camps
- Nutritional supplementation for pregnant and nursing mothers, as well as for children six months to five years of age;
- School meals to address short term hunger in primary/secondary schools;
- Rehabilitation and Infrastructure development activities for returnees.
- Food-for-training activities

3.7.3. Asian Development Bank (ADB)

ADB has developed an operational plan for Asia'a food security in 2009 under Strategy 2020 of freeing Asia from poverty. The operational plan thus accords priority to achieving sustainable food security in Asia and the Pacific. The plan puts emphasis on the integration of agricultural productivity, market connectivity, and resilience against shocks and climate change impacts as the three pillars to achieve sustainable food security.

ADB is also supporting for agriculture research to integrate technology and innovation to agriculture to increase the productivity, income, and livelihoods. Areas for agricultural research that ADB has identified for the next 10 years include reducing yield gaps; increasing yield potential of crop varieties or hybrids; and reducing crop losses during harvest, storage, or processing. ADB also supports and partners with international agricultural research centers that undertake research advances to improve rice varieties and crop management systems and practices.
ADB also supports multi-sectored areas of food security such as infrastructure environment, Regional Corporation and integration, finance, education, agriculture, health, disaster and emergency assistance.

3.7.4. World Organization for Animal Health

The OIE is the intergovernmental organization responsible for improving animal health worldwide. The objectives of OIE are ensure transparency in the global animal disease situation, collect, analyze and

disseminate veterinary scientific information, encourage international solidarity in the control of animal diseases, safeguard world trade by publishing health standards for international trade in animals and animal products, improve the legal framework and resources of national veterinary services, to provide a better guarantee of food of animal origin and to promote animal welfare through a science-based approach.

3.7.5. UNICEF (United Nations International Children's Emergency Fund)

UNICEF is a key partner in the major global initiative called the Scaling up Nutrition (SUN) movement, which is bringing much needed focus and investment for nutrition in a number of countries. In addition, UNICEF is committed both to working in and convening partnership across all sectors of society with governments, UN organizations, the private sector and civil society.

UNICEF has taken many actions to improve the food nutritious of the children worldwide. UNICEF nutritional priorities include providing nutrition security and nutrition in emergencies, Monitoring infant growth rates, Supporting community-based programmes, Infant and child feeding and care, Delivering vital micronutrients.

3.7.6. Food and Agriculture Organization (FAO)

The main goals of FAO are eradication of hunger, food insecurity and malnutrition, elimination of poverty and the driving forward of economic and social progress for all, sustainable management and utilization of natural resources, including land, water, air, climate and genetic resources for the benefit of present and future generations.
FAO creates and shares critical information about food, agriculture and natural resources in the form of global public goods. FAO plays a connector role by facilitating partnerships for food and nutrition security, agriculture and rural development between governments, development partners, civil society and the private sector.

3.7.7. United Nations Environment Programme (UNEP)

The United Nations Environment Programme (UNEP) is the leading global environmental authority with the objectives of assessing global, regional and national environmental conditions and trends, developing international and national environmental instruments, strengthening institutions for the wise management of the environment. UNEP's activities are based on climate change, disaster and conflicts, ecosystem management, environmental governance, chemicals and waste, resource efficiency.

3.8. HIGHLIGHTS

There are four level of actors, namely, national, regional, local, and international, involved in food systems. The governance in Sri Lanka can be divided into 3 categories; National level by national ministries,

provincial/regional level by provincial ministries, and local level by local authorities. A limited role is played by DS divisions in specific instances, such as resilient to shocks.

The national and provincial level involvements go beyond the CMC area. Stakeholders of the Colombo city food system are complex to be analyzed as a whole, and was discussed under identified categories that are important in the context of the CMC. The analysis showed most of the national level actors work independently in an isolated manner without working collaboratively. The regional level authorities do not play a significant role though they have been vested with powers through the constitution. CMC only plays a limited role in catering food safety and food waste areas. Though CMC has powers to act in other areas through MC act and food act, the active involvement is limited.

After considering all international and national actors, (a) international agencies are mainly considered about developing policies to eradicate poverty and hunger, conducting long-term food related projects in the countries, and assist in disaster situations (e.g. World Bank and World Food Programme funds several food related programs in Sri Lanka while other international organizations have an indirect impact for the policy developing activities) (b) Many National level ministries mainly involve in policy making and the institutes under ministries involve in food research, food production distribution and marketing, and also act as an information source to the public. The private sector is actively involved in food production, importing, marketing and distribution activities, and moderately on food research (involvement of the public institutes were only considered in this initial study).

4. LEGAL AND POLICY FRAMEWORK OF COLOMBO FOOD SYSTEM

4.1. FOOD LEGISLATIONS FRAMEWORK OF COLOMBO FOOD SYSTEM

Sri Lanka food system is mainly governed by national level regulations, which are equally applicable to the CMC and the rest of the country. At provincial level, there is not much involvement in food systems except food production aspects such as agriculture, livestock, and fisheries. However under 1978 constitution 13th amendment, Provincial council is granted with variety of legislative powers in relation to the food system and provincial councils do not implement the authority (e.g. Nutrition, Markets, fairs, etc.). Some responsibilities to execute the regulations related to food systems are given to Colombo Municipal council through the municipal council act and the CMC bylaws (i.e. locally passed regulations on food systems using the power vested to the CMC by the municipal council act and approved by the higher authorities).
Other sections of this document will briefly discuss about the key national level regulations and attempt to explore the impact on CMC.

4.2. NATIONAL REGULATIONS

Sri Lanka Food act No. 26 of 1980 is the main national level legislative document related to food and food safety in Sri Lanka. The latest amendment of the act was No. 29 of 2011 and it explains many aspects of food safety requirements based on different types of food. In addition, national level laws and regulations such as import control regulations, health regulations, environmental protection, and consumer protection regulations indirectly influence the food system. Table 4 categorizes national level regulation and policies according to food supply, food processing, food security, food safety, and food price.

Table 4. Selected national regulations and policies related to Colombo food system by value chain level

	Food Supply & Food Processing	Food safety	Food Security	Food Price
Major Generic National regulations on food	Food Act (amendment) No. 29 of 2011 Food supplies ordinance Act 30 of 1957 The Consumer Affairs Authority Act 09 of 2003 Sri Lanka Standards Institution Act No. 6 of 1984 Consumer Protection Act No.1 of 1979			
Environmental regulations	National Environment act No.47 of 1980			

Import related regulations	Import and Export control Act No.1 of 1969 (amended version 1987)	Food (Imported Food Inspection) Regulations 2001 -Food act of 29 of 1980		Customs (amendment) act No.2 of 2002 & custom regulations Government Budget and Other Special Regulations.
Agriculture related regulations and policies	Food Production (Estates) Act No 40 of 1954 Sri Lanka National Agricultural Policy by Ministry of Agriculture and Agrarian Services, (2007) Kapruka Navodawa-National Coconut Sector Development Plan (2011-2016) National Campaign to Motivate Domestic Food Production	National Policy and Strategic Framework for Prevention and Control of Non-Communicable Diseases (NCD) National Policy and Strategy on Cleaner Production for Agriculture Sector National Food Safety Policy National Policy on Drinking Water,	National Land use policy of Sri Lanka National Maternal and Child Health Policy National Climate Change Policy of Sri Lanka, National Nutrition Policy of Sri Lanka National Nutrition Strategic Plan 2009-2013	
Livestock and Fish related regulations and policies	Ten year Development Policy Framework of the Fisheries and Aquatic Resources Sector (2007-2016) Livestock Master Plan (2011) Fish Processing Establishment Regulations (1998) Aquaculture (Monitoring of Residues) Regulations (2002)			

4.3. NATIONAL LEVEL LAWS AND REGULATIONS

4.3.1. Food Act No 26 of 1980

The legal background of food in Sri Lanka pertains with the Food Act (amendment) No. 29 of 2011 which is the amended act of Food Act No. 26 of 1980. Accordingly, the act is to regulate and control the manufacture, importation, sale, and distribution of food within Sri Lanka. Moreover, food advisory committee in Sri Lanka, appointed under the Food Act controlles all administrations of the Food Act, food-related policy issues, and new developments. Food advisory committee consists of authoritative representatives for food administration, national health, Sri Lankan Custom, Colombo municipal council, animal health, and related food production institutes etc. and several other members nominated by the minister.

Following main rules and regulations will enact under the Food Act No. 29 of 2011 within Sri Lanka.

i. Food authority in the country

For administrative areas in the country, a Municipality, any other local authority, or the medical officer of health, is appointed by the Minister as the food authority for that area. If the local authority constituted for that area is not appointed as the food authority then the superintendent of health services in an area, or excise commissioner in the area, or principal collector of custom, shall be authorized for all food related aspects in that area.

ii. Prohibition in respect of food

Any food, which is naturally or with added deleterious substances, if rendered injurious to health, unfit for human consumption, which consist in whole or in part any unclean or diseased animal substance or decayed vegetable substance and which is adulterated, is prohibited to manufacture, sell, or distribute in Sri Lanka. Prepare, preserve, package, or store such kind of foods for sale is prohibited within Sri Lanka.

Every manufacturing, sales, storing, and other should be compatible with the directions issued by the food authority in Sri Lanka.

iii. Labeling, packaging and advertising

No food can be labelled, packaged, treated, processed, sold, or advertised in a manner that is false, misleading, deceptive, or likely to create an erroneous impression regarding its character, value, quality, composition, merit, or safety.

iv. Warranty and Licensing

No manufacturer, distributor, commission agent, or a dealer in any food shall sell such food to any vendor unless s/he also gives that vendor a warranty in the prescribed from in respect to the nature substance and quality of that food.

No person shall manufacture, prepare, preserve, package, store, or sell any food in any premises unless such premises has been licensed by the relevant Food Authority who shall be the licensing authority.

v. Procedure in respect of articles seized

An article in respect of which an offence has been committed is detained under the Food Act No. 29 of 2011 and such article may be destroyed or otherwise disposed, where the owner of such article or the person in possession of such article at the time or seizure consents in writing to the destruction of such article. According to the nature of the offence relating to the human health and animal health, there are different defined imprison punishments and fines.

vi. Food (Hygiene) Regulations

Food hygiene regulations shall apply to all food establishments dealing with the processing, transport, distribution, handling, storage, or sale of food or any other matters related to food establishments. Accordingly, food manufacturing or food processing establishments shall not be located in,

(a) Environmentally polluted areas or areas of ongoing industrial activities; or

(b) Areas subject to flooding unless sufficient safeguards are provided; or

(c) Areas prone to infestations of pests; or

(d) Areas where wastes, either solid, liquid or gas, cannot be effectively removed.

Moreover, the Act will provide legal conditions for most of the functions relating to food establishments including constructing the buildings, maintaining water supply and storage, cleaning and disinfection process, material used for wrapping and packaging, storing processed or unprocessed foods, etc.

vii. Food coloring substances regulations

Under the food coloring substance regulations, it is described and regulated the accepted coloring substances and other items relating to the food preparations in the country.

viii. Food regulations under food varieties

Food (Bread Standards) Regulations detailed on ingredients shall be there for bread products, mainly including the percentage of flour added. As per the Food (Melamine in Milk and Milk Products) Regulations 2010, no person shall import, manufacture, transport, distribute, sell, offer, or keep for sale any milk or milk products in Sri Lanka, containing melamine in levels exceeding 1.0 mg/kg (Part per Million).

Food (Bottled or Packaged Water) Regulations of 2005 highlights that no person shall,

(a) Bottle or package Natural Mineral Water or Drinking Water; or

(b) Import and distribute bottled or packaged Natural Mineral Water or Drinking Water, without obtaining a Certificate of Registration from the Chief Food Authority.

The regulation established rules on Physical, Chemical, and Microbiological requirements for Bottled or Packaged Natural Mineral Water as well (Gazette published regulations of 1420/4 on 21st November 2005).

Food regulations for cereals, pulses, legumes and derived products, and vegetable proteins highlights that the percentage of cereals and other grains that should contain in food items based on the identified food categories; also the labeling requirements of the relevant cereal or grain food under the regulations.

ix. Food (Shelf Life Regulations)

All items of foods imported into Sri Lanka possess a minimum period of sixty percent (60%) of unexpired shelf life at the point of entry.

4.3.2. Food supplies ordinance Act 30 of 1957

This ordinance make provision for maintaining, controlling, and regulating the supply of articles of food as to secure their sufficiency, their equitable distribution, and their availability at fair prices, and for that purpose to take power to requisite articles of food and to pay compensation in respect of any article so requisitioned and to provide for the importation of certain essential articles of food solely by or on behalf of the state for the purpose of maintaining, controlling, and regulating the supply of articles of food as to secure their sufficiency, their equitable distribution, or their availability at fair prices.

4.3.3. The Consumer Affairs Authority Act, 2003[26]

This provides regulations for the establishment of the Consumer Affairs Authority to promote effective competition and to protect the consumers. Basis for the establishment of 'A Consumer Affairs Council' for the repeal of the consumer protection Act No. 1 of 1979, the fair trading commission act No. 1 of 1987, and the control of prices act No. 29 of 1950, and for all matters connected therewith or incidental thereto.

Objectives of the Authority are:

(a) To protect consumers against the marketing of goods or the provision of services which are hazardous to life and property of consumers;
(b) To protect consumers against unfair trade practices and guarantee that consumers interest shall be given due consideration;
(c) To ensure that wherever possible consumers have adequate access to goods and services at competitive prices;
(d) To seek redress against unfair trade practices, restrictive trade practices, or any other forms of exploitation of consumers by traders.

4.3.4. Food Production (Estates) Act No 40 of 1954

This is an act to make provision for the cultivation of foodstuff by proprietors of estates or for the payment of money in lieu of such cultivation, for the establishment of a Food Production Fund, and for matters connected therewith or incidental thereto. This act applies to the maintenance of every land or group of lands that cultivate food.

[26] http://www.caa.gov.lk/web/images/pdf/act.pdf

4.3.5. Environment Protection Legislations[27] (National Environment act No.47 of 1980)

The Central Environmental Authority does not directly engage in food related matters; however the authority have enforced certain general requirements to be fulfilled by any entity including those who are involved in food industry relating to the environmental impact from processes and outcomes. To ensure that entities adhere to the environmental requirements, CEA has introduced certain licenses to be obtained by the entities.

Environment Protection License - Since July 1990, all industries that discharge or deposit effluents or emissions into the environment are required to obtain an Environmental Protection License (EPL) from the Central Environmental Authority. The License issued to an industry will stipulate the standards and criteria under which the industry is allowed to discharge its waste. Different standards are required to be complied with, depending on whether the final effluent is discharged into an inland surface water body such as a river or lake, into coastal waters, or used for irrigation purposes.

4.3.6. Regulations for Importing Foods

Though Sri Lanka is an agrarian country, it has not fulfilled all its food requirements locally. Hence, many food items are needed to be imported and distributed to fulfill the requirements of various segments of the food system. The food import cannot be avoided and have multiple dimensions to be considered such as protection of consumers and farmers, food safety issues, seasonal production, and foreign currency control import of food items are controlled by multiple regulations.

i. Import and Export control Act No.1 of 196928 (amended version 1987)

Aim of the Act is to regulate importation and exportation of goods by appointing an import and export controller in Sri Lanka. According to the Act, commercial import and export entities or persons need to obtain a license from the import and export controller (no person shall import into, or export from, Ceylon any goods except under the authority, or otherwise than in accordance with the conditions, of a license Issued in that behalf under this Act by the Controller). There are list of commodities, which can export under the regulations of import and export control Act. The 1813/14 government notification for the regulations for import and export control Act dated 2013.06.05, specifically mention specific livestock, meat, and other food items that can import to Sri Lanka[7].

ii. Food (Imported Food Inspection) Regulations 2001 -Food act of 29 of 198029

As per this act, "No consignment of imported food intended for human consumption shall be removed by the importer or his authorized agent or any other person out of the Port Premises without the approval of the Authorized Officer appointed under the Food Act." According to this regulation, any food item imported to Sri Lanka should be checked and sample tested by the authorized persons before granting permission to

[27] http://www.inece.org/5thvol1/ellepola.pdf
[28] http://www.imexport.gov.lk/web/images/PDF_upload/act/acts.pdf
[29] http://www.health.gov.lk/en/FOODWEB/files/regulations/draft/food_(import_inspection)_regulations.pdf

release from the port. Further, this regulation specifically states about the authorized person who can do the inspection; "No person other than a Food & Drugs Inspector specifically authorized by name by the Chief Food Authority in writing shall carry out inspection of imported food for the purpose of clearance from the Port Premises". In this regulation, it is specifically mentioned the food items that cannot be imported to Sri Lanka and the responsibilities of the importers to ensure food inspection performed before releasing the consignment from port: "Details of all consignments of imported food intended for direct human consumption or for further processing prior to human consumption shall be notified to the Imported Food Inspection Unit at least 24 hours prior to the intended removal of such consignments".

iii. Customs Ordinance and Custom Regulations

Amended version of custom ordinance No. 17 of 1869 is the governing Act of the import and export process in Sri Lanka. According to the Act, Sri Lankan custom is the controlling body of import and export items in the country and they regulate the inward and outward flow of goods based on the regulations imposed by various legal and regulatory bodies. Importation of food items will be controlled according to the above mentioned regulations and also specific requirements and levy imposed by the customs ordinance and Sri Lankan Inland Revenue department.

iv. Government Budget and Other Special Regulations

Since import of food items have multi-dimensional influences to health, local production, foreign trade, foreign expenditure, and government income, the government imposes certain regulations time to time to discourage food imports and loosen certain regulations to encourage food imports in certain occasions. Import taxes and tax exceptions are few tools that government use to control the import food flow in Sri Lanka.

4.4. National Policies and Strategic plans relating to food system

Apart from the legislative framework on food, there are few policies and strategic plans relating to food system in Sri Lanka. In reality all policies and plans relating to health, education, and business land use in food production, improving agriculture, and farming and food production in Sri Lanka may influence on the food system in Colombo.

a. **National Land use policy of Sri Lanka[30]:** The national land use policy will provide an appropriate policy framework, to ensure proper land use, protect agriculture, economic development, and the maintenance of the productivity of the land at a higher level. Goal of the policy is rational utilization of land as a resource in the national interest in order to ensure food security, a high quality of life, equity, and ecological sustainability.

[30] http://www.luppd.gov.lk/LU%20Policy%20new.pdf

b. Sri Lanka National Agricultural Policy by Ministry of Agriculture and Agrarian Services, (2007)[31]: The National Agricultural Policy covers crop sectors of Food, Floriculture, and Export Agriculture and aim to achieve food and nutrition security of the nation, increase employment opportunities and income, and living standards of farming community through adoption of technically feasible, socially acceptable, economically viable, and environmentally sustainable agricultural production technologies and marketing.

c. National Policy and Strategic Framework for Prevention and Control of Non-Communicable Diseases (NCD), Ministry of Health, (2010) : The policy aim at the prevention of chronic NCDs and promoting healthy lifestyles among Sri Lankans through implementation of a cost-effective NCD screening program at community level, strengthening the health system to provide integrated and appropriate curative, preventive, rehabilitative, and palliative services at each service level and empower the community for promotion of healthy lifestyles for NCD prevention, and controlling and strengthening national health information system including disease and risk factor surveillance. This includes illnesses due to nutrient and calorie deficiencies.

d. National Maternal and Child Health Policy, Ministry of Health, (2010): The policy will provide directions to address the challenges arising from rapid demographic transition that resulted in new demands for services, rising peoples' expectations, and reported trends in unhealthy lifestyles and behavioral changes of young adults by effective planning, implementation, monitoring, and evaluation of Maternal and Child Health programs.

e. National Climate Change Policy of Sri Lanka, Ministry of Environment, (2012): This policy provides guidance and directions for all stakeholders to address the impacts of climate change issues locally and highlights the strategies for climate change mitigation, technology transfer, financing and investment mechanism, education, training and awareness, monitoring, assessment, and management of impact risks due to climate change. The National Action Plan aims at addressing the environmental issues in Sri Lanka including meeting the challenges in climate change, saving fauna, flora and ecosystems, sustainable use of coastal belt, land resources and waste management, and environmental friendly choices for industries. Climate change has a clear impact on food security.

f. Kapruka Navodawa-National Coconut Sector Development Plan (2011-2016) Ministry of Coconut Development and Janatha Estate Development (2011): This plan aims to increase coconut production up to 3,650 million nuts per annum by 2016 to meet domestic demand while improving productivity of coconut lands, expanding new cultivation, promoting coconut based industries, and disseminating modern technology.

g. Ten year Development Policy Framework of the Fisheries and Aquatic Resources Sector (2007-2016), Ministry of Fisheries and Aquatic Resources Development: The policy framework envisages policy

[31] http://www.agridept.gov.lk/images/stories/site/PDF/Publication/English/BOOK/nationalagriculturalpolicy.pdf

measures, strategies, and activities to accelerate growth of fisheries sector with the target of increasing fish production to achieve per capita availability of 22kg of fish and fish products, Rs. 41,000 million export earnings, and create additional 110,000 employments during 2007-2016. Inland and aquaculture production will be increased up to 50 percent by commercializing the sector, with diversified products, adoption of new technologies, value addition, and selective breeding.

h. **National Policy and Strategy on Cleaner Production for Agriculture Sector[32]:** Sustainable agriculture has been a key focus in recent discussions around the world with the issues related with global warming, climate shifts, and deforestation. There was a discussion on going with cleaner production align with that in Sri Lanka. Cleaner production is the continuous application of an integrated and preventive environmental strategy to processes, products and services, to increase overall efficiency, and reduce risks to humans and environment. Further, it identified its influence on food security in the long run. Considering these emerging concerns, aim of the policy is set to achieve food security of the nation through ecologically sound, economically viable, and socially acceptable agricultural systems. This aim supposed to be achieved with four policy goals:

    1. Ensure food and nutrition security to the nation;
    2. Improve eco-efficiency in the entire agriculture sector;
    3. Ensure efficient and effective management of natural resources;
    4. Achieve sustainable socio-economic development in Sri Lanka.

i. **National Nutrition Policy of Sri Lanka[33]:** Health and social status of Sri Lanka has progressed significantly over the last several years. However, there are some issues related to nutrition level, which can improve further. According to past evidences, the nutritional status of children is not satisfactory, and neither that of adolescents and women. Although a wide range of programs (e.g. Thriposha (nutritional supplementary food) program, growth monitoring and promotion of children, micronutrient supplementation etc.) have been ongoing for several years, it is imperative that they are evaluated and strengthened to reap the full benefit. National Nutrition Policy was formed to establish well-defined policy and a workable action plan to serve as a guideline to the relevant stakeholders in planning and management of nutrition programs with effective integration ensuring efficiency and sustainability. The aim of the policy was stated as to achieve and maintain the nutritional well-being of all Sri Lankans enabling them to contribute effectively towards national socio-economic growth and development with five specific objectives:

    1. To ensure optimal nutrition throughout the life cycle;
    2. To enhance capacity to deliver effective and appropriate interventions;
    3. To ensure effective management of adequate nutrition to vulnerable populations

32 http://www.environmentmin.gov.lk/web/images/pdf/national%20policy%20and%20strategy%20on%20cleaner%20production%20for%20agriculture%20sector%20english.pdf

33 https://extranet.who.int/nutrition/gina/sites/default/files/LKA%202010%20Sri%20Lanka%20National%20Nutrition%20Policy-English_0.pdf

4. To ensure food and nutrition security for all citizens;
5. To strengthen advocacy, partnerships, and networking;
6. To strengthen research, monitoring, and evaluation.

j. National Nutrition Strategic Plan 2009-2013, Ministry of Health, (2010)[34]: This strategic plan aims at providing a platform for inter-sectorial coordination to accelerate efforts to achieve optimum nutrition level required for every Sri Lankan. The strategy introduces coordination and partnership of all relevant stakeholders for effective implementation of the strategic plan.

k. Livestock Master Plan 2011[35]: This strategy aim to promote Sri Lanka to a level of self-sufficiency in meat and milk, by Ministry of Livestock and Rural Community Development. The master plan aims to achieve self-sufficiency in milk, 40% self-sufficiency in swine products, and meeting demand and required quality in chicken, mutton, and egg production locally through enhanced productivity, value addition, breeding programs, and animal health management.

l. National Food Safety Policy[36]: Food safety has been a major concern in food system. However, majority of the regulations related to food safety were rooted from the Food Act of 1980. There is a need of up to date food safety, which attempt to address by the policy. Hence, an up-to-date national policy on food security is in need. It is already drafted and possibly appear for public opinion in near future.

m. National Campaign to Motivate Domestic Food Production[37]: With drastic weather pattern changes, urbanization, and land use pattern in Sri Lanka, there is a need to strengthen food security in the country. Align with that, a National campaign to motivate domestic food production was initiated in year 2007. There were ten objectives to the program:
   - Increasing the production of essential food crops;
   - Enhancing the contribution of agriculture to the GNP;
   - Ensuring the food and nutrient security of the people;
   - Improving the consumption pattern of the people;
   - Reduction of foreign exchange spent on food imports annually;
   - Improving the income of farming community;
   - Reducing the use of chemical fertilizer by 25% in the next three years by enhancing the use of organic manure;
   - Dissemination of modern and appropriate technologies;

[34] http://www.treasury.gov.lk/depts/fpd/policydeve/policydeve-annualreport2011.pdf
[35] http://cabinetoffice.gov.lk/cab/index.php?option=com_content&view=article&id=16&Itemid=49&lang=en&dID=4099
[36] Dr. Ilmi G. N. Hewajulige, ministry of health during the press briefing with regard to the National Poisoning Prevention Week - See more at: http://www.dailynews.lk/?q=local/food-safety-policy-be-implemented-soon#sthash.tJrgoutA.dpuf
[37] http://www.agridept.gov.lk/images/stories/site/PDF/Publication/English/BOOK/letuscultivate.pdf

- Encouraging youth towards agriculture;
- Promoting environment friendly and local/traditional agriculture methods.

n. **National Policy on Drinking Water, Ministry of Water Supply and Drainage, (2010)[38]:** This policy aims at developing broad sets of strategies to promote the growth of drinking water sector in terms of coverage, quality, and service delivery.

o. **National Sanitation Policy – Draft:** This policy is still at draft stage and one component of the policy focus on human waste recycling as a nutrient source in Agriculture.

4.5. COLOMBO MUNICIPAL COUNCIL FOOD REGULATIONS

i. Food Hygiene and Safety

- CMC has declared the authority under the Food Act. CMC has taken many steps towards food safety and few examples are;
- Control over the delivery of lunch packets within the city in line with the public health and safety. Accordingly, every lunch packet that are supposed to be sold and delivered for selling should contain an accepted packaging according to the food labeling and packaging regulations containing the particular manufacturer details and the lunch packets are required to be sold within four hours after cooking.
- If any party wishes to distribute food items free to the public as "dansal" and others, those parties are required to obtain the registration from the CMC Chief Public Health Inspector.
- CMC has applied regulations with regard to bottled drinking water within the city. Accordingly, with the hand of consumer affairs authority, CMC takes actions for random checking of bottled drinking water in the market to ensure the safety and conditions of those for use.

ii. Colombo Waterworks Ordinance

Colombo waterworks ordinance of CMC is applied over all the maintenance, use, and heath assurance of water systems within the suburb. Accordingly, the duties of water engineers on water supply maintenance and penalties on fouling of water over the public are disclosed under this ordinance.

iii. Public Health Inspector (PHI) Service

In accordance to the Colombo municipal ordinance of 1947, CMC applied PHI service for the public under the control of CMC – food control unit. Moreover, the acts passed from time to time shall be applicable for all those duties, responsibilities, and services of PHI. Now, the CMC-Food Control Unit has 4 food inspectors and 18 PHI officers. PHI officers apply random checking mechanism in the market to check and ensure food production and safety on public health. Accordingly, food hygiene of the food outlets including hotels, food

[38] http://waterboard.lk/web/images/contents/organization/policies/national_drinking_water_policy.pdf

producers, and other stores within the city are entitled for combination of random and structured. Case studies relating to PHI service are listed in Appendix 10.

4.6. CURRENT REGULATION FRAMEWORK OF COLOMBO FOOD SYSTEM

All markets governed by CMC should pay rental and need to obey regulations imposed by the CMC. The CMC appoint person in charge for each market and s/he is responsible for food safety and supervise waste management of the market. According to the regulations of the Food Act, apart from the Colombo municipal council ordinance and other imposed regulations of the CMC, every prepared food selling outlets need to get a license from the CMC. In practice, the main regulation on food safety is explained in the Food Act and CMC and MOH offices are executing them as per the instructions in the Act. If there is no valid license for such outlets, and if it is identified through inspection by PHIs and food inspectors, they have the authority to close down the business through a court order. Otherwise, they have to apply for license and provide evidences that they adhere to the food safety requirements defined by CMC as per Sri Lanka Food Act.

When a business applies for a license, CMC's food control unit and medical units review the application for basic requirements. If it meet all basic requirements, then PHIs visit the place and check for fire safety, building facility, and health concerns etc. If necessary requirements are met at a satisfactory level, then CMC grant the license to continue the business. If the requirements are not met at a satisfactory level, then the application will be rejected. In such cases, required improvements are in need before re-applying the license. If the re-application satisfies necessary criteria, license is granted and business can start operations. Since the normal license period is one year, food businesses need to apply for license annually. In most cases, before renewing the license, PHIs will make an inspection to ensure all requirements are met. It is expected that this process would ensure the safety and quality standard of the food they sell.

Apart from license process, food businesses in Colombo city will be monitored by two other ways:

1. If customer or public complain against food safety or environmental issue relating to a business
2. Random and structured checks assigned to area PHIs to check food businesses in their area regularly

PHIs can close down the business after receiving a court order in case of a violation of requirements or in an instance where a lab test proves food safety issues in the business. Then the businessmen have to face court action and do the necessary alterations to improve food safety of their business before operational again (Figure 5).

Box 4.1

Interviews with PHIs during the study revealed that the court does not encourage business to shut down due to food safety issues, as it may the sole income of a businessman. Hence, court always encourages businesses to improve their standards and continue the business in compliance with food safety regulations. Even though food inspectors of Ministry of Health have the right to conduct random checks, if there are any complaints in Colombo municipality, they will hand over them to CMC to maintain consistent standards of evaluation.

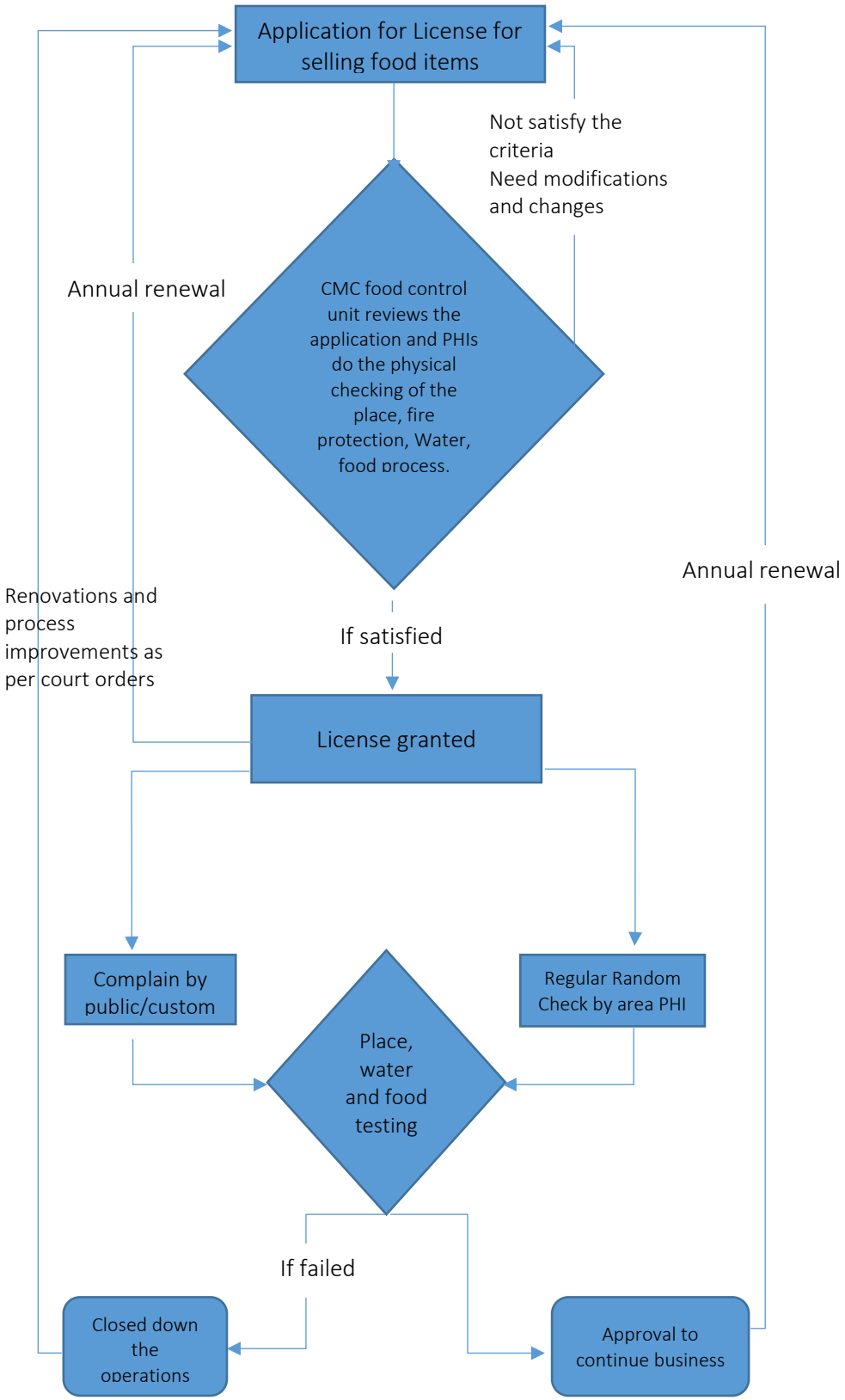


Figure 5. Flow chart diagram showing key activities in obtaining a license for a catering service

4.7. CURRENT REGULATION FRAMEWORK OF PROVINCIAL COUNCILS (UNDER 13TH AMENDMENT TO 1978 CONSTITUTION)

The Western Provincial council (WPC) has taken significant steps towards improving CRFS such as introducing urban and peri urban agriculture policy, establishing waste management authority etc. The WPC plays a regional role, which includes the CMC area. The authorities are vested to the provincial councils under list 1 and list 3 activities.

Box 4.2
The authorities that are vested to WPC on CRFS include:

Section 9 - Agriculture and Agrarian Services
9:1 Agriculture, including, agricultural extension, promotion, and education for provincial purposes and agricultural services (other than in inter-provincial irrigation and land settlement schemes, State land and plantation agriculture);
9: 2 Rehabilitation and maintenance of minor irrigation works;
9: 3 Agricultural research

Section 11 - Health
11: 2 Public health services, health education, nutrition, family health, maternity and child care, food and food sanitation, environmental health;
11: 3 Formulation and implementation of Health Development Plan and of the Annual Health Plan for the Province;

Section 15 – Authorities to conduct markets and fairs

Section 16 - Authorities to conduct food supply and distribution within the Province

Section 19 – Irrigation (planning, designing, implementation, supervision, and maintenance of all irrigation works, other than irrigation schemes relating to rivers running through more than one Province or inter provincial irrigation and land development schemes)

Section 20 - Animal husbandry (preservation, protection, and improvement of stock and prevention of animal diseases within the Province)

Section 21 – Implement national policies (subject to the formulation and implementation of National Policy in regard to development and planning, the power to promote, establish and engage in agricultural, industrial, commercial, and trading enterprises and other income-generating projects, within the Province without prejudice to the power of the Government and public corporations to have such enterprises and projects)
(Source: http://www.priu.gov.lk/Cons/1978Constitution/Schedle_9_Amd.html)

4.8. CURRENT REGULATION FRAMEWORK OF COLOMBO MUNICIPAL COUNCIL

With the responsibility of solving issues related to local food systems, CMC has been granted authority under municipal council act 1980. Under the section 267.1 of the municipal council act, every municipal council has the power to make bylaws that appears to be necessary to implement the principles and

provisions of the municipal council act. The powers vested by the municipal council act and the utilization of power granted to the municipal council in making by laws is summarized in Table 5. When comparing the powers granted to the CMC by the municipal council act and the actual power utilized by the CMC on CRFS, it shows availability of more space to improve. Many of the by-laws are made in early 20th century making them are less practical with the present scenario (e.g. bylaws on bakeries were gazetted on 29th April 1932).

Table 5. Authorities vested to municipal council by MC act and CMC by laws

Criterion	Authority vested at MC	By laws
Food safety	8. Markets, fairs, bakeries and provisions including: (a) the licensing, regulation, management and conduct and inspection of bakeries and the persons employed therein, and of the manufacture and quality of bread; (c) the seizure, forfeiture and removal and destruction of unwholesome flesh, fish or other provisions introduced into the municipality and the prevention of the sale there of; (d) the prohibition of the holding of cattle markets except in duly licensed place, and the granting of licenses for holding such markets or the withdrawal of such licenses for breach of the conditions there of. 9. The management and control of slaughterhouses including the levy and recovery of fees for the use of thereof, and prevention of cruelty to animals therein. 19. the regulation, supervision and inspection and control of the sale of articles of food or drink including the sale or the storage or the manufacture for the purpose of sale of such articles at hotels shops and places other than markets. 20. Itinerant vendors including: (a) The supervision and control of itinerant vendors;	By laws relating to eating houses (gazetted in 1962): - The roof of the building must be made of some permanent material - The premises must be provided with adequate surface drainage , and sanitary dust bin - The premises must be provided with water service from the council's water mains, where such mains are available - All wood work must be oil painted in white or varnished. - The entire ground floor must be cemented - The kitchen or any room used for the serving of meals must have no direct internal communication on the same floor and under the same roof with any part of a dwelling house. By laws relating to the bakeries (gazetted in 1932): - No person shall spit within the bakery; - Every licensee of a bakery shall provide clean water, clean towels, nail brush and soap and keep them so easily accessible to those engaged in the manufacture of bread.

	(b) The issue of licenses for such purposes of such supervision or control and the condition to be attached to such licenses; 22. The licensing, registration, and regulation of lodging houses, restaurants, eating houses and tea and coffee boutiques. 23. Dairies including- (a) the licensing, registration, and regulation of dairies, cow sheds, milk shops, milk stores, dairymen, cow keepers and purveyors of milk (b) the inspection of dairies and dairy cattle, and the medical examination of those engaged in dairies or in the distribution of milk for sale (c) the lighting, ventilation, cleansing, drainage and water supply of dairies and cow sheds in the occupation persons following the trade of cow keepers or dairymen (d) the cleanliness of premises in which milk is kept, and of milk shops, and of vessels used for containing milk for sale (e) the precautions to be taken by purveyors of milk and persons selling milk by retail against infection and contamination 29. the prohibition of fishing in waters polluted by refuse and sewage.	2. The premises equipped with a kitchen should consist of: • A minimum superficial floor of 120 square feet, comprised with at least one window which could be opened 7 feet wide which have an area less than one fifteenth floor area of such a kitchen; • Except where cooking in it is done by gas or electricity or efficient smoke vent. 4. The eaves of the must not be less than 6 feet; 7. The entire ground must be cemented; 8. The premises should be comprised with adequate surface drainage and sanitary dust bin; 9. The premises must be provided with sufficient latrine accommodation and washing facilities for customers and employees; 10. The kitchen should be detained of communication with any part of the dwelling house in the same floor under the same roof; 11. The water supply should be provided by the council's water supply; Nuisance ordinance (1863): 2. Whosoever shall commit any offence shall be liable for a fine not exceeding fifty rupees: - Having foul and offensive drains upon a house or building owned by him; - Suffering waste or stagnant water to remain within any place of the premises; - Exposing for sale unwholesome meat, poultry, fish, fruit, or vegetables or allow to

		be exposed for sale which are unfit for the food of man; - Selling noxious and unfit articles for food; - Keeping manufactories without license; - Keeping an accumulation dung, offal , filth , refuse or other noxious or offensive matter or suffer such receptacle to be in a filthy or noxious state; 4. Any person authorized by the board of health, or urban council, or town council have the authority to visit the market and seize and destroy the unwholesome meat, fish, fruit etc; 6. The board of health for each province ,urban council or town council may make by laws for any matter for the preservation of the public health and suppression of nuisance; 9. A breach of a by-law made an offence; **Food act 26 of 1980 (power has been delegated to LA):** 1. Prohibition on manufacture, importation, sale and distribution of food: - That has upon it any natural or added deleterious substance that it injurious to health - That is unfit for human consumption; - That consist of unclean, putrid, repugnant, decayed, decomposed or diseased animal or decayed vegetable substance or is insect infested; - That is adulterated; - That has upon it any substance in contravention of the provisions of this act or any regulation made there under, 2. No person shall manufacture, prepare, preserve, package or store

		for sale any food under insanitary conditions; 3. No person shall import, sell or distribute any food manufactured, prepared, preserved, packaged or stored for sale under insanitary conditions; no person can label, package or treat, process and sell, advertise in food in a manner that is false, misleading, deceptive or likely to create unpleasant impression regarding its character, value, quality, composition, merit or safety. 4. Where a standard is prescribed it is prohibited to sell, label, package, any food which does not conform to the standard. **By–laws on grain stores (under section 4 of " The quarantine & prevention of disease ordinance):** 8. for the purpose of these regulations , a grain store shall be deemed to be rat proof 9. It shall be unlawful to sell a store grain in any grain store which is no rat proof and any beach of this regulation shall be deemed to be an offence. 15. No grain store shall be utilized for purpose of human habitation, nor shall a person sleep or remain there overnight. 32. Under no circumstances will water be permitted in or near a store , and no food , green vegetables or plants allowed in store 34. All grain stores shall be closed between sunset and sunrise. **By laws on dairies (17th April 1935):**

		11. No new building shall be erected for keeping of cattle for any purpose of dairy, provided that in any commercial area the chairman may at his discretion permit the erection of any such building for keeping of not more than 15 head of cattle. Seizure of articles unfit for food: 2. (a) No person shall mix, colour stain, or powder any article of food with any ingredient or material so as to render the article injurious to health with intent that the same may be sold in that state , and no person shall sell any such article so mixed , coloured , stained or powdered; 2. (b) No person shall expose for sale any cooked food, pastry, sweet meats, confectionery or preserved or dried fruit intended for human consumption , unless he has taken all reasonable precautions to protect it from dust , flies and bad odour; 3. It shall not be lawful for any person to sell, hawk about, or expose for sale any cow's milk or buffalo's milk which has been adulterer with water or any foreign substance whatever; 4. No person shall sell or offer for sale any milk from the cream has been removed, unless he previously informs the person to whom he sells or offers it that the cream has been removed.
Food supply	8.Markets, fairs, bakeries and provisions including: (a) the licensing, regulation, management and conduct and inspection of bakeries and the persons employed therein, and of the manufacture and quality of bread; (b) the establishment of markets and fairs, private as well as public, including marts for the sale of cattle and other livestock and the regulation, control, and use of such markets and fairs, and the buildings, shops, shed, stalls,	11. the water supply should be provided by the council's water supply Eating homes means: - Premises in which cooked rice is prepared for sale or sold out for the public even though it is not consumed in such places; - Any restaurant whether there is cooked rice or not;

	pens, and standing therein and for preventing nuisances or obstructions therein or in the immediate approaches thereto. 11. The maintenance and regulation of quarantine sections for cattle, and levying of fees for the occupation there of: 20. Initerent vendors including (b)the issue of licenses for such purposes of such supervision or control and the condition to be attached to such licenses; 22. the licensing, registration, and regulation of lodging houses, restaurants, eating houses and tea and coffee boutiques; 23. dairies including- (a)the licensing, registration, and regulation of dairies, cow sheds, milk shops, milk stores, dairymen, cow keepers and purveyors of milk; 24. The registration of cows kept in premises other than licensed dairies, the cleanliness and drainage of the buildings or parts of the building in which such cows are kept and the levying of the fees for the registration of such cows.	- Any tea or coffee boutique or both serving food and drinks for public. 3. Under license of commissioner one could keep an eating-houses which is established under administrative limits of municipal council. Bylaws on bakeries (gazzeted on April 29,1932): 18.No licensee of a bakery shall allow any person to transport bread from his bakery for sale , unless such person is in possession of a card of registration signed by the chairman and by the licensee of the bakery; 19. The chairman shall, on application made to him by the licensee of a bakery, issue cards of registration for use by every person employed by such licensee in transporting bread for sale, provided that such person is free from any infectious contagious or loathsome disease; 20. No licensee of a bakery shall allow any bread to be transported from his licensed premises for sale, except in a closed vehicle or a closed basket, tin or other suitable receptacle. The licensee shall examine such vehicle, basket, tin or other receptacle, and shall satisfy himself that it is clean and wholesome before he allows transport.
Food security	9. The management and control of slaughterhouses, including the levy and recovery of fees for the use thereof, and the prevention of cruelty to animals therein; 11. The maintenance and regulation of quarantine sections for cattle, and levying of fees for the occupation there of; 12. Revenue including the assessment of property and the collection of rates and taxes;	Food act no.26 of 1980: 7. No person shall manufacture, prepare, store or sell unless he is the holder of a license authorizing him to manufacture, prepare, store, sell or distribute any food otherwise than in accordance with the terms and conditions of such licence;

	19. The regulation, supervision and inspection and control of the sale of articles of food or drink including the sale or the storage or the manufacture for the purpose of sale of such articles at hotels shops and places other than markets; 23. dairies including: (e) the precautions to be taken by purveyors of milk and persons selling milk by retail against infection and contamination.	
Food waste	129. (a) for properly sweeping and cleansing the streets, including the footways and for the collection and removing all street refuse; (c) for the proper disposal of all street refuse, house refuse and night soil; 130. All street refuse, house refuse, night soil or other similar matter, collected in any municipality under the provisions of this part shall be the property of the council; 131. The council shall from time to time, provide convince for the proper disposal….. disposed of in such a way as to cause a nuisance.	
Food processing	4. Waterworks including: - The direction of use and prescribing the size, nature, strength and materials and the mode of arrangement, position, alteration, removal, renewal, and repair of the pipes, valves , cocks, cisterns, soil pan, water closets, and other apparatus and receptacles or any of them to be used respectively or any of them to be used respectively for carrying, delivering, regulating and storing water; - (c)the regulation of the supply of water by private services and the materials and fittings to be used; - The regulation of the supply of water by private services and the materials and fittings to be used;	2. (a) That the room In which kneading takes place has a superficial floor space of not less than 180 square feet with a clear space of not less than 2 feet round the main kneading table that the lower 5 feet of the internal surface of the walls is covered with glazed tiles or plaster with cement and kitchen is not less than 80 square feet; (b) that there is free external air space not less than 7 feet wide on at least one of the sides of the kneading room which contain doors and windows; (c) the door of the oven does not open directly into the kneading room; (d) that every kneading room is provide with ceiling which is either plastered or lime washed or made of closely fitting boards which are either lime washed or oil painted.

	- (f) The regulation of the terms and conditions subject to which water will be supplied for other than domestic purposes and the price to be paid for water so supplied.	3.(a) that the troughs, tables except the main kneading table, and all the utensils used in the making of bread are capable of being moved about for the purpose of cleaning the floor and the walls; (b) that the tops of the tables used in making of bread are made of well-seasoned closely fitting planks or of some non-harmful impervious material; (c) That the kneading room shall be rendered fly proof by means of wire gauze screens in windows and doors that the flour, if flour is stored shall be stored in a special fly roofed room provided with dovetailed ceiling.
Resilience against shocks	23. dairies including: (h) facilitating inquiry in connexion with the spread of infectious or contagious diseases through dairies.	
Food price regulation	8. Markets, fairs, bakeries and provisions including: (g) The regulation of the mode of the sales of articles whether by measure , weight, tale or place; (gg) The fixing of the price(both whole sale and retail)above which any of the article shall not sold in any market or fair whether public or private; (h) The regulation, supervision, inspection and control of the sale of living animals. 22. The licensing, registration, and regulation of lodging houses, restaurants, eating houses and tea and coffee boutiques.	
Food quality maintenance	23. Dairies including: The standardization of milk and prevention of the sale of milk below prescribed standard (g) The determination of the deficiency in any of the normal constituents of genuine milk(including condensed and curdled milk) cream, butter or cheese or what addition of extraneous matter, or proportion of water in any sample of milk, cream, butter or cheese which shall for the purposes of any enactment, by-law or in force raise a presumption contrary	Seizure of articles unfit for food: 2. Prohibition of mixture of injurious ingredients and of smelling the same; 3. It shall be not lawful to sell or expose to sale adulated milk; 4. No person shall sell any milk where he cream has been removed, without the informing the person to whom he sells or offer; (a) No person shall sale any milk that contains less than cow's milk

	is proved that the milk cream, butter or cheese is not genuine or is injurious to health; 29. The prohibition of fishing in waters polluted by refuse and sewage.	standard of 12 % milk solid, 3.5 milk fat. 5. The medical officer of health or assistant medical officer of health or veterinary surgeon or any municipal inspector has the authority to deal with the taking samples of milk. - The authority for inspection of tinned food that is unfit for human use; - Inspection of aerated water factories.

Highlights

Sri Lanka food system is mainly governed by national level regulations, which are equally applicable to CMC and rest of the country. Sri Lanka Food act no. 26 of 1980 is the main national level legislative document related to food and food safety in Sri Lanka. Food act has empowered local authorities to establish a food authority in each of the local authority. At provincial level, there are no much involvements in food systems except food production aspects such as agriculture, livestock, and fisheries. However, under 1978 constitution 13th amendment, Provincial council is granted with variety of legislative powers related to the food system; but the provincial councils do not implement the authority. CMC bylaws are only limited to food safety and catering food supply. Food waste management is performed by the CMC, though the specific bylaws are not presented on food waste. Bylaws covering other aspects of the food systems are limited and some of them are very old. Thus, in many cases, the attributes supposed to be addressed may no longer exist.

5. SNAP-SHOT OF THE LOCAL CONTEXT

The governing structure of Sri Lanka has divided into three main layers namely; national, provincial, and local government levels. The administrative structure divides into district level, divisional secretarial level (DS), and Grama Niladhari (GN) divisions (Figure 6). A close relationship exists between DS divisions and local government in Sri Lanka, where the boundaries of LAs are defined based on the boundaries of DS divisions. In some cases, DS division is same as the local government boundaries and in others, more than one DS division is encompassed by local government region. The CMC owns two DS divisions; namely Colombo and Thimbirigasyaya DS divisions.

Even though GN division is the lowest administrative division in the country, most socio, economic, and demographic data are desegregated to district levels and rarely to DS divisions.

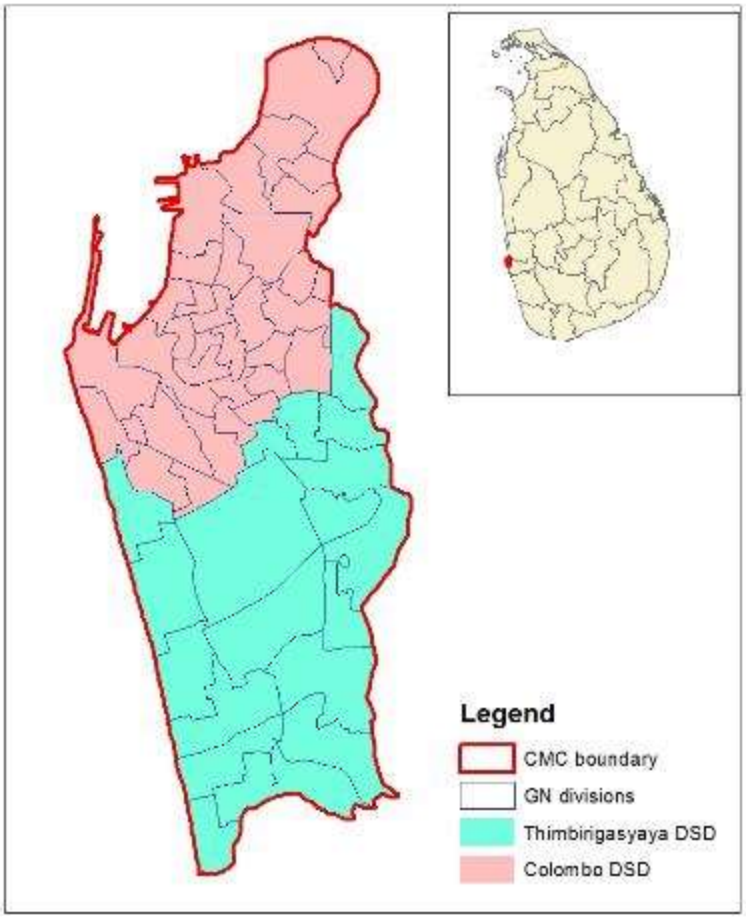


Figure 6. Administrative Boundaries CMC

5.1. INTRODUCTION TO COLOMBO MUNICIPAL COUNCIL (CMC)

Colombo is the commercial capital and the largest Local Authority (LA) in Sri Lanka and one of the oldest in South Asia, which was established in 1865. The resident population of CMC was 561,314 (as at 2012) and the floating population (non-resident population travel to CMC area to get access for services, employments, and businesses) was nearly 500,000 per day (as estimated by CMC).

CMC consists of 15 Departments that are mainly responsible for the provision of services in public health and curative, solid waste management, maintenance of roads, lands, environmental development, street lighting, water and drainage, and veterinary (Figure 7). These are the services directly in line with is study. In addition, there are number of Departments providing social services, sports and recreation, and library

services. The mayor and the council provide leadership to the council and the council members are elected through local government elections held once in four years.

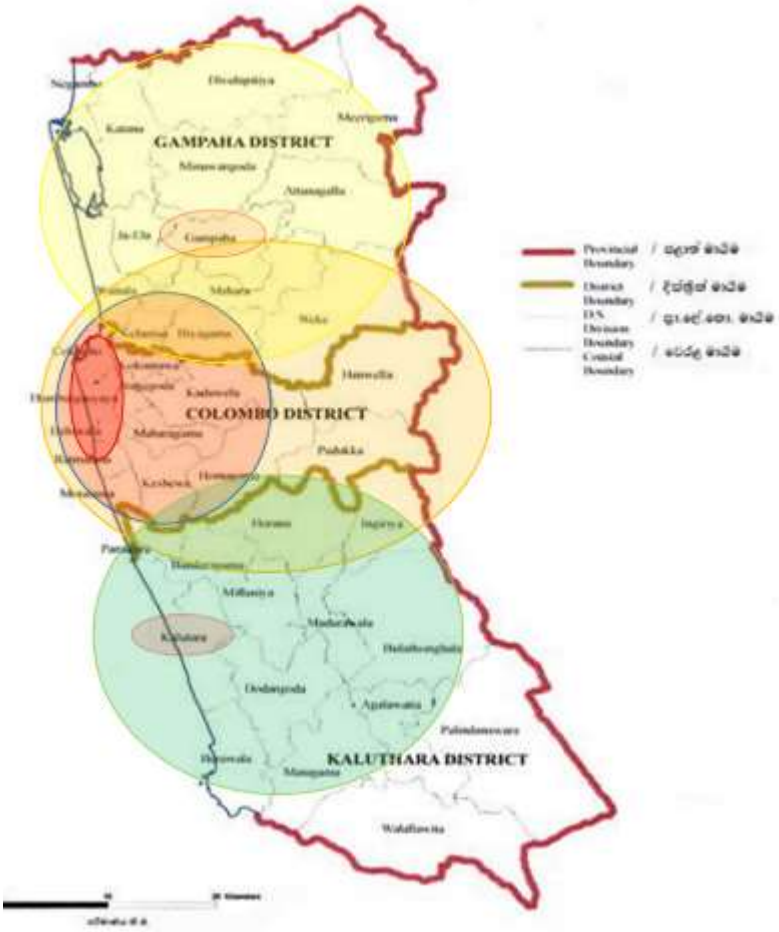


Figure 7. CMC in Western Province (Source: Department of Census and Statistics Sri Lanka)

5.2. POPULATION IN COLOMBO AND WESTERN PROVINCE

Prior to discuss about CMC population, it is worth to explore the population statistics in the country and the provinces to achieve a comparative understanding.

The total area of Sri Lanka is 65,619 km^2 and as of 2012, the midyear population in Sri Lanka was 20,359,439 (Table 6). According to population distribution, more than one quarter of the population lives in Western province, which is the smallest province in the country (consisting only 5% of the total land). This province is the most urbanized region in the country, but almost 2/5 (i.e. 40%) of the population reside in urban areas, where average urban population is 2.27 million. A recent World Bank study pointed out that the official statistics on urbanization is calculated using a narrow factor of the population in Municipal Council areas*. However, more people live in areas with urban characteristics than claimed (Economy next, 2015) and this is specifically applicable to Colombo district.

(*Sri Lanka consist of 335 LAs, out of which, 23 of are Municipal Councils https://en.wikipedia.org/wiki/Local_government_in_Sri_Lanka).

Table 6. Area, Population, and Sectorial composition by Province (Source: Department of Census and Statistics Sri Lanka, 2012)

	Sri Lanka & provinces			Sector		
	Area km^2	Total	%	Urban %	Rural %	Estate %
Sri Lanka	65610	20,359,439		18.2	77.4	4.4
Western province	3593	5,851,130	28.7	38.8	60.4	0.8
Central province	5575	2,571,557	12.6	10.5	70.6	18.9
Southern province	5383	2,477,285	12.2	10.6	87.7	1.7
Northern province	8290	1,061,315	5.2	16.7	83.3	-
Eastern province	9361	1,555,510	7.6	25.1	74.9	-
North Western province	7506	2,380,861	11.7	4.1	95.5	0.4
North Central province	9741	1,266,663	6.2	4	96	0
Uva province	8335	1,266,463	6.2	5.5	81.7	12.8
Sabaragamuwa province	4921	1,928,655	9.5	6	85.9	8.1

Population burst is even worse during district level analysis of the Western province (

Figure 8). While over 25% of the population is hosted by Western province, 80% of its population is equally shared by Colombo and Gampaha districts. Kalutara district hosts only 21% of the province population (

Figure 8), but have shown the highest population growth from 2001 to 2012 (1.21%). Colombo revealed the lowest growth rate (0.23%) while Gampaha proved 0.97% growth in population[39].

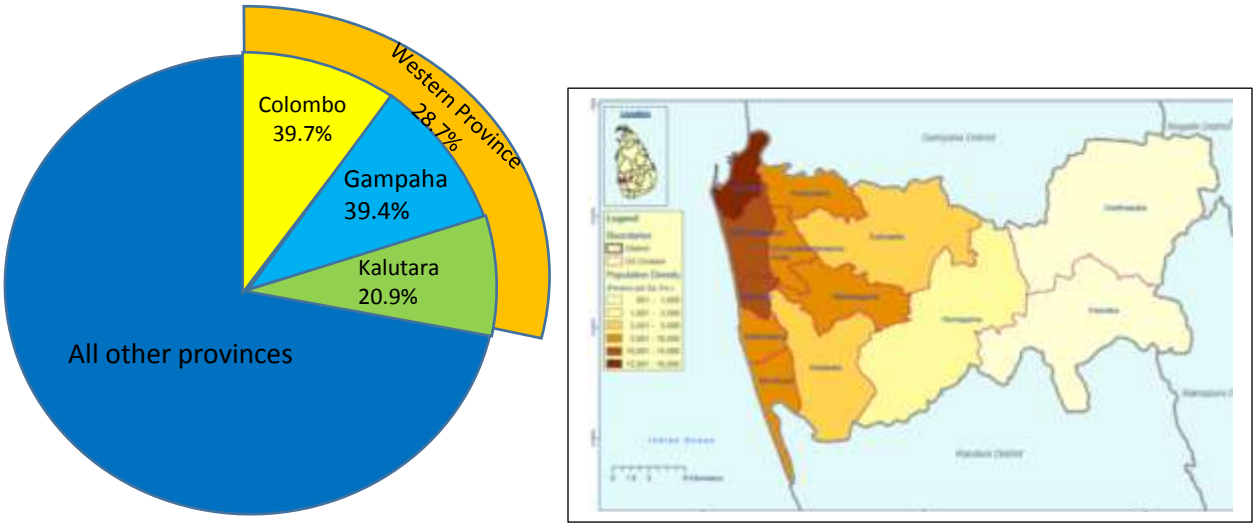
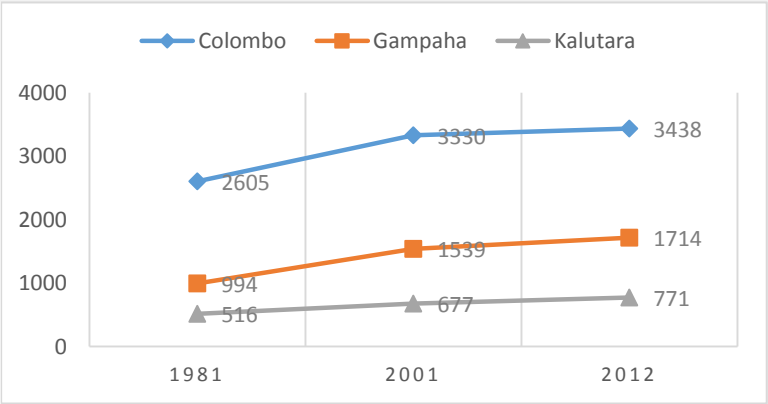


Figure 8. (Left) Population Composition of Sri Lanka (right) Population density distribution of Colombo District (Source: Department of Census and Statistics, 2012)

Box 5.1

Colombo district was the most congested in Sri Lanka with the density of 3438 people/km^2 in year 2012. Due to rapid commercialization of Colombo district, people tend to proceed to closest districts like Gampaha and Kalutara. Hence, population growth rates in Gampaha and Kalutara were higher than Colombo district. Nevertheless, Colombo remains as the most populated district in Sri Lanka.



Population Density of Colombo, Gampaha, and Kalutara in 1981-2012

[39] Census of Population and Housing 2001 and 2012, Department of Census and Statistics Sri Lanka

5.3. SOCIO-CULTURAL PROFILE OF COLOMBO CITY REGION

Colombo district consists of 13 divisional secretariats (DS) and the CMC area consists of Colombo and Thimbirigasyaya DS divisions. Please refer Annex 3 for more details.

5.3.1. Age and Gender diversity

Age has an influence on food culture such as toddler dietary needs and old age dietary needs with different requirements. Some traditional beliefs may control food consumption among gender, but this aspect has lesser influence compared to the age (Table 7).

Table 7. Age and gender diversity in Colombo

		Less than 5	Between 5-14	Between 15-29	Between 30-44	Between 45-59	Between 60-74	Above 75
		Toddlers	**Children**	**Youth**	**Late youth**	**Middle aged**	**Old age**	**Older aged**
Colombo District	Both Sex	166,605 (7%)	337,299(14 %)	556,554 (24%)	528,408 (23%)	419,539 (18%)	244,004 (11%)	71,940 (3%)
	Male	84,185 (7%)	171,063 (15%)	281,796 (24%)	264,940 (23%)	200,272(18%)	110,314(10%)	27,902(2 %)
	Female	82,420(7%)	166,236(14 %)	274,758(23%)	263,468(24%)	219,267(18%)	133,690(11%)	44,038(4 %)
Colombo City*	Both Sex	7.4	15.7	24.8	21.8	18	9.6	2.7
	Male	7.5	15.9	25.4	22.7	17.7	8.7	2.1
	Female	7.4	15.5	24.1	20.9	18.3	10.5	3.3
Colombo DS	Both Sex	8.5	17.2	24.8	21.6	17.5	8.5	2
	Male	8.4	17.3	25.8	22.2	17.2	7.5	1.6
	Female	8.5	17.1	23.9	20.9	17.8	9.4	2.4
Thimbirigasya ya DS	Both Sex	6.1	13.7	24.7	22.2	18.6	11.1	3.7
	Male	6.2	14	24.8	23.5	18.4	10.2	2.9
	Female	6	13.3	24.5	21	18.9	12	4.4

*includes Colombo and Thimbirigasyaya DS divisions

5.3.2. Ethnic diversity

Ethnicity makes sub-cultures within the society that would influence different food consumption patterns. Since there are traditions and practices unique to different ethnic groups, they change their food types, method of preparation, consumption quantities of different food types, seasonal consumption habits, etc. Ethnically, CMC is highly diverse as shown in Table 8. Ethnic diversity in two DS divisions within the CMC is

very much different as in Figure 9. For an example, the Sinhalese percentage increase from 25% to 52.7% and Sri Lanka Moor percentage decrease from 40% to 15% from Colombo to Thimbirigasyaya DS divisions.

Table 8. Ethnic diversity in CMC area

Ethnicity	National %	CMC %
Sinhalese	74.9%	36.7%
Sri Lanka Tamil	11.1%	29.8%
Indian Tamil	4.1%	1.7%
Sri Lanka Moor	9.3%	29.5%
Burgher	0.2%	0.5%
Malay	0.2%	1.0%
Sri Lanka Chetty	0.0%	0.1%
Bharatha	0.0%	0.1%
Other	0.1%	0.6%

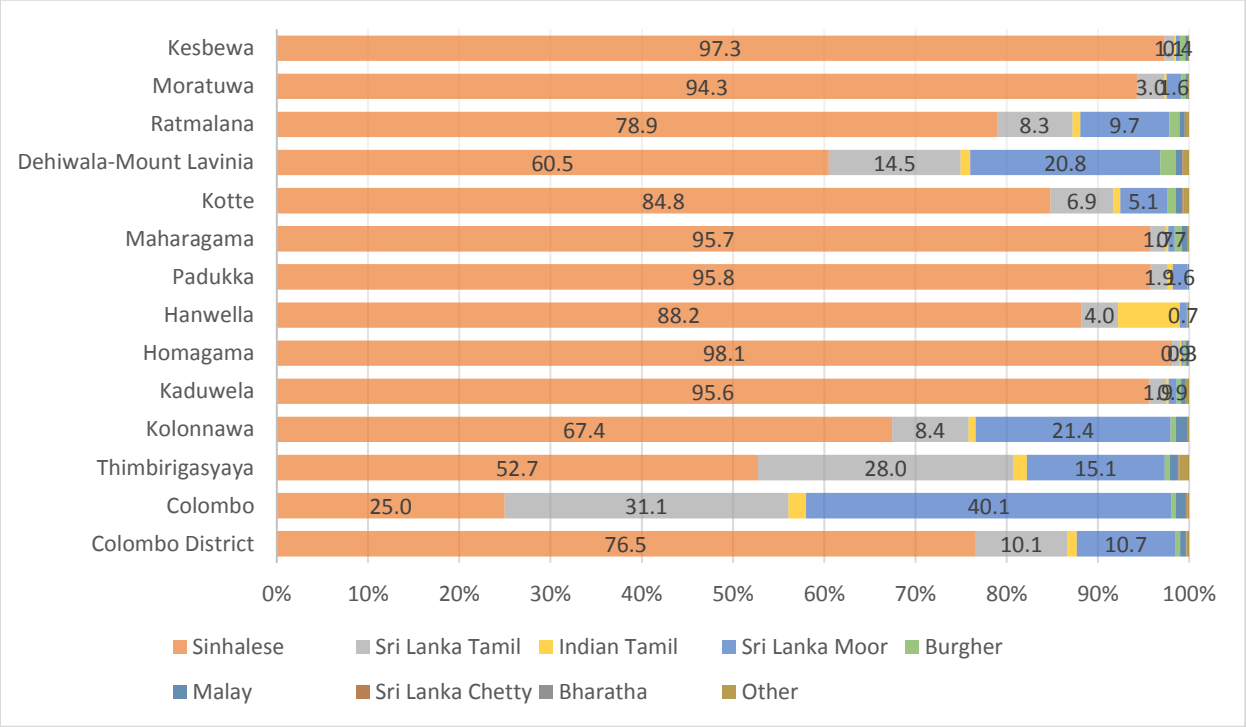


Figure 9. Ethnic Composition of Colombo City and Region (Source: Department of Census and Statistics Sri Lanka, 2012)

5.3.3. Religious diversity

In parallel to ethnicity, religions have some control over the food pattern since ethnicity and religion has a close relationship in Sri Lanka (Figure 10). For example, most Sinhalese are Buddhists, Moors are Muslims, and Tamils are Hindus while Christians consists of all ethnicities. Sri Lanka has multiple religions, which are contradicting over using animals as source of food (e.g. Buddhists). There is a significant divergence

between vegetarians and non-vegetarians among people based on religious principles. Further, owing to religious practices, there are certain preferences in selecting or rejecting the livestock as a food item (e.g. Muslims and Hindus rejects pork and beef respectively).

Sri Lanka is mainly a Buddhist country with over 75% of the population following Buddhism, though it is only 31% in CMC area. However, a remarkable difference exists in Colombo and Thimbirigasyaya DS divisions following the variations in ethnicities as presented in Figure 10. This diversity is expected to create complex food patterns and food systems in Colombo city region, compared to other parts of the country.

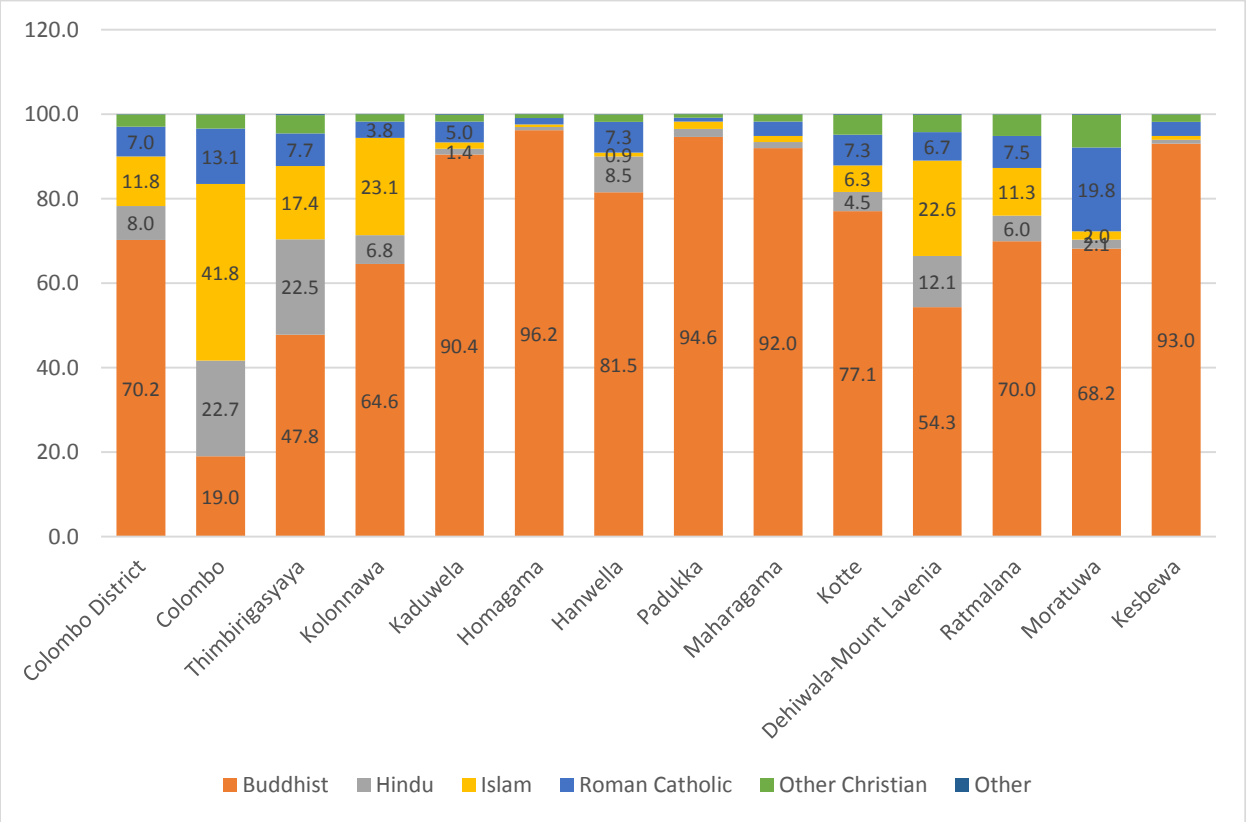


Figure 10. Religious composition of Colombo city Region (Source: Department of Census and Statistics Sri Lanka, 2012)

5.3.4. Level of Education

Level of education can be considered as an important factor that makes people to choose healthy and diverse foods. It is expected that people with higher education levels are more concerned when selecting their food pattern by understanding the nutrient requirements and side effects of over consumption of certain foods.

In Colombo district, 75% of the people have secondary or higher education qualifications whereas only 9% have no schooling. One fourth of the population in Colombo DS division completed primary school education only, which is the worst ration in the region. In Colombo DS Division, 67% of the population has only secondary schooling of below education level. Only 11% of the population has A/L or higher education.

Thimbirigasyaya depicts a better education level where 29% of the population has A/L or a higher education level and only 19% have primary or lower education as shown in Figure 11.

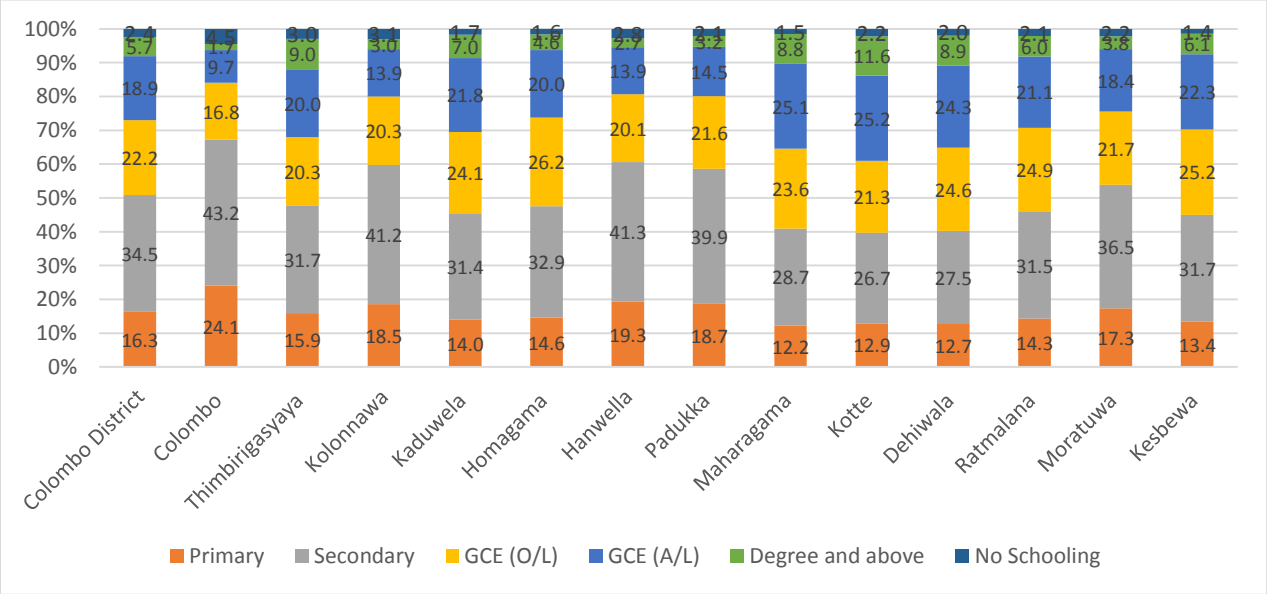


Figure 11. Education level of the people in Colombo city region (Source: Department of Census and Statistics Sri Lanka, 2012)

5.3.5. Living environment

The living environment has an impact on food and nutrient security of the people and poor living conditions lead to frequent sicknesses and diseases such as diarrhea and likely to reduce the nutrient absorptions while creating adverse impacts on nutrient security. The assessment of the living environment standard is not straightforward. It was noted that the access to sanitation facilities is higher than 99% in CMC area (i.e. open defecation is less than 1% in CMC), pipe borne water supply covers 100% of the city. There are many other factors attached to the living environment, for example; encounter waste, hygiene of food preparation, and hygienic practices. Housing structure seems a more acceptable indicator to measure the impact of urbanization on the standard of living environment. Single story and two story houses are the common house structures in Colombo. More than 75% of households own either a single story or a double story house. Land scarcity, fashion, and high land price might influence to up rise housing complexes as the present trend (Figure 12).

Line/row/shanty houses refer to low standard houses in CMC context. There are few shanties in CMC and remarkably, 13% of houses in Colombo DS and 6% of houses in Thimbirigasyaya DS have identified as line or shanty houses. Madampitiya, Kehtharama, Sammanthranapura, Bloemendhal, Lunupokuna, Aluthmawatha, Maligawatta West, Mattakkuliya, Hunupitiya, and Modara Gramaniladari Divisions (GN) have more shanties in Colombo city (Figure 13). Further, in Thimbirigasyaya DS division, Dematagoda, Wanathamulla, Kirula, Kirulapona, Wellawaththa-north and South, and Pamankada west have more number of line houses and shanties.

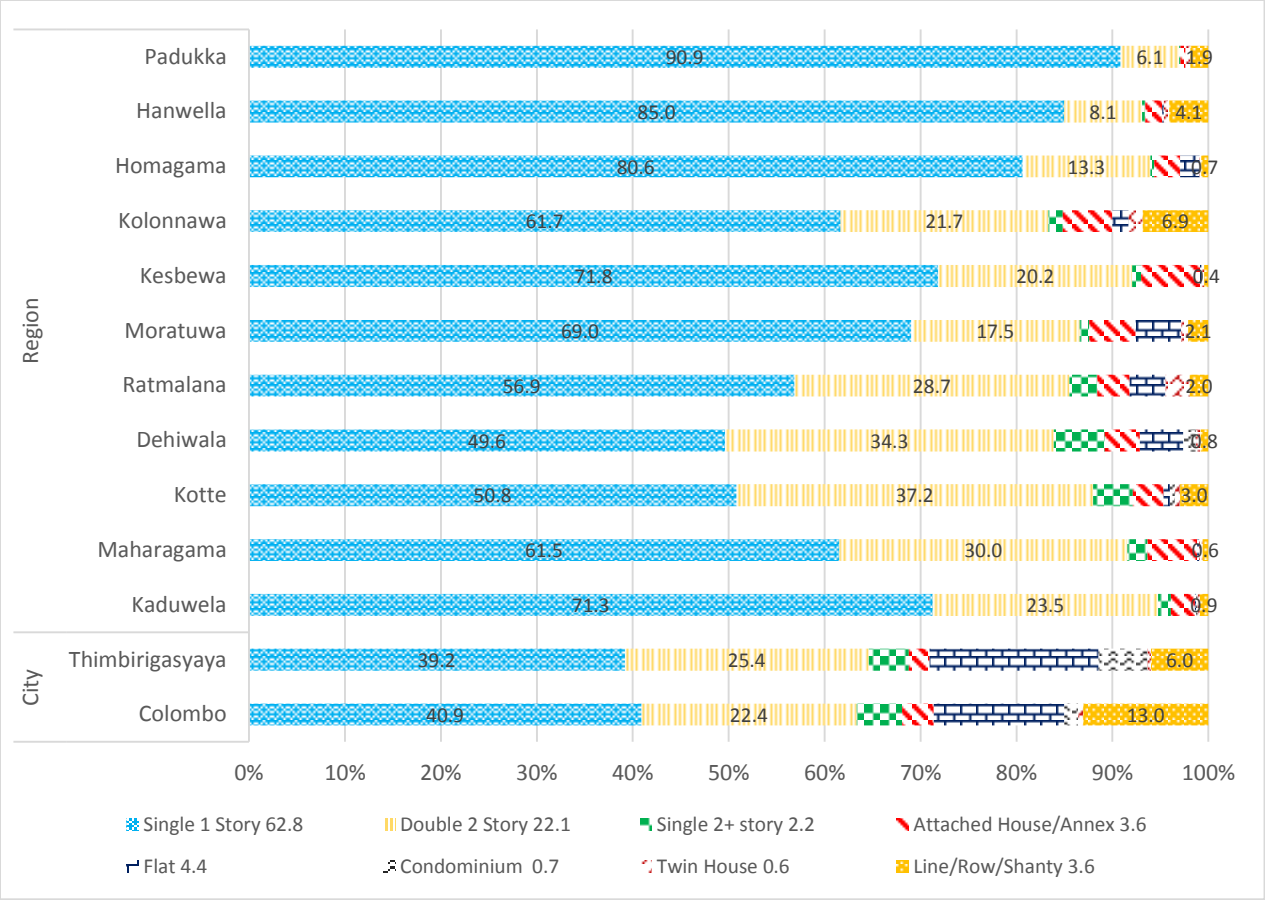
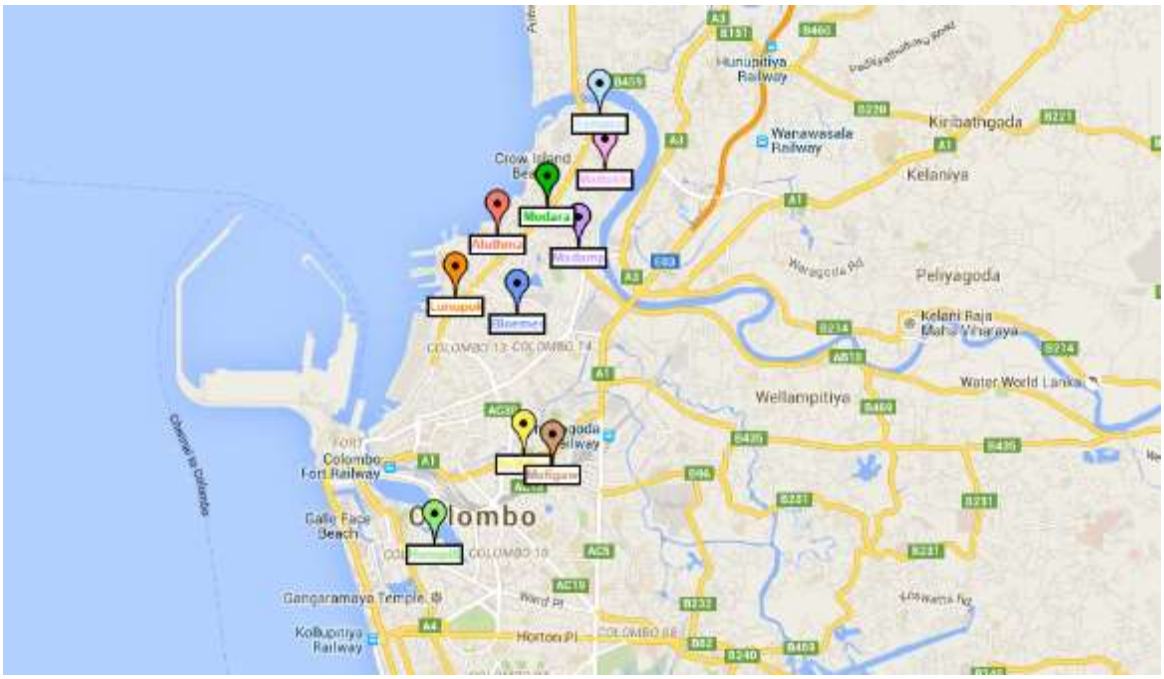


Figure 12. Housing Structure of Colombo City Region (Source: Department of Census and Statistics Sri Lanka, 2012)



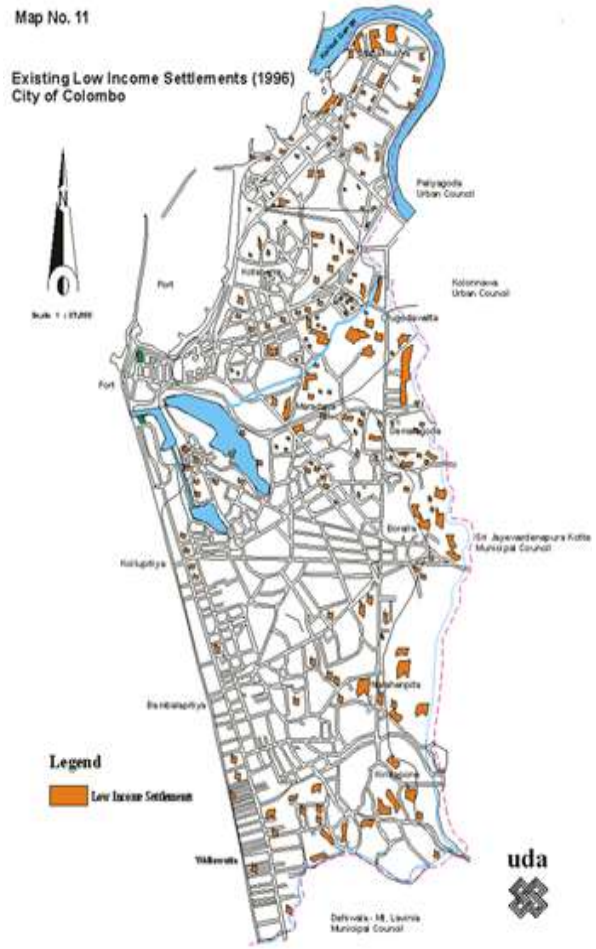


Figure 13. Major Line and Shanty areas in Colombo city – mainly concentrated to the North of Colombo (Source: UDA)

5.3.6. Poverty

Poverty is measured using various indices. In Sri Lanka, poverty line is one of the popular indicators to measure poverty. The poverty line is expected to capture the basic needs necessary to meet minimum living standards[40] and is calculated as Poverty head count index; i.e. the percentage or number of population living below the poverty line. The poverty line is defined by the consumption bundle, which includes food and non-food items. This assessment was conducted during the Household Income and Expenditure Survey (HIES). Hence, poverty line is a good indicator of people having minimum standard of living in terms of their consumption patterns (but includes food and non-food items) and can be considered as an important parameter.

Latest available poverty data at DS division level is in year 2002. Hence, lack of up-to-date data prevents understanding the current status of poverty at city and region level. However, this 2002 data was used to have an overview of the situation.

According to Table 9, poverty line of Colombo district was established at Rs. 1547 per month[41], which is the minimum level of expenditure to fulfill the basic food and nonfood items of people. Poverty head count index of Colombo district was estimated as 6% and the population below the poverty line was 144,106 in year 2002. In Colombo DS division, the head count index was 12% (39,819 people), which is the second highest in all DS divisions. Thimbirigasyaya DS division of the Colombo city had 4% of poverty head count and only 9,672 people lived below the poverty line. Hence, there was a remarkable difference in poverty between the two DS divisions in Colombo city.

Table 9. Poverty in Colombo District (Source: HIES, 2002)

	Head count index %	Population below poverty line
Colombo	6	144,106
Colombo	12.1	39,819
Thimbirigasyaya	4.4	9,672
Kolonnawa	8.2	12,292
Kaduwela	6	11,614
Homagama	6.4	10,797
Hanwella	14.2	12,562
Padukka	10.7	5,439
Maharagama	3.5	5,973
Sri Jayawardanapura	2.7	2,750
Dehiwala	2.1	1,896
Rathmalana	4.2	4,058
Moratuwa	10.3	16,908
Kesbewa	5.2	10,326
Poverty line of Colombo Rs. 1547		

[40] Head count index and population below poverty line by DS division-Sri Lanka 2002

[41] http://www.statistics.gov.lk/poverty/small%20area%20reportNEW.pdf

5.3.7. Engagement in economic activities

Population aged over 15 years are considered as eligible to take up an employment as per Sri Lankan law. According to the latest census statistics, 50% of the population in Colombo districts are employed and only 2% have been considered as unemployed (Figure 14). Rest of the population in Colombo district (48%) categorizes as economically inactive[42]. In CMC area, 47% are employed, 3% unemployed, and 50% economically not active as shown in Figure 14.

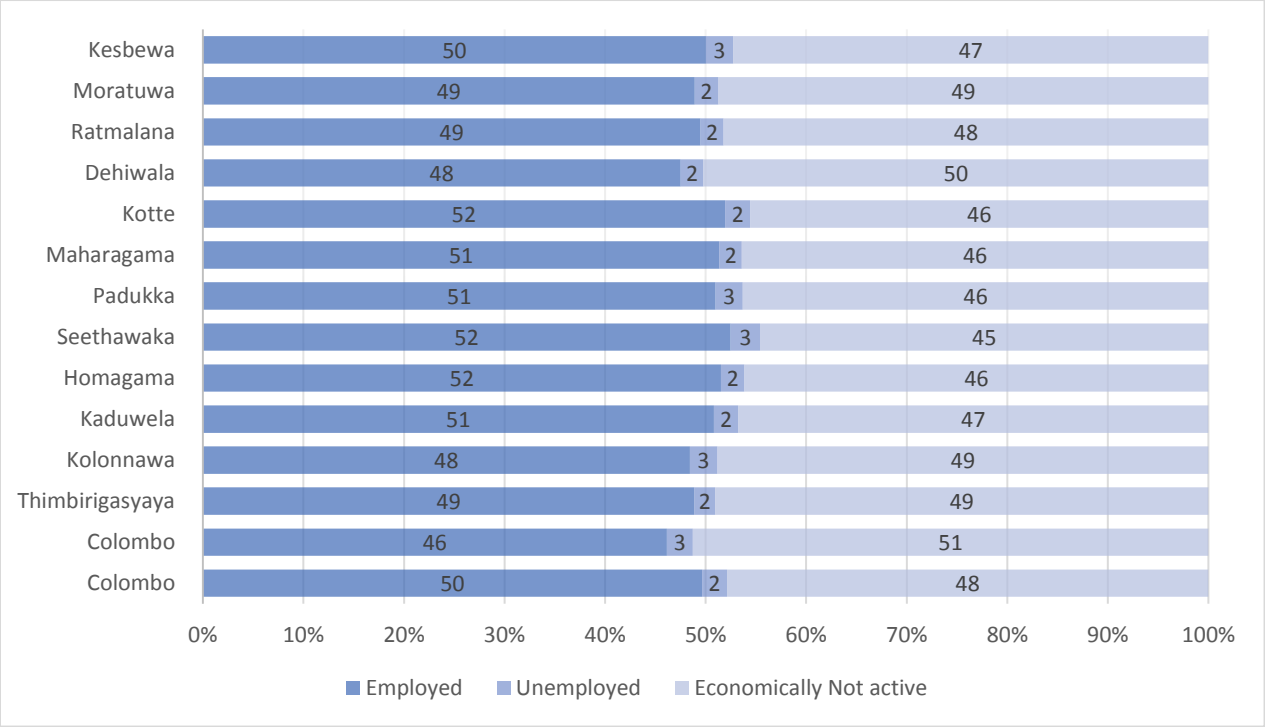


Figure 14. Engagement of economic activities by 15 years or more population in Colombo city region (Source: Department of Census and Statistics, Labor force survey data)

Colombo city, which consists of Colombo and Thimbirigasyaya DS divisions, illustrates less than 50% employment rate. In Colombo DS division, 51% of the 15 years or above age population were economically inactive, which is the highest in the district, when a considerable number of people (out of Colombo) travel to Colombo each day for their employments.

Evidences are lacking to find the exact reasons for economic disengagement, but many economically inactive inhabitants at GN divisions have indicated that people from shanties may not engage in economic

[42] Economically inactive persons means persons who are neither working nor available/looking for work and classified as "not in the labour force." Persons are not in the labour force for such reasons as full time care of the household, full time students, retired or old age, infirmed or disabled, or are not interested in working for one reason or another.

activities. Figure 15 presents the GN divisions with more than 4000 economically inactive inhabitants in CMC area. These GN divisions consist of high number of line houses and shanties in Colombo and Thimbirigasyaya DS divisions. Therefore, socio and economical background of people living in shanties in CMC have increased poverty levels and in return own low living standards. Even though the provincial and district level analysis indicate the western province and Colombo districts have high standard of living in the country, there are regions even within Colombo city where people suffer from extreme poverty levels and its consequences.

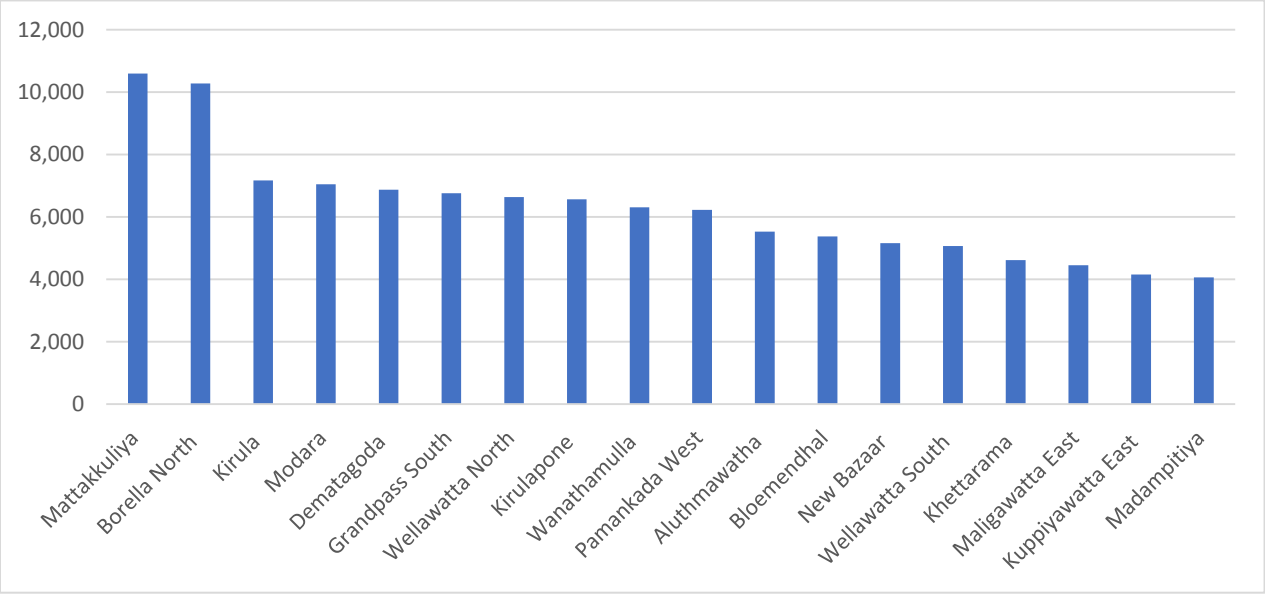


Figure 15. GN divisions with more than 4000 economically inactive people in Colombo city (Source: Department of Census and Statistics, Labor force survey data)

5.3.8. Income Levels

When considering the demographic, Socio-Cultural, standard of living, and economic profile of the CMC, it is noteworthy that the CMC area is not a place with luxuries for everyone. Significant disparities prevail in living standards, economic wealth, and socio-cultural imbalances. Even though Colombo city is the heart of Sri Lanka, there is a significant proportion of marginalized people living in the area. In most cases, their living standard and poverty level seems to be much worse than those of the other regions in Colombo district.

6. CHARACTERIZATION OF THE COLOMBO CITY REGION FOOD SYSTEM

6.1. IDENTIFICATION OF MAJOR COMMODITIES

Owing to the high population density, diversity, and commercial activities, CMC can be identified as the most dynamic and diversified region in Sri Lanka. In comparison to rest of the country, it has created a fast and complex life style. Vastly diversified socio-demographic profile within the CMC has resulted in remarkably diversified food patterns of people.

Even though this diversity is apparent explicitly, any published data or statistics, specific to food consumption patterns in CMC is hardly available. Lack of secondary data availability hinders comprehensive analysis of food patterns in CMC.

This assessment do not intend to collect primary data; instead it uses available literature and statistics on food patterns at district level and the assumptions and methodologies are stated below.

Identification of major food commodities

It is assumed that the expenditure on food items correlate with the consumption level. In other words, the major commodities in use can identify by considering expenditure on each food type. Table 10 presents the commodities, in which the total expenditure is above 1% (by considering the expenditure on food types). In essence, from 2002 to 2012/2013, major commodities or the expenditure levels on the major commodities have not changed substantially. Two main exceptions are the expenditure on rice and fish, which has changed by -4.4% and +2.8% from 2002 to 2012/3. However, it is difficult to make conclusions on the consumption level without an understanding on comparative price fluctuations of the commodities. It is fair to assume that the food consumption pattern (i.e. food plate in general) has remained unchanged throughout the last decade and probably remain so in near future.

Table 10. Changes of expenditure on food since 2002 (Source: HIES 2012/13)

	2012/2013		*2009/2010*		*2006/2007*		*2005*		*2002*	
	Rs	**%**	**Rs**	**%**	**Rs**	**%**	**Rs**	**%**	**Rs**	**%**
Rice	2134	13.6	2298	17.3	1197	13.9	1051	13.8	1052	18.0
Wheat flour	210	1.3	189	1.4	97	1.1	94	1.2	72	1.2
Bread	462	3.0	426	3.2	303	3.5	273	3.6	253	4.3
Condiments	1416	9.0	1209	9.1	803	9.3	687	9.0	532	9.1
Pulses	552	3.5	547	4.1	304	3.5	259	3.4	185	3.2
Vegetables	1279	8.2	1006	7.6	727	8.4	617	8.1	464	7.9
Coconuts	962	6.1	738	5.6	473	5.5	429	5.6	426	7.3
Meat	669	4.3	517	3.9	366	4.2	337	4.4	188	3.2
Fish	1430	9.1	1169	8.8	744	8.6	647	8.5	371	6.3
Dried fish	656	4.2	492	3.7	348	4.0	290	3.8	219	3.7
Milk and Milk products	1389	8.9	1038	7.8	754	8.7	748	9.9	489	8.4
Eggs	160	1.0	134	1.0	85	1.0	78	1.0	47	0.8
Fruits	461	2.9	386	2.9	294	3.4	296	3.9	212	3.6
Sugar	459	2.9	452	3.4	315	3.6	248	3.3	193	3.3
Other Food and Drinks	3412	21.8	2672	20.1	1831	21.2	1539	20.3	1144	19.6
Total	**15651**	**100.0**	**13273**	**100.0**	**8641**	**100.0**	**7593**	**100.0**	**5847**	**100.0**

In Sri Lankan food culture, rice (the major staple food), and occasionally bread, are consumed with curries, which require different flavours of condiments and coconut milk. Surprisingly, spending on condiments is the second highest percentage spent on a single food item, which is an average of 9%. Other than these identifiable food items, higher proportion of total food expenditure is spent on unclassified food items, such as drinks, restaurants and hotel meals, etc., which amounts to more than 20%. Table 10 provides further details. Annex 9 and Annex 10 show the average monthly consumption in quantities and average monthly expenditure in district level respectively.

Box 6.1

HIES does not cover for 2014, but it has evidence for a huge increase in wheat importations as shown in Table below (Wheat is not cultivated in Sri Lanka and totally depends on imports). This may be an indicator that wheat consumption (consumption of commodities) depend on other factors (such as price) than changes to the diet. Further details on other commodities can be found in Annex 5.

Wheat import quantity

(Source: http://www.indexmundi.com/agriculture/?country=lk&commodity=wheat&graph=imports)

YEAR	IMPORT QTY '000 MT	INCREASE (USING 2009 AS THE BASE)
2009	1257	0 %
2010	1232	-1.99 %
2011	1108	-11.86 %
2012	892	-29.04 %
2013	773	-38.50 %
2014	1200	-4.53 %

Irrespective of diverse nature of the community, rice is the staple food of all Sri Lankans. An average Sri Lankan has spent 14% of total food expenditure on purchasing rice in year 2012-2013, which was 17% during the year 2009/2010.

Figure 16 presents major food commodities consumed in Sri Lanka. As CMC has a highly complex socio-demographic profile and owes a busy and a fast life style compared to rest of the country, it is uncertain whether the major food commodities of the CMC are same. Data representing CMC is not available; however, HIES 2012/2013 data of Colombo district depicts that same commodities identified for national level fits to district level, as illustrated in Figure 16. Considering Boxes 6.1 and 6.2, it can be concluded that the main commodities remain same despite community diversities and income levels.

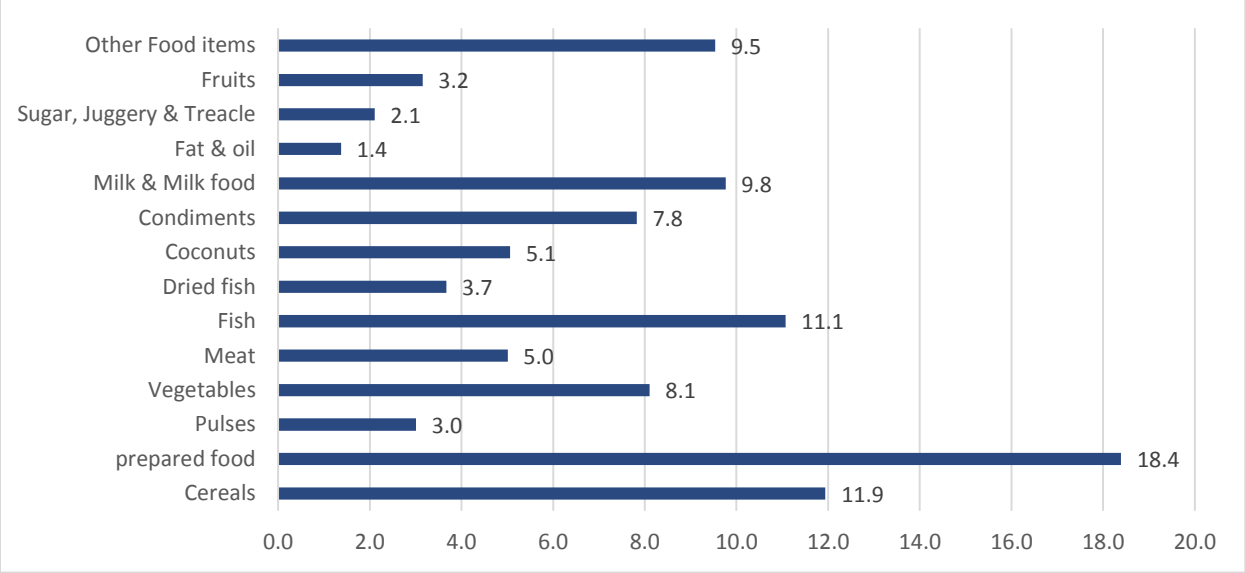
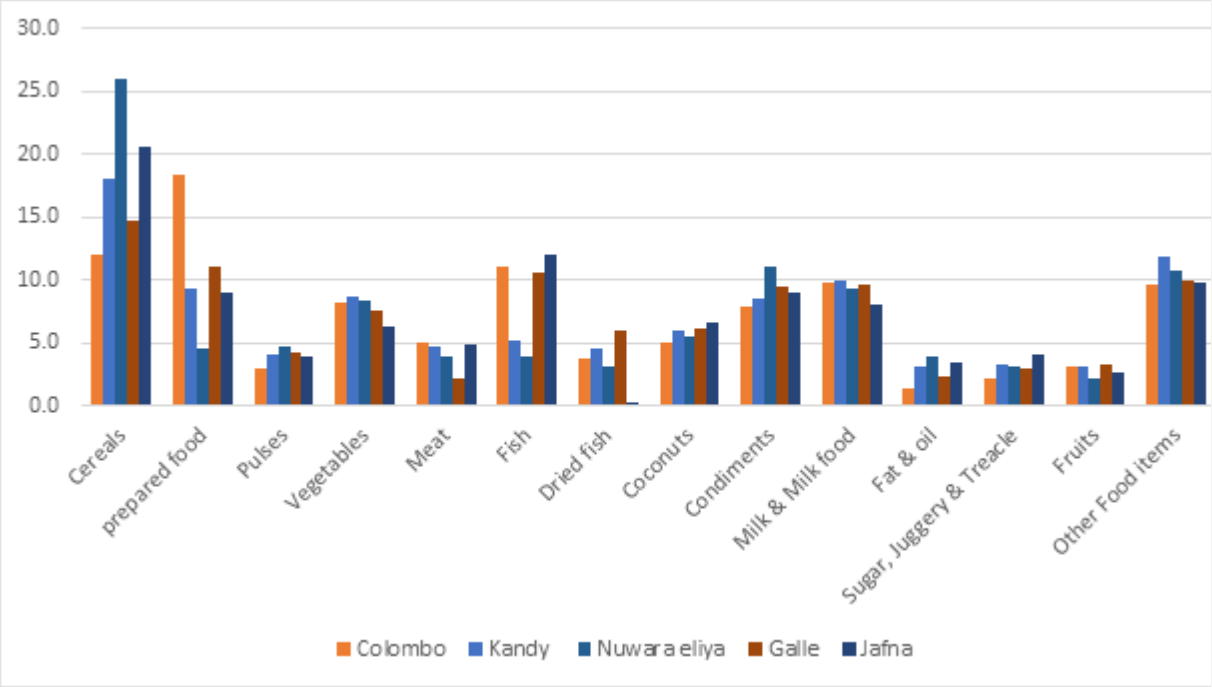


Figure 16. Food expenditure pattern in Colombo (%) (Source: HIES 2012/13)

There are 12-13 major commodities identified for Colombo district that complies much with the commodities in national level. The busy and fast lifestyle in Colombo poses a high demand for prepared foods. In CMC, there are many caterings for different income segments of the population. In year 2012/2013, out of the total food expenditure, spending on prepared foods was 18.4%, which is the highest proportion among all food items. Prepared food includes bakery products, hoppers, string hoppers, and pittu etc., which are wheat or rice-based food items. Other food items mainly consist of eating outs and drinks. Figure 16 produce detailed data on monthly expenditure on major commodities.

Box 6.2

Comparing Colombo's expenditure on food with selected other districts from North (Jaffna, majority of Sri Lankan Tamil community), South (Galle, Sinhalese community in coastal area) and Central region (Kandy, Sinhalese of the up country area and Nuwara eliya, Indian Tamil community) representing different ethnic groups reveal that cereals, meat, fish, and prepared food consumption have variations than other commodities. However, main food commodities in consumption remain the same.



Food expenditure pattern on selected districts (%) (Source: HIES, 2012/13)

Majority of Colombo population consists of middle-income citizens, next to hardcore poor citizens. The food consumption and the commodities in use can be very much different between these two groups. It was not possible to find a study assessing food consumption patterns of the two groups in CMC. However, when compared with per capita daily food intake of respondents in Malabe (middle income residential close to the CMC area) with respondents in Hunupitiya (low-income settlement in CMC), a significant difference in food intake in these two regions was evidenced as presented in Figure 17. Accordingly, average rice consumption of Malabe area is very high, which is also higher than the national average daily rice intake. Furthermore, fruits, coconut, and fish intake in Malabe is somewhat higher than Hunupitiya low-income area. Comparatively, low-income settings in Hunupitiya utilizes relatively higher quantity of wheat products (probably because consuming bread need only few curries), and vegetables (probably leafy vegetables due to cheap prices), and marginally high meat consumption (probably due to high percentage of Buddhists in Malabe area). However, major commodities in consumption seem the same (with variations to the quantities in consumption) regardless of different income levels.

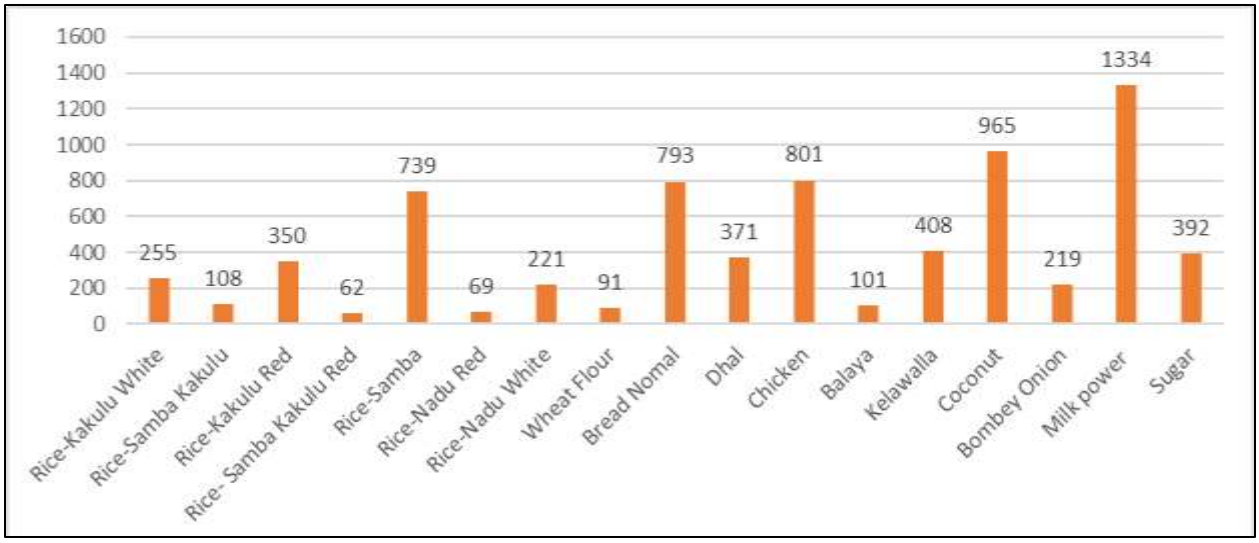


Figure 17. Average Monthly expenditure (in LKR) on selected food items in Colombo (Source: HIES 2012/13)

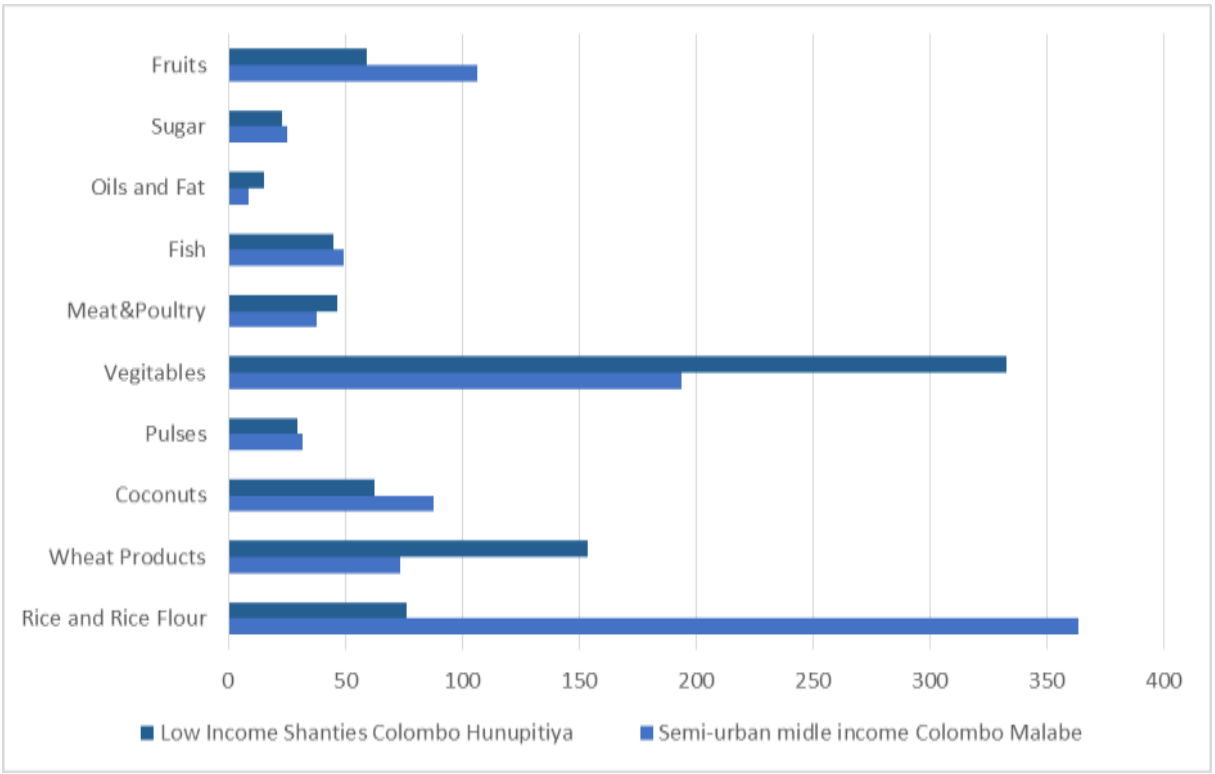


Figure 18. Comparison of Food intake between Hunupitiya and Malabe

Even though the average daily food consumption pattern may be different among sub-communities, lack of adequate data prevents assessing this for CMC area. HARTI (2014) conducted a survey on Paddy farming communities, Chena Farmers, Semi-urban middle-income dwellers, Estate Tamils, Low-income urban dwellers in Shanties, and Muslim communities in various locations in Sri Lanka. The findings suggest a significant difference in food patterns among different communities in Sri Lanka (Figure 18).

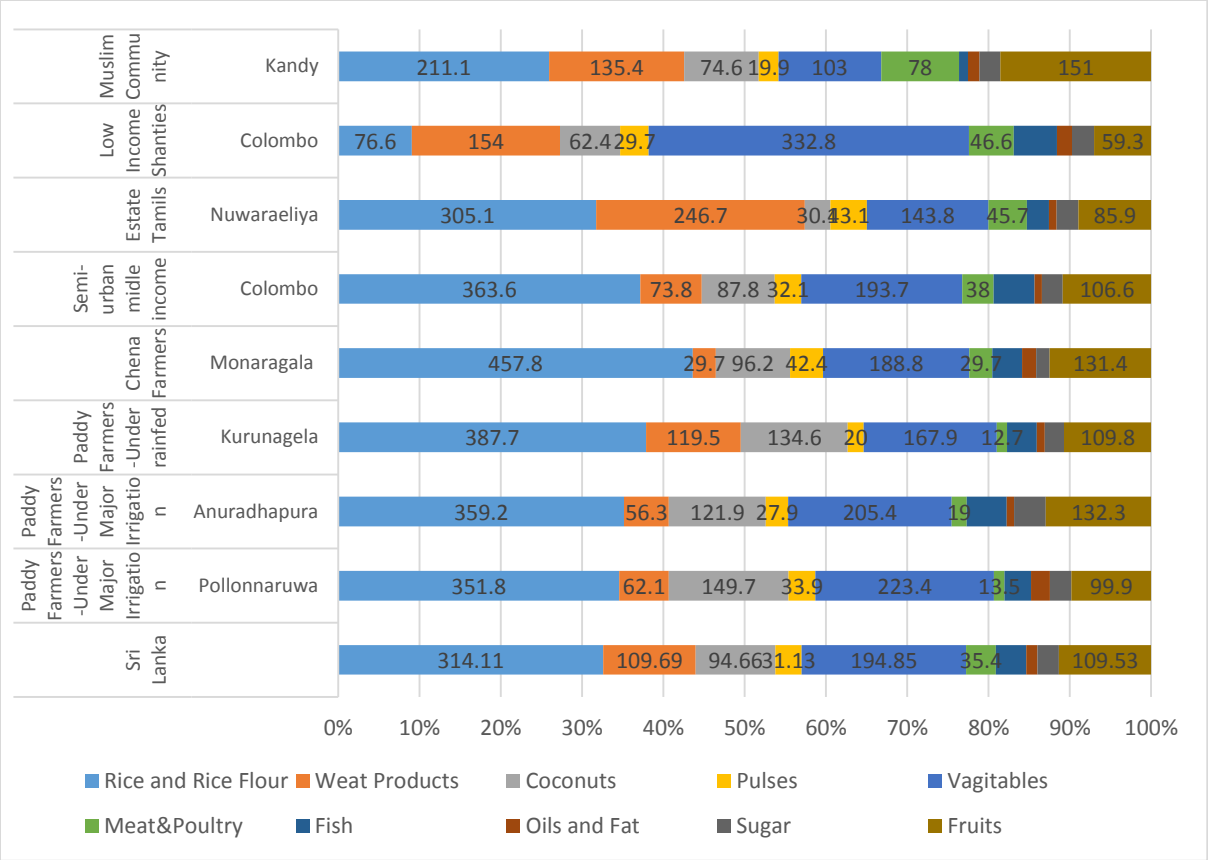


Figure 19. Consumption of selected food items (in grams) by different segments in Sri Lanka (Source: HARTI, 2014)

With ethnic diversity, there are deviations in food consumption patterns; for example, Estate Tamils consume a large proportion of wheat products per day than Muslims and Muslim communities in general consume high amount of meat than any other communities in Sri Lanka. Incidentally, they are the least consumers of fish (Figure 19).

It was evident that depending on the income, religion, ethnicity, geographical area lives in, and livelihood, a significant difference prevails in food consumption patterns, though major commodities identified remain the same. However, huge data gaps in this area affect arriving at conclusions. Possibly, the same commodities may aid conducting assessments in any other part and community in Sri Lanka.

Highlights

Around 12-13 (depend on whether prepared food is considered as a commodity or part of the cereal-based commodity) major food commodities are in consumption by assuming they can be listed base on the expenditure. The selection criteria was the spending on a single food commodity is higher than 1%, to select it as a major commodity. Regardless of the income, geographical location, livelihood, urban or rural, ethnicity, and religion, the commodities in use seem to be the same (i.e. major 12-13 commodities are similar). The quantity of the commodities in use may vary.

6.2. FOOD AND NUTRIENT SECURITY

6.2.1. General overview

FAO 2001 (The State of Food Insecurity in the World, 2001) adopted the definition that, "Food security is a situation that exist when all people, at all times, have economic, physical, and social access to sufficient, safe, and nutritious food that meet their dietary needs and food preferences for an active and healthy life." According to FAO (2002), food insecurity is conceptualized as a phenomenon, which needs consideration of hunger and the risk of future hunger. The definition on food security used in the *Declaration of the World Summit on Food Security* (FAO, 2009) implies that, 'food security is very much a multidimensional phenomenon, with the final outcome being an adequate intake of food energy and nutrients'. With regard to adequacy of nutrients, many researchers [including Naiken (2003), Nanayakkara and Premaratne (1987), and Nanayakkara (1994)] supported that food gives the required dietary energy from proteins and other nutrients, and argued the focus on the energy intake is sufficient. In general, food energy intake is considered as an indicator of food insecurity.

Ability to pay and accessibility to food directly affects food and nutrient security and the calorie intake of a person. In the CMC context, the accessibility to commodities is not an issue. The FAO assessment[43] on vulnerability to food insecurity of Sri Lanka in 2003 indicates that, not only CMC but also the entire Western Provincial Council is not vulnerable to food insecurity as presented in Figure 20 If food insecurity exists, it is due to the inability to pay or the result of any other reason.

[43] http://www.fao.org/docrep/006/j2253e/j2253e00.htm

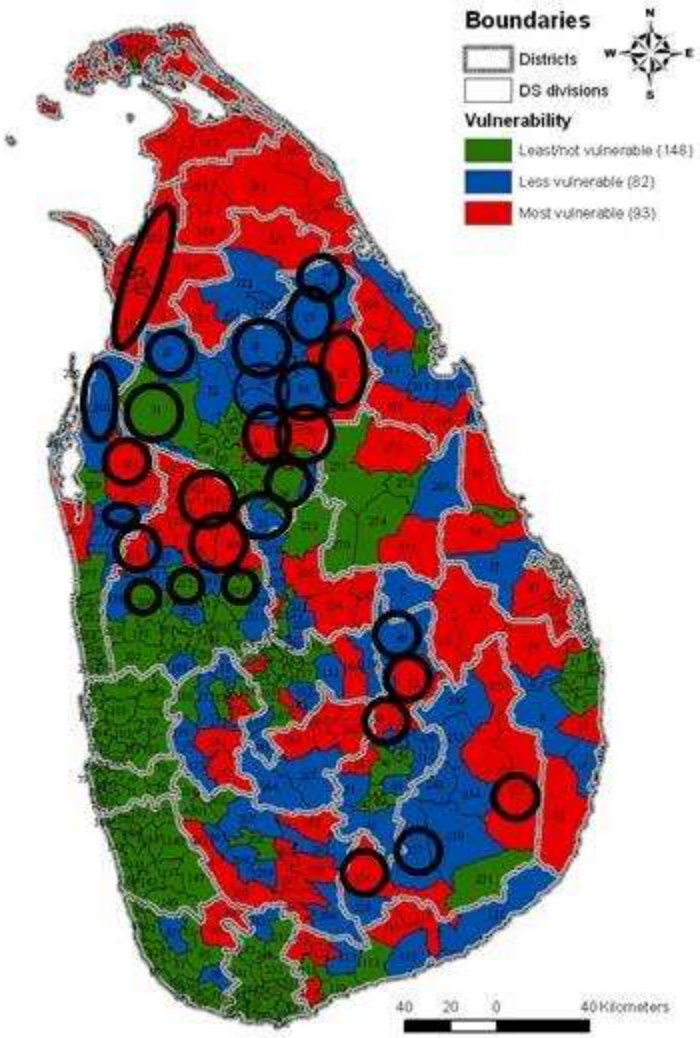


*Figure 20. Vulnerability to food insecurity of Sri Lanka 2003 (Source: FAO, 2004) *area circled are drought prone areas*

The minimum daily calorie requirement values are proposed after considering various factors. According to Food and Agriculture Organization (FAO, YEAR), 1810 kcal is the general Minimum Dietary Energy Requirement (MDER). However, in Sri Lanka, 2030 kcal per capita is considered as the MDER for compilation of official poverty line. Since most of the existing local studies referred 2030 kcal value, this Sri Lankan standard was used to measure food insecurity level in the present study. Sample survey results on obese and overweight can be found in Annex 4.

Nutrient security is achieved by inclusion of vital nutrient components in daily diets. Careful analysis of the daily food basket of an average Sri Lankan reveals the largest proportions of supplied nutrients:

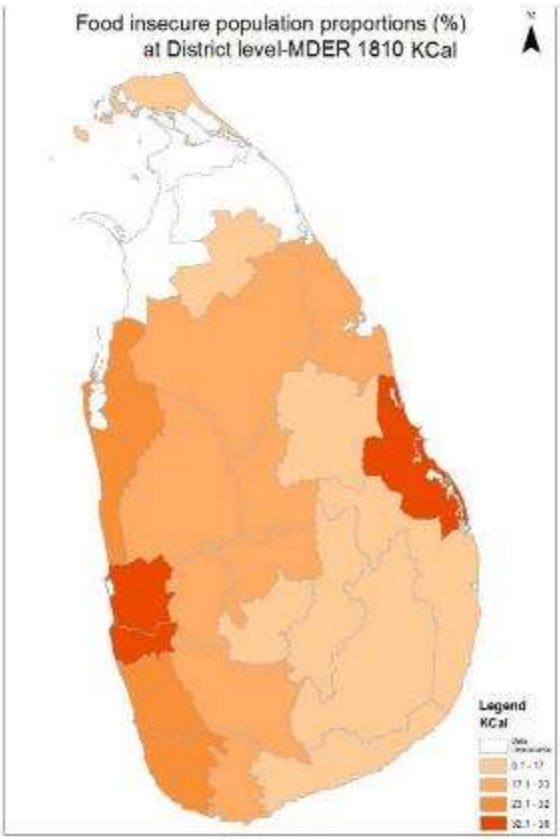
Table 11. Commodities for major nutrients

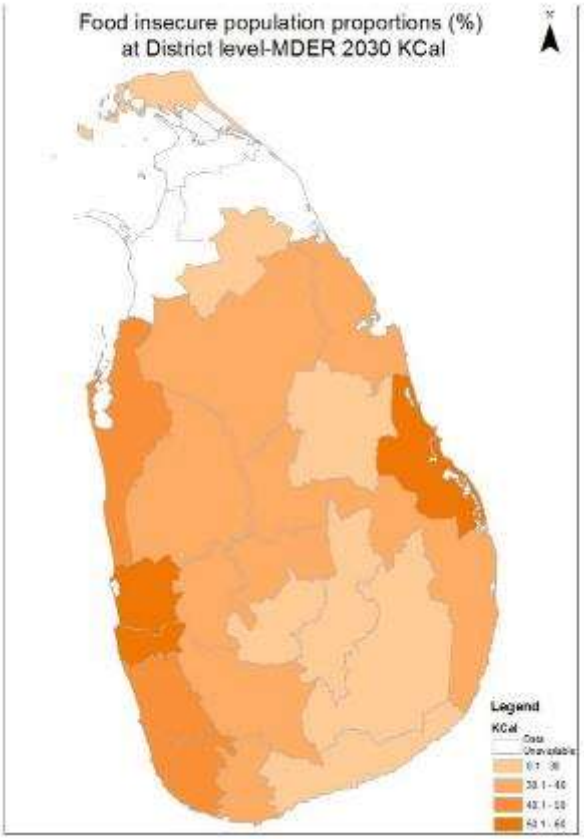
Nutrient	Commodity
Carbohydrate	Rice, Wheat
Fat & lipid	Coconut, Oil
Protein	Fish, Dry fish, Meat, Milk, Rice
Vitamins	Fruits, Vegetables

Mayadunne and Romeshun (2013) compared district calorie intake of 2006/2007 and 2009/2010 years. Percentage proportion of the population under 1810 KCL MDER and 2030 KCL MDER between the periods of 2006/2007 and 2009/2010 by district level are indicated in Figure 21. Accordingly, 18.9% of the population in Sri Lanka does not receive 1810 KCL MDER and over one third of the population has not achieved 2030 KCL MDER level in 2009/2010.

The situation is worse in Colombo district. Remarkably, more than one third of the population in Colombo has not achieved 1810 KCL level whereas over half of the population in Colombo district has not reached 2030 KCL MDER level[44]. Colombo as the highly urbanized district in the country also records the worst ratings for food insecurity among all districts. The reason may be due to the food dependency that creates a price for each food item available, which could possibly be unreachable for the poorer sections of the Colombo population. Though secondary data is not available to justify, the income level and food consumption pattern suggests that people in low-income settlements in Colombo lives below the minimum required caloric intake level per person.

[44] Mayadunne & Romeshun, 2013





District	2006-2007 Data		2009-2010 Data	
	MDER 1810 Kcal	MDER 2030 Kcal	MDER 1810 Kcal.	MDER 2030 Kcal
	%	%	%	%
Sri Lanka	18.7	37.5	18.9	37.0
Colombo	35.6	55.5	38.0	58.3
Gampaha	37.7	57.9	34.0	54.8
Kalutara	24.6	43.0	27.1	45.7
Kandy	18.7	34.1	20.3	36.5
Matale	23.0	38.9	22.7	38.5
Nuwara Eliya	14.7	27.1	8.6	18.7
Galle	29.6	47.6	30.5	49.3
Matara	26.1	43.9	22.0	39.8
Hambantota	16.7	30.6	17.0	30.0
Kurunegala	22.3	37.8	21.1	36.2
Puttalam	25.8	40.9	29.1	46.6
Anuradhapura	20.8	35.2	20.1	36.3
Pollonnaruwa	18.6	32.9	14.3	26.6
Badulla	18.1	33.5	14.3	28.2
Moneragala	16.7	30.6	11.2	22.1
Ratnapura	21.1	36.5	20.2	35.2
Kegalle	27.5	44.9	22.3	38.4
Batticaloe	20.4	35.2	32.2	50.4
Ampara	17.8	32.9	16.7	31.3
Trincomalee	n.a[4]	n.a	23.1	37.3
Jaffna	n.a	n.a	14.1	26.1
Vavuniya	n.a	n.a	10.0	20.8

Figure 21. Proportion population living under 1810 and 2030 KCAL intake in Sri Lanka (Source: Mayadunne,)

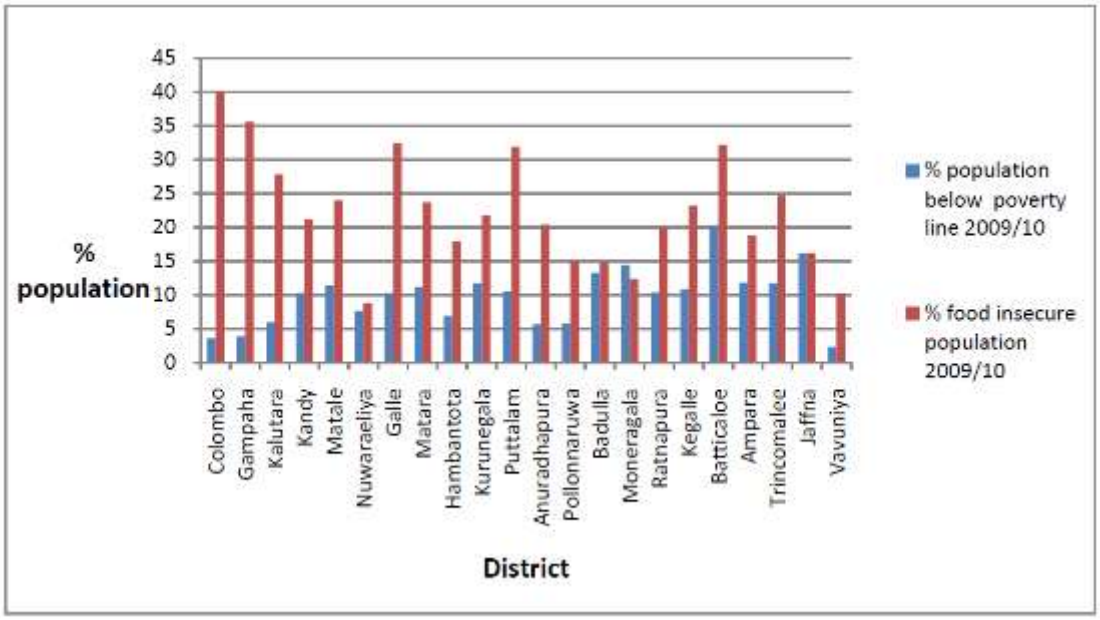


Figure 22. Poor and food insecure population based on 2009-2010 HIES data

Contrary to our expectations, comparison of District rankings based on prevalence of food insecurity, and rankings based on official poverty estimates of the DCS (Department of Census and Statistics, Sri Lanka 2008c, 2011) proved that poverty and food insecurity should move in the same direction. Figure 22 illustrates that Districts with lower levels of expenditure poverty (Department of Census and Statistics, Sri Lanka 2008c, 2011, 2014) have no prevalence of food insecurity and vice versa. Districts of Colombo, Gampaha, and Kalutara with low poverty levels present high food insecurity, while Nuwara Eliya, Moneragala, and Badulla, which have high poverty levels portrays low food insecurity. High food insecurity in Districts with low levels of poverty may result from low expenditure on food, and particularly, low expenditure on energy yielding staples, despite higher levels of total expenditure on food and non-food, which qualifies a household to be above the poverty line.

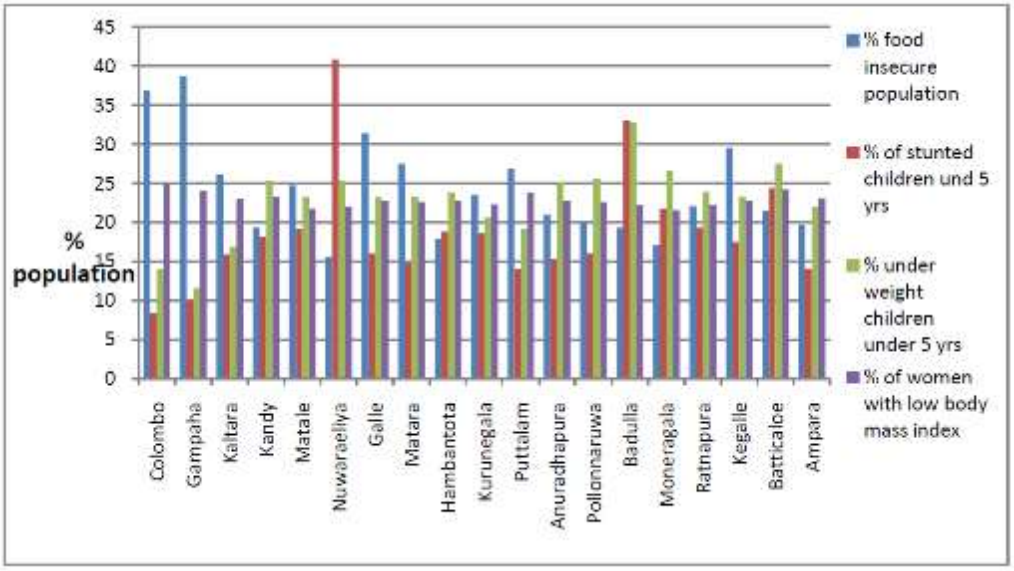


Figure 23. Food insecurity and nutrition outcomes

If staples are high-energy sources compared to non-staples, the analysis indicates that districts having a higher share of energy from staples in the diet result in low nutrition outcomes. This point out the necessity to re-think the assumption [which was based on literature Naiken (2003), and Nanayakkara and Premaratne (1987)], "Food giving dietary energy bring along with it the protein and other nutrients." This observation indicates the potential to improve the food insecurity measure by accommodating other nutrient concerns in the estimation of prevalence of food insecurity. As illustrated in Figure 23, nutrient security is comparatively higher in Colombo district than other districts, regardless of the high level of MDER recorded.

Box 6.3

Food Security vs. Nutrition Security?

Food security and nutrition security are quite different terms, often used interchangeably in the literature. Food security, an important input for improved nutrition outcomes, is concerned with physical and economic access to food of sufficient quality and quantity in a socially and culturally acceptable manner. Nutrition security is an outcome of good health, a healthy environment, and good caring practices, in addition to household-level food security. For example, a mother may have reliable access to the components of a healthy diet, but due to poor health or improper care, ignorance, or personal preferences, she may be unable or may choose not to use the food in a nutritionally sound manner, thereby becoming nutritionally insecure. A household achieves nutrition security when secure access to food couples with a sanitary environment, adequate health services, and knowledgeable care to ensure a healthy life for all household members. A family (or country) may be food secure, yet have many individuals, who are nutritionally insecure. Food security, therefore, is often a necessary but not a sufficient condition for nutrition security.

Source: World Bank 2006a

6.2.2. Malnutrition among Children

Food intake influences the nutritional status of an individual largely, but it is not the only critical factor responsible for malnutrition, particularly with children under five years of age. Living standards, water and sanitation, birth weight, birth interval, weaning practices, and mother's education, are a few important contributory factors revealed by research studies on the subject in recent past. However, dietary inadequacy is certainly the basic cause of malnutrition in preschool children, and many above identified factors directly or indirectly contribute to malnutrition (Department of Census and Statistics Sri Lanka, 2000).

According to the UNICEF, Sri Lanka is a country that suffers no significant food shortages and provides extensive, free maternal and child health services. However, malnutrition affects nearly one-third of children and one quarter of women.
In Sri Lanka:

- Almost one out of five children is born with low birth weight; around 29 per cent under-fives are reported to be underweight, and in some deprived districts, it rises as high as 37.4 per cent;
- When weight of children under-five years is compared to the weight of a normal child of the same height, it reveals 14 percent of them suffer from acute malnutrition (wasting);
- Nearly 58 per cent of infants between 6 and 11 months and 38 per cent children between 12 - and 23 months are anemic[45].

Box 6.4
Several criteria assist identification of malnutrition among children. According to UNICEF, definitions of such criteria are:

I. Stunting: A child whose height for age is below -2 SD from the median of the reference population is considered short for his/her age, or "stunted," a condition reflecting the cumulative effect of chronic under nutrition. Those that have height for age values less than - 3 SD are considered as 'severely stunted';
II. Wasting: A child whose weight for height is below -2 SD from the median of the reference population is considered as "wasted," a condition reflecting the effect of short term under nutrition. Those that have weight for height values less than -3 SD are considered as 'severely wasted';
III. Underweight: A child whose weight for age is below -2 SD from the median of the reference population is contemplated as "underweight." Those that have weight for age values less than -3 SD are considered as 'severely underweight';
IV. Overweight: A child whose weight for height is above +2 SD from the median of the reference population is considered as "overweight" (UNICEF, 2012).

[45] http://www.unicef.org/srilanka/activities_1667.htm

According to Figure 24, in Colombo district, 17% of the children are at wasting category, and 16.3% at underweight category. Further, there were 8% in the stunting category. The overall situation of Colombo is not worse than the national average, yet is not satisfactory.

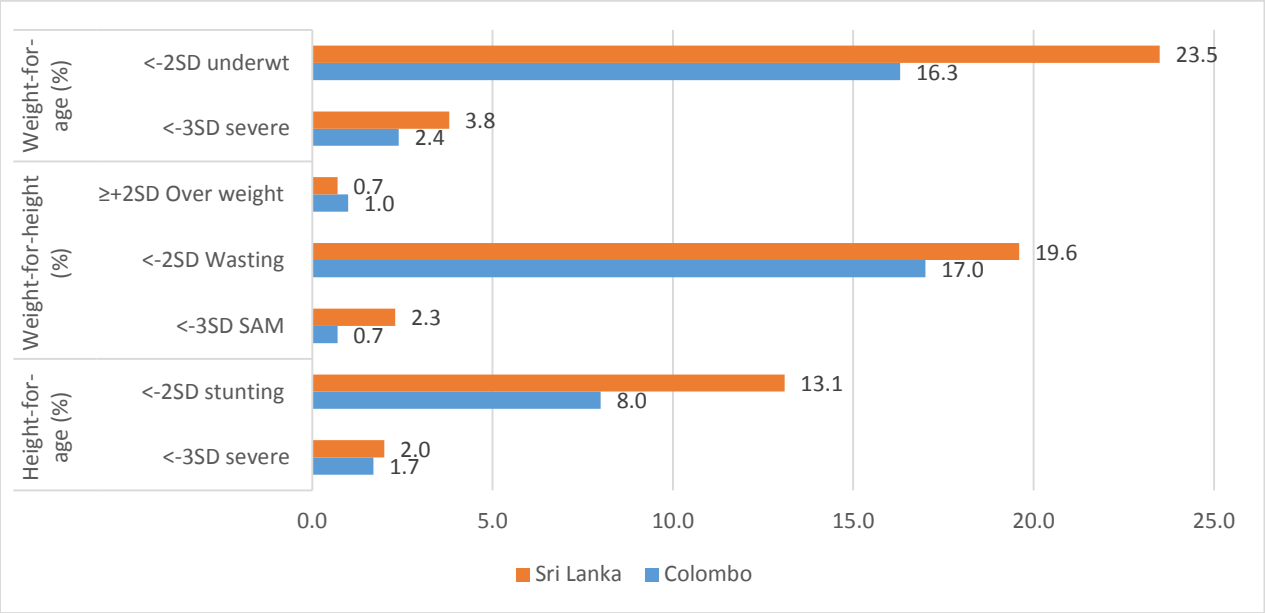


Figure 24. Malnutrition situation among Children in Colombo and Sri Lanka (Source: Adapted from UNICEF's National Malnutrition and Micronutrient Survey 2010)

Income poverty is identified as the main cause for child malnutrition, but is not the sole cause for the problem. Children in Colombo district face an unbearable competitive education system. There is a remarkable demand for national schools located in Colombo city and sometimes students from distant locations in Colombo region attend city schools on a daily basis. They have to start their journey to school early in the morning and return home late afternoon. Most of these children participate in private tuition classes directly from school and return home in the evening. This practice has kept children away from home breakfast and lunch. In most occasions, they tend to eat homemade light diet, or junk food. Schoolchildren have faced a serious dietary inadequacy that might lead them to malnutrition problems[46]. Data covering the CMC area is unavailable; however, data on Colombo district shows a worse situation, which could be same in the CMC area.

[46] In-depth explanation of the nutrition and food security assessment in Sri Lanka is available in Medical Reserach Institute - Nutrtion and food security assesment in Sri Lanka, 2009)

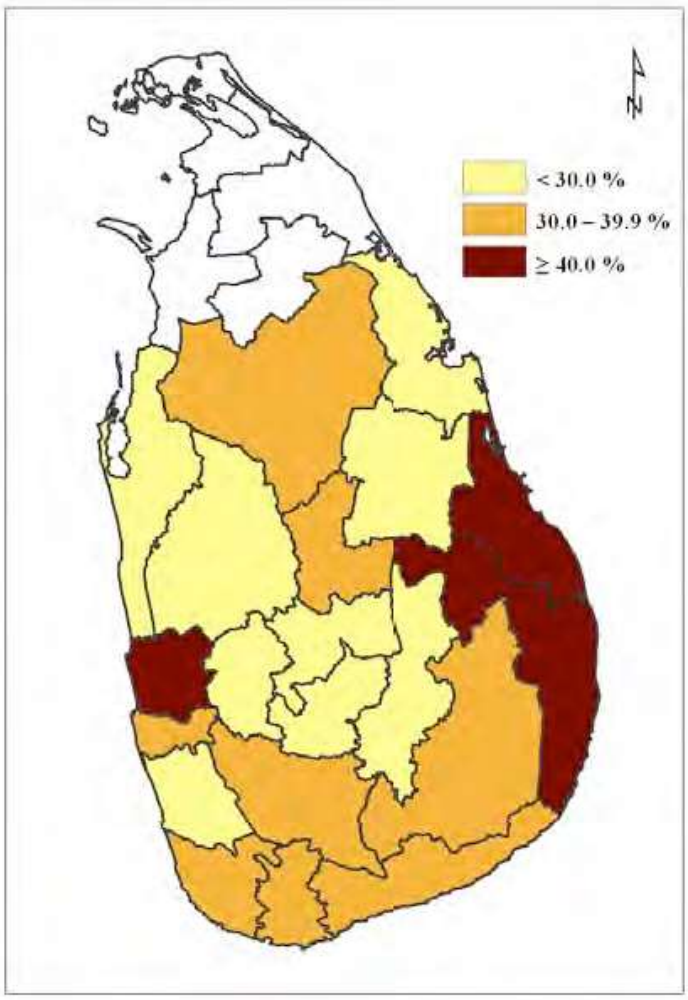


Figure 25. District distribution of anemia in children of 6-59 months of age (Source of data: DHS, 2006 - 07)

DHS (2006-2007) presents 30-39.9% of under 5 years age children are suffering from anemia in Colombo district (Figure 25). The NFSA 2009 found that Jaffna, Ratnapura, Colombo MC, and Trincomalee districts have a high prevalence of anemia among pregnant women. In CMC area, the prevalence of anemia among pregnant women was noted as the highest in the country, which was 28.6%. When all non-pregnant and lactating women are considered, the CMC depicted the deficiency percentages to be higher than the national average between both groups.

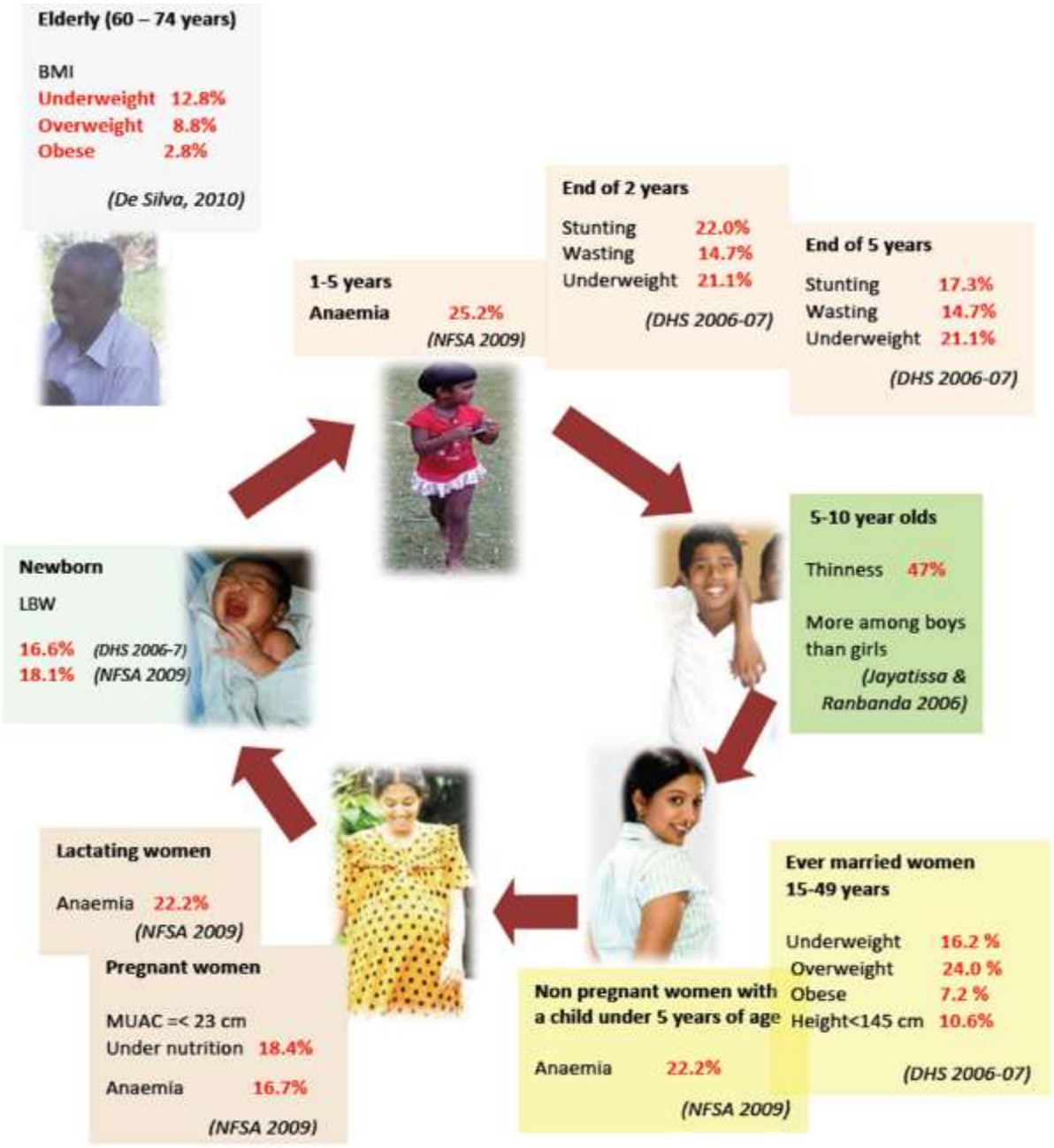


Figure 26. Cycle of malnutrition of Sri Lanka (Source: UNICEF's National Malnutrition and Micronutrient Survey, 2010)

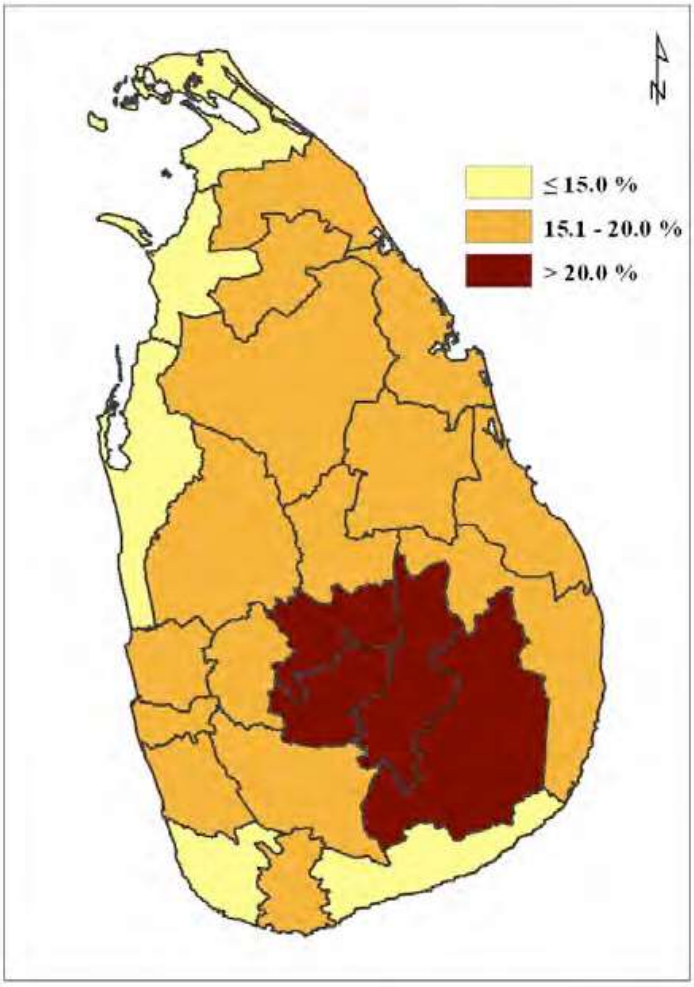


Figure 27. District distribution of Low Birth Weight (IMMR, unpublished, based on 2008 data)

Figure 26 presents the cycle of malnutrition in the country and how it continues throughout the life cycle of citizens. Only a limited data is available on the CMC area or Colombo district. However, CMC area probably faces similar challenges as other parts of the country or similar to national average. For an example, the national Low Birth Weight percentage vary from 16.6% to 18.1% and with respect to Colombo district, this stands at 15.1% to 20%, and very similar to the national scenario (Figure 27).

Highlights

The CMC area is not vulnerable to food security in the sense of physical and social aspects. The economic access to food would be the reason for any resulting food insecurity. No data exists in CMC level but situation of Colombo districts is comparatively worse than other districts. More than one third of the population in Colombo has not achieved 1810 KCL level whereas over half of the population in Colombo district has not reached 2030 KCL level. All three districts under Western provincial council (Colombo, Gampaha, and Kalutara) have low poverty levels but high food insecurity. Contrary to the above findings, the nutrient security is comparatively higher in Colombo district than other districts, despite high level of food insecurity.

6.3. FOOD PRINTERS AND SUPPLY CHAIN OF FOOD ITEMS

As discussed previously, there are 13 major commodities in consumption in Sri Lanka. Household income and expenditure survey identified more than 250 major food items in use, which were slotted into 13 commodity categories. There are endless varieties of food items devoured by consumers; however, a comprehensive analysis of each item is difficult to perform. Note: Food prices and food import quantities can be found in Annex 7 and Annex 8).

This section will present a detailed discussion on overall food production and their market mechanism. Flow of the identified 13 commodities can broadly represented as in Figure 28.

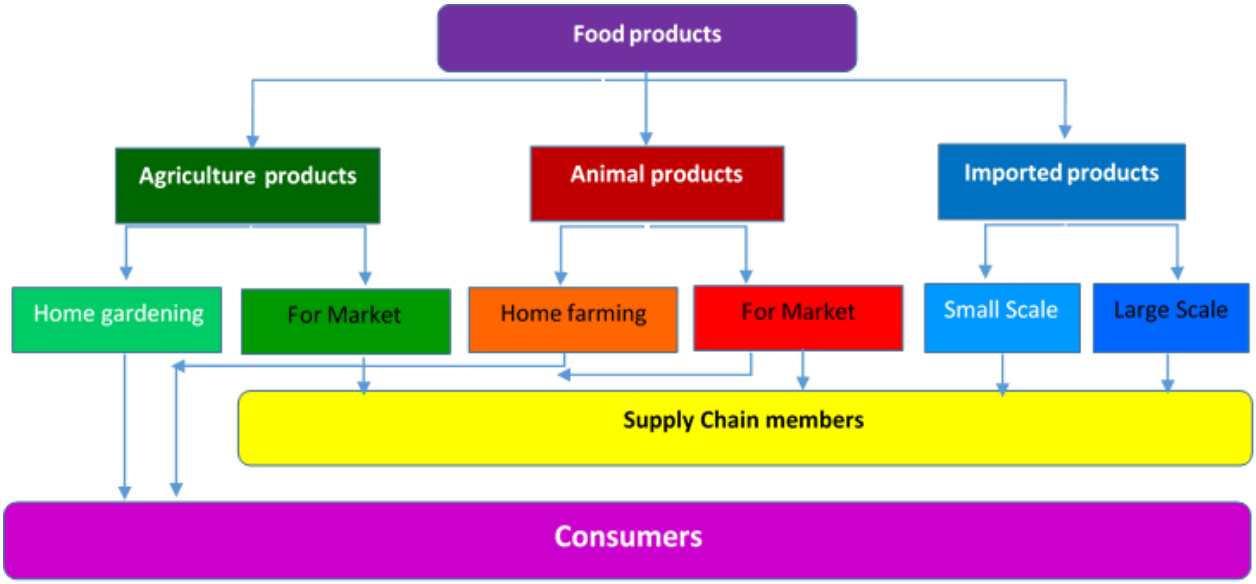


Figure 28. Hierarchy of food printers

6.3.1. Small Scale Food Printers for Consumption

Hardly any agriculture food production is noted in Colombo city (CMC area). Even in its regions, large-scale food production is not available as shown in Figure 29. Hence, almost all agriculture and animal food products in Colombo city are printed in other regions in Sri Lanka or imported from other countries (Department of Census and Statistics, 2015). Although there is hardly any production in Colombo, there are sizable small scale agri-preneurs[47] who are engaged in farming in rural areas in Colombo region and other districts, either with consumption or with commercial interests. According to agricultural activities economic census 2013/14, these small-scale farmers are divided into two categories based on the land size and purpose of farming.

1. Less than 40 perches of land used for agriculture/animal farming for consumption purposes

[47] Agripreneurs are a new breed of entrepreneurs combining their love of farming and agriculture with business.

2. Higher than 40 perches of land used for agriculture/animal farming for commercial purposes

According to the census, there are 1,983,401 small-scale agriprenuers with less than 40 perches of land use for agriculture/animal farming for consumption purposes in Sri Lanka during the year 2014. Remarkably, 37% of them are from the Western province. Gampaha district has the highest number of such agriprenuers (330,177), Colombo district the second highest (239,969) and Kalutara (155,775) district become third. The lowest number of argiprenuers is reported in North Central Province, which is a large agrarian region (GIS map on the distribution is illustrated in Appendix 9). However, in CMC area, the number of agriprenuers is low. Further, female involvement in farming in Sri Lanka is relatively low in all districts (refer Figure 30 below. Female farmer percentage is marked in pink for each district).

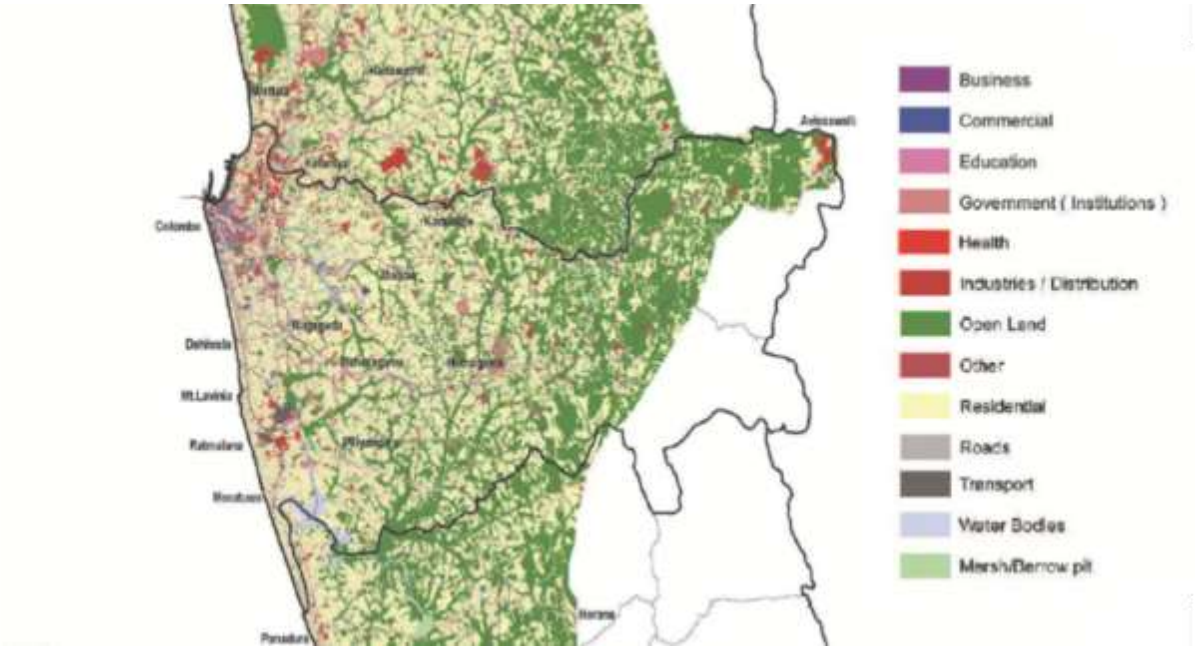


Figure 29. Land use pattern in CMC and its suburbs

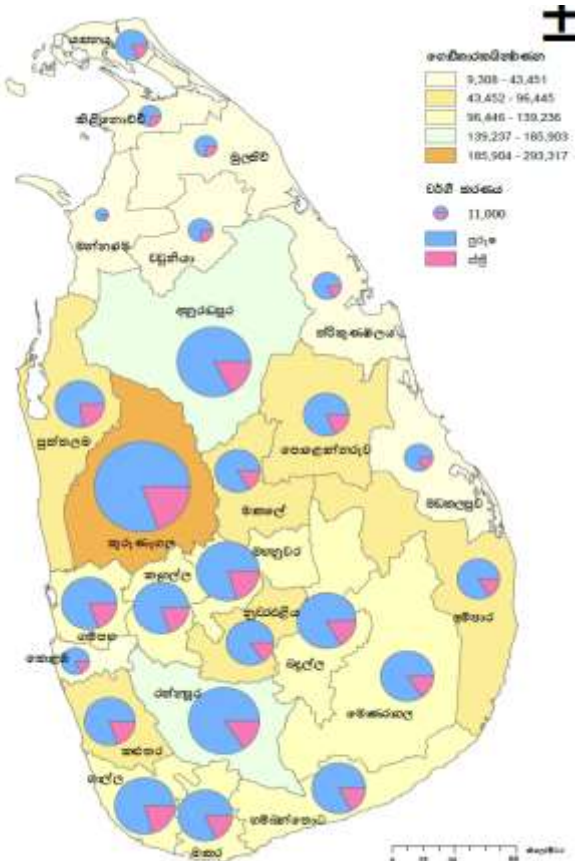


Figure 30. Distribution of agriprenuers with higher than 40 perch of land use for agriculture/animal farming for commercial purposes by district and gender

6.3.2. Colombo City Region Food System on GIS maps

Colombo is the major consumption hub in Sri Lanka and due to the urbanized nature of the entire region, the CMC is fed by other regions of the country. Being a smaller country, the CMC seems fed by all regions and different commodities coming from different parts of the country. The country consists of eight different agro-ecological regions and each region cultivates crops specific to the region. It seems difficult to draw a generic CRFS for CMC, however separate CRFC for each major commodity seems possible as presented below.

Seasonal changes are not reflected in the GIS maps presented in following sections. It indicates the cumulative extent and production of selected food items. However, in order to provide the impact of major seasonal variances on food supply, statistical data on agriculture products related to food systems are presented in Annex 1.

The food production data in district level is available with various government institutes. The data on the manner in which Colombo is fed is not available. However food print in Colombo district can be found in

Annex 2. To establish the daft CRFS for Colombo, the traders from each commodity (or food type) were interviewed. The CRFS maps are based on findings from 5-10 traders.

6.3.2.1. Generic Vegetable and Fruit printers and suppliers

As a developing and an Asian country, agriculture is one of the key elements in Sri Lankan economy. Vegetable and fruit cultivation is a major agricultural activity in Sri Lanka. Two types of vegetables, namely low country vegetables and up country vegetables are cultivated in different agro ecological areas. Sri Lanka annually produces over 800,000 metric tons of vegetables and fruits. The GIS maps of annual production of selected upcountry and low country vegetables indicate that larger proportion of upcountry vegetables are grown in Badulla and Nuwara Eliya districts. Potato production heavily depends on these two districts.

Further, beans, tomato, carrot, and leaks are cultivated in those two districts. Matale also have a sizable production. Unlike upcountry vegetables, there are no considerable geological restrictions for producing low country vegetables. Districts such as Kurunegala, Monaragala, Anuradhapura, and Hambantota produce Okra, Bitter gourd, and Snake gourd in mass whereas other districts produce them in a relatively lower capacity. Hence, unlike upcountry vegetables in Sri Lanka, low grown vegetables do not have a monopoly. After 30 years of civil war, vegetable production from north and east parts is gradually increasing, and the vegetable and fruit production in Sri Lanka has continuously increased during the post war periods. This contributes to set a relatively lower price for low grown vegetables in the market and premium price for upcountry vegetables.

Vegetable and fruit supply chain has always being a contemporary topic, creating news in media, academia, and state institutes in Sri Lanka. Vegetable price fluctuations, excess supply, and wastage are the most common and recent issues that are frequent in vegetable and fruit supply chains. It is also been proved that this is a common issue for a majority of developing countries including Sri Lanka.

Apart from the local consumption, vegetables and fruits are exported to Maldives, United Kingdom, India, Pakistan, Qatar, Saudi Arabia (and other Middle East countries), and Germany. In fact, Germany and India are the top countries importing fruits from Sri Lanka. Carrot, leeks, cabbage, cauliflower, salad leaves, beetroot, beans, bell paper, cucumber, pumpkin, and bitter gourds are the main vegetables and pineapple, melon, bananas, young jackfruit, lime, dragon fruit, and papaya are the major types of fruits Sri Lanka exports (Central Bank Of Sri Lanka, 2014).
Flows of vegetables and fruits across the country are presented in Figure 37 and Figure 38.

i. Vegetable and Fruit whole sale supply chain in Colombo city

Manning Market in Pettah is the oldest wholesale market in Sri Lanka. There are over 1400 commission agents and sellers involved in buying and selling vegetables and fruits on daily basis[48]. Colombo Municipal council owns the premises and each stall is rented to commission agents at a rate of Rs. 1,500 per month.

[48] Interview with Mr. Premasiri, one of the pioneering commission agent at Pettah market

According to the commission agents (interviewed by this study), Manning market is the only place in Colombo city with a multitude of Sinhala businessmen.

The Market is virtually open for 24 hours, where lorries filled with vegetables from various districts arrive to the market from early morning. According to the business process, farmers and their agents bring the harvest to selected commission agents in Manning market for an agreed price. Then the commission agent collects the vegetable stocks and resells to wholesale and retail customers. At the end of the day's sales, commission agent deposit the agreed amount to farmer's bank account after deducting their commission from the daily trades. With this model, farmers expect to sell their harvest without facing problems and dealing/bargaining with customers.

Figure 31. A vegetable stall at Manning Market

Box 6.5

Thousands of traders and farmers from all over the island reach the Manning market with their harvest every day. The main objective of establishing the Manning market was to accumulate all vegetable and fruit harvests throughout the country in order to distribute them easily and to eradicate the inability of harvest selling by farmers.

Before introducing the concept of Dedicated Economic Centres, all vegetable and fruit harvest in Sri Lanka were distributed through the Manning market. Currently, there are 12 dedicated economic centers in Sri Lanka. They are, Thambuththegama, Nuwaraeliya, Kappetipola, Kurunduwaththa, Welisara, Veyangoda, Narahenpita, Embilipitiya, Meegoda, Piliyandala, Dambulla and Rathmalana. Apart from the Manning market, there are 18 other relatively large markets located in Colombo city limits including the markets in Maradana, Grandpass, Dematagoda, Borella, Wellawatta, Kirulapona, and Narahenpita. Unlike the Manning market, these markets are largely involved in retail business of vegetable and fruits purchased from the Manning market.

Figure 32. Arrival of vegetables to Manning market

Certain types of distribution flows prevails that are associated from the point of farmers reaping their harvest until the harvest reaching the final consumer. From farmer to Manning market, many actors are involved. For this study, it was only considered the flows within the Manning market and all actors beyond the Manning market was named as intermediaries (i.e. the CMC is considered to be the main exchange point in these distribution flows). Such vegetable and fruit distribution chains observed are with and without commission agents.

In this vegetable and fruit distribution flow, farmers bring their harvest directly to Manning market by their own transport system or hire vehicles for transportation (most farmers collectively hire a vehicle such as a Lorry). At Manning market premises, farmers sell their harvest to buyers (for whole sellers mostly). In this process, simply harvests move within the Lorries (farmers' Lorries to wholesalers Lorries) instead of unloading and storing at Manning market premises. No middle commission agent exists in this flow. The wholesale sellers will then sell the harvest to retailers and consequently ending up the process by reaching the harvest to the final consumer. Occasionally, super market chains act as wholesale sellers or retailers in this flow and other distribution flows as well (Figure 33).

Another distribution flow consists of Intermediaries who act in between farmers and the Manning market. Those intermediaries buy the harvest from farmers on the spot (at harvesting fields) or via collection agents and bring them to the Manning market to resell. Intermediaries whom are mainly businesspersons having transporting facilities bring the harvest to the Manning market with the intention of selling them to wholesale sellers. Once the wholesale sellers buy the harvest, then goods will reach the final consumer through retailers; i.e. latter part of the chain is identical to the earlier (Figure 6.6).

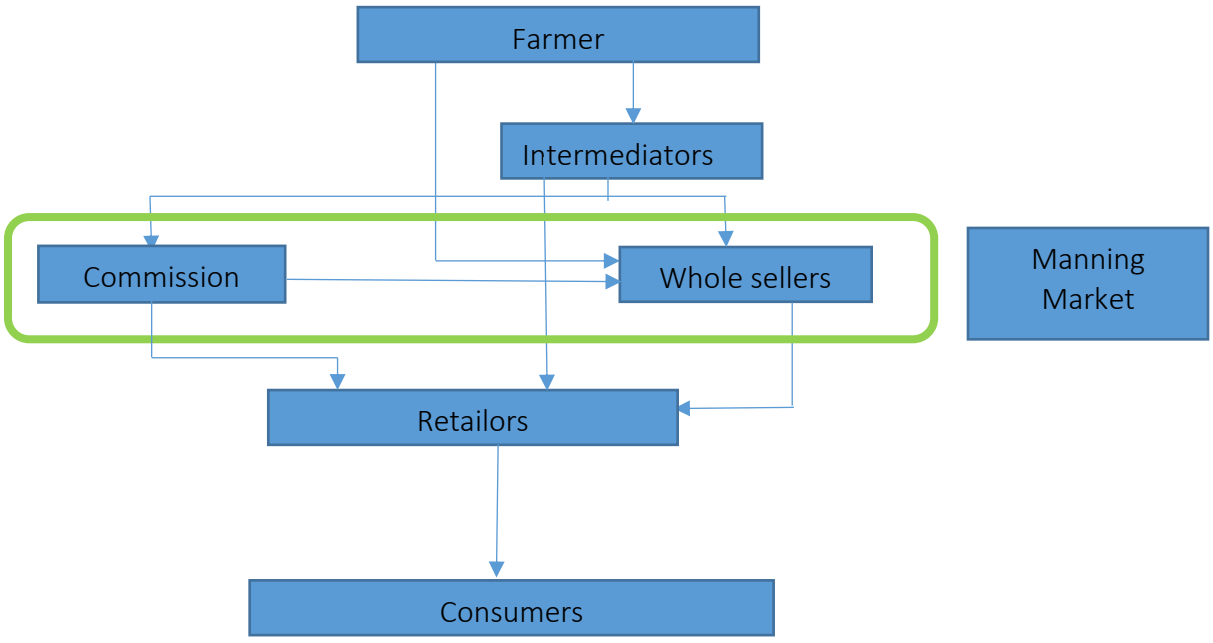


Figure 33. Vegetable and fruit flows at Manning market without commission agents

In Manning market, there are 1400 stalls owned by the commission agents who are supposed to buy vegetables and fruits from farmers in large quantities and resell those to retailers and wholesale sellers (mostly). These traders are playing the role of middlemen. When farmers bring their vegetables and fruits to the Manning market, these traders purchase them. Some farmers bring their harvest only to a selected commission agent.

Note: The main reason for farmers to be bound to sell their harvest only to those middlemen is that traders help and finance selected farmers in their agricultural activities. Once farmers bring the harvest, they resell them again to retailers, wholesalers, and street sellers, keeping a considerable profit margin (Commission)[49].

The intermediaries directly visit farmers and buy vegetables and fruits from them. Thus, the intermediaries transport the vegetables and fruits to the Manning market and they will act as the suppliers to wholesalers, retailers, and street sellers. Normally intermediaries are not obliged to commission agents, thus normally intermediaries will not supply vegetables and fruits for a specific trader. Hence, they are free to sell to the highest payer. Sometimes the buyer can be a commission agent. This form of supply chain is more complicated and has more intermediaries involved in the sale of vegetables and fruits. This particular supply chain is not advantages to farmers or consumers, but makes the middle parties richer.

ii. Vegetable and Fruit Retail Supply Chain in Colombo City

Apart from the Manning market, there are 18 other relatively large markets located in Colombo city limits including the markets in Maradana, Grandpass, Dematagoda, Borella, Wellawatta, Kirulapana, and Narahenpita. Narahenpita Economic center attracts many retailers and consumers to buy vegetables, fruits, dry fish, fish, and other food products.

Figure 34. Narahenpita Economic Center in action

Vegetable and fruit supply for other markets in Colombo and the economic center (Narahenpita Economic center) has two major paths of supplies:

[49] Source: Interview results with commission agents

1. There are lorries coming directly from farmers and intermediates to specific stalls
2. There are lorries coming from Manning market to specific stalls

In market and other economic centers, the incoming goods have specific owners when they arrive. There are number of privately owned stalls and stalls governed by the cooperatives, and the market operates from afternoon to midnight. Majority of customers expect to buy vegetables and fruits at lower sale prices, hence there are many customers visit the center every evening.

Figure 35. Food prices as Narahenpita economic center

iii. Major concerns in Vegetable and fruit supply chain in Colombo

❖ Uncontrolled supply

Sri Lankan vegetable and fruit supply chain is the typical example for traditional supply chain management. It is a 100% non-demand driven system. It takes a long time to respond to periodic changes in demand and hence the vegetable and fruit supply chain cannot react to market changes accordingly. This is the reason for the wastage of certain types of vegetables. Not only the wastage, but higher inventory levels sometimes

Box 6.6
Price determination for green leaves is slightly different from other commodities. Farmers who own fields (termed as 'Koratu') bring their harvest by Lorries to Manning market and receive a fixed price. Most of the green comes from peri-urban agriculture. Apparently, prices of green leaves will not change according to the supply or demand in the market.

leads to price discriminations as less demand and high supply causes low prices. Vegetables as cucumber is among the most wasted vegetables because supply surpasses demand. It may be necessary to change the traditional supply chain to minimize wastage. Vegetable and fruit prices are determined by daily vegetable and fruit supply and demand. Quality of the harvest is another crucial factor that affects price determination.

- ❖ Transportation

Methods of transportation and packing are reasons influencing quality of harvest. Gunnies are mainly used for packing in order to transport vegetables and fruits. For fruits such as tomatoes, papaya, and guava, wooden crates are used.

Some Lorries do not have proper covers (hood) to protect (especially from sunburn, rain) vegetables and fruits during transport. Hence lack of proper transportation mechanism and method of transportation apparently leads to low quality of goods received to Manning market and consequently to final consumer, and high wastage. It was clearly noted that method of transportation and packing are the main factors affecting quality of harvest, especially for most perishable goods.

Figure 36. Food transport and handling at manning market CMC

The government of Sri Lanka introduced plastic crates instead of gunnie bags as a solution for post-harvest wastage. According to the special Gazette issued on October 2011, enforcement of 'Crate Law' prohibited the use of gunnies for transporting vegetables and Fruits Island wide. This law was enforced to reduce the spoilage of vegetables and fruits during transport. However, this attempt failed as farmers and transporters protested opposing this new regulation.

However, considering the use of crates in transporting vegetables and fruits:

- Packing them in plastic crates is expensive than using gunnies;
- Gunnysacks hold a high volume of vegetables, while plastic crates can hold only a relatively low volume. The volume of vegetable can be loaded to Lorries reduced accordingly;
- Crates need to be returned to the farmer ';
- Traders do not have enough facilities to receive vegetables in crates (e.g. enough storage facilities).

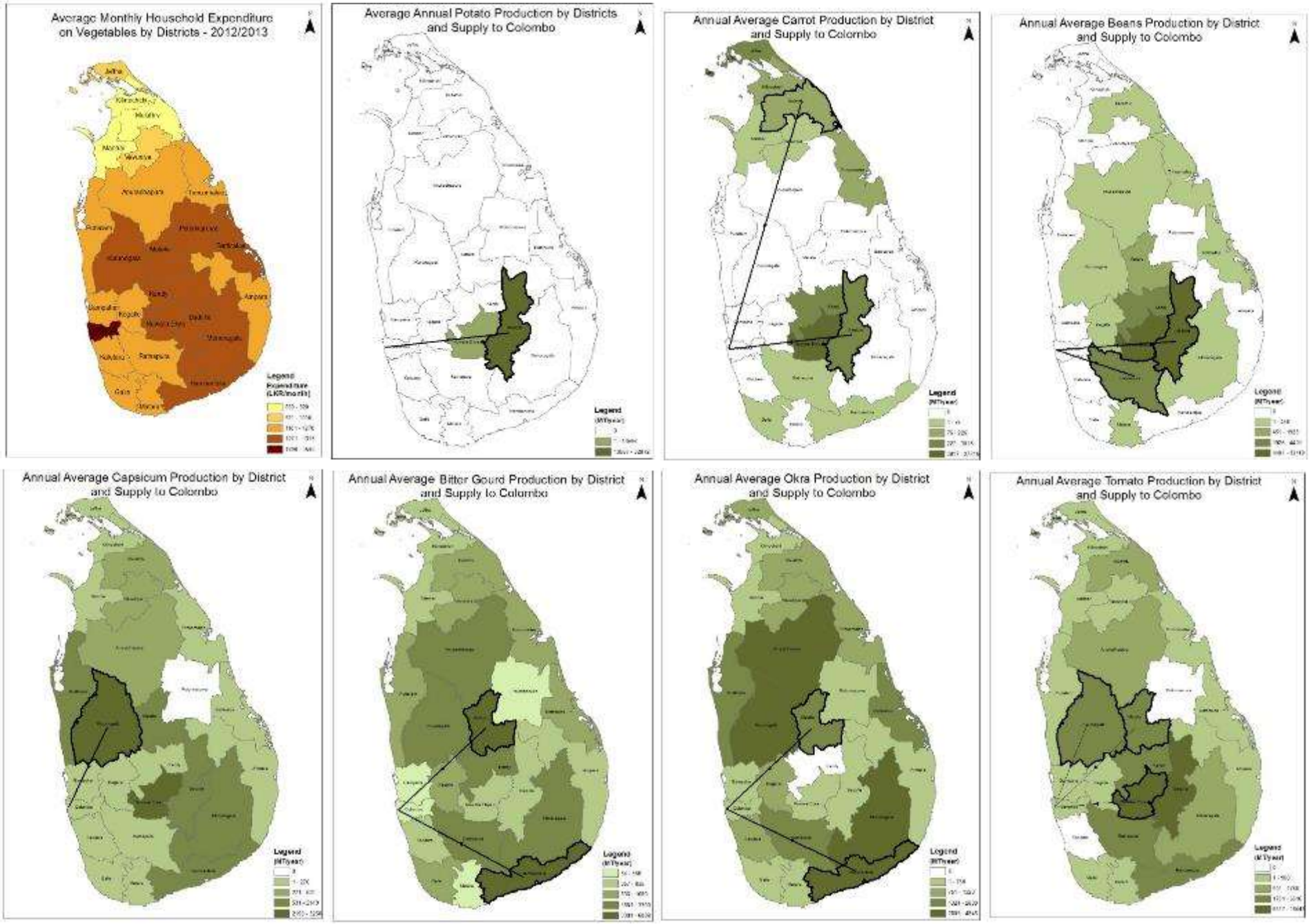


Figure 37. Vegetable production and supply to Colombo

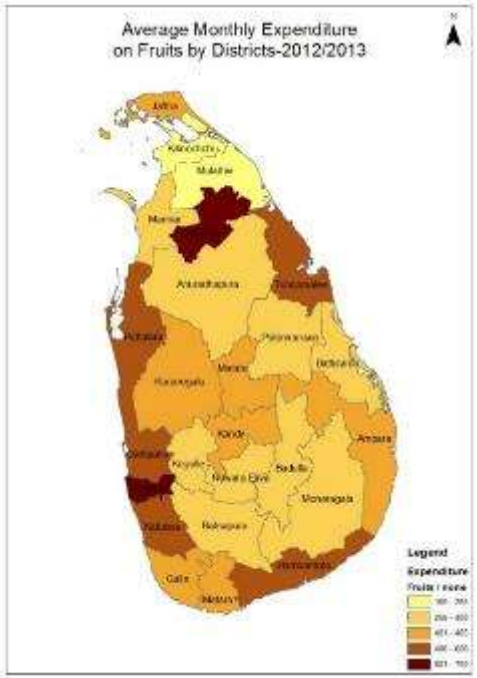


Figure 38. Fruit production and supply to Colombo

6.3.2.2. Livestock

Since Sri Lanka has a Buddhist culture, meat consumption is relatively low. According to the Household Income and Expenditure Survey in Sri Lanka 2012/2013, there were monthly quantities of only 1.6 Kg of meat, 11 eggs, and 4 liters of milk consumed by the average Sri Lankan household. However, there is a relatively higher consumption of livestock products in Colombo district.

Apart from the massive egg producing farms that contribute 6.5% of the total egg production of Sri Lanka, there is no significant livestock production in the entire Colombo city. Food production in Colombo city area is negligible. Hence, Colombo heavily depends on other districts where livestock are produced.

According to the statistics of year 2014, Kurunagala, Jaffna, Badulla, Nuwara-Eliya, Anuradhapura, Kandy, and Gampaha districts had the major cattle and buffalo farm holders in Sri Lanka. They produced milk and meat. Jaffna, Kandy, Batticaloa, Puttalam, Kurunegala, and Matara had many goats and Puttalam, Gampaha, Kurunagala, and Ampara had main Swine farms.

Compared to other types of livestock, a higher demand for poultry products exist in Colombo and in Sri Lanka. Kurunagala, Ampara, Gampaha, Batticaloa, and Puttalum districts mainly have small-scale broiler chicken farms, while Kurunegala, Monaragala, Puttalam, Kegalle, and Gamapaha have large broiler chicken farms (Table 12).

Table 12. Livestock farms by District and type of livestock (Source: Department of Census and Statistics)

District	Percentage of Farms Raising								
	Cattle and/or Buffalo	Goat	Swine	Poultry					Total
				Local Poultry	Broiler Farms		Egg Producing Farms		
					% of Chicken Below 1000	% of Chicken Over 1000	% of Chicken Below 1000	% of Chicken Over 1000	
COLOMBO	0.9	0.9	2.2	1.1	1.0	3.4	0.3	6.5	1.0
GAMPAHA	4.7	3.9	22.5	8.3	7.1	6.9	3.5	2.2	7.1
KALUTARA	1.7	1.9	1.8	3.1	2.8	5.3	1.0	1.0	2.6
KANDY	5.0	6.5	0.2	6.1	2.6	3.7	9.2	0.9	6.5
MATALE	3.0	2.1	1.0	4.4	1.3	3.1	2.8	0.6	3.8
NUWARA-ELIYA	5.5	4.8	0.5	7.5	4.9	0.9	13.9	0.2	8.6
GALLE	1.4	0.8	0.5	2.7	1.4	2.3	2.7	1.6	2.6
MATARA	1.8	5.3	0.2	1.6	1.1	0.5	1.9	0.5	1.6
HAMBANTOTA	2.2	0.4	0.4	1.4	0.5	0.7	1.1	0.5	1.3
JAFFNA	10.0	28.0	0.0	3.1	5.4	0.3	0.4	0.0	2.6
KILINOCHCHI	1.4	1.5	0.0	3.1	3.7	0.1	9.7	0.0	4.6
MANNAR	1.3	2.2	2.0	0.4	0.7	0.0	1.1	0.1	0.5
VAVUNIYA	2.5	2.0	0.1	1.2	3.0	0.0	0.2	0.0	1.0
MULLATIVU	3.3	1.4	0.0	1.5	1.2	0.0	0.0	0.0	1.1
BATTICALOA	4.0	6.5	0.0	2.5	7.0	1.3	3.7	36.8	3.4
AMPARA	4.5	2.3	2.7	4.9	12.1	1.2	6.3	0.1	5.5
TRINCOMALEE	3.4	3.4	0.2	3.5	2.5	0.5	4.0	0.1	3.5
KURUNEGALA	12.3	5.8	17.1	9.3	13.3	28.9	5.2	41.6	9.1
PUTTALAM	4.5	6.4	45.4	10.9	6.9	10.8	2.5	4.8	8.7
ANURADHAPURA	5.1	1.7	1.0	6.1	3.1	1.9	4.0	0.1	5.3
POLONNARUWA	3.0	1.5	0.2	3.5	3.2	0.9	6.0	1.6	4.0
BADULLA	8.8	4.8	0.1	4.0	6.2	0.3	10.8	0.1	5.6
MONARAGALA	4.5	0.6	0.5	3.0	2.7	16.1	4.8	0.0	3.5
RATNAPURA	1.6	2.0	0.3	2.0	1.6	2.0	2.1	0.8	2.0
KEGALLE	1.9	2.8	0.9	2.7	3.6	7.7	2.6	0.2	2.8
MAHAWELI "H"	1.7	0.5	0.3	2.3	1.3	1.1	0.3	0.0	1.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

i. Open Market prices of live stock

Main meat types consumed in Sri Lanka are chicken, pork, beef, and mutton. According to the open market prices for livestock products, mutton is the most expensive meat, where 1Kg of mutton is sold for Rs. 1241. Starting from Rs. 612 per Kg in 2007, mutton price has continually increased each year. Likewise, all meat products including egg prices continually are increasing in each year (Figure 39).

Since there is hardly any production in Colombo city limits, consumers have to buy the products available in the market for the given prices. Among the existing consumers of livestock products in Colombo, highest proportions are Muslims and Christians. The next highest proportion is for Tamils. Since the prices are relatively high, the consumption of livestock products, other than eggs, seems relatively low in Colombo.

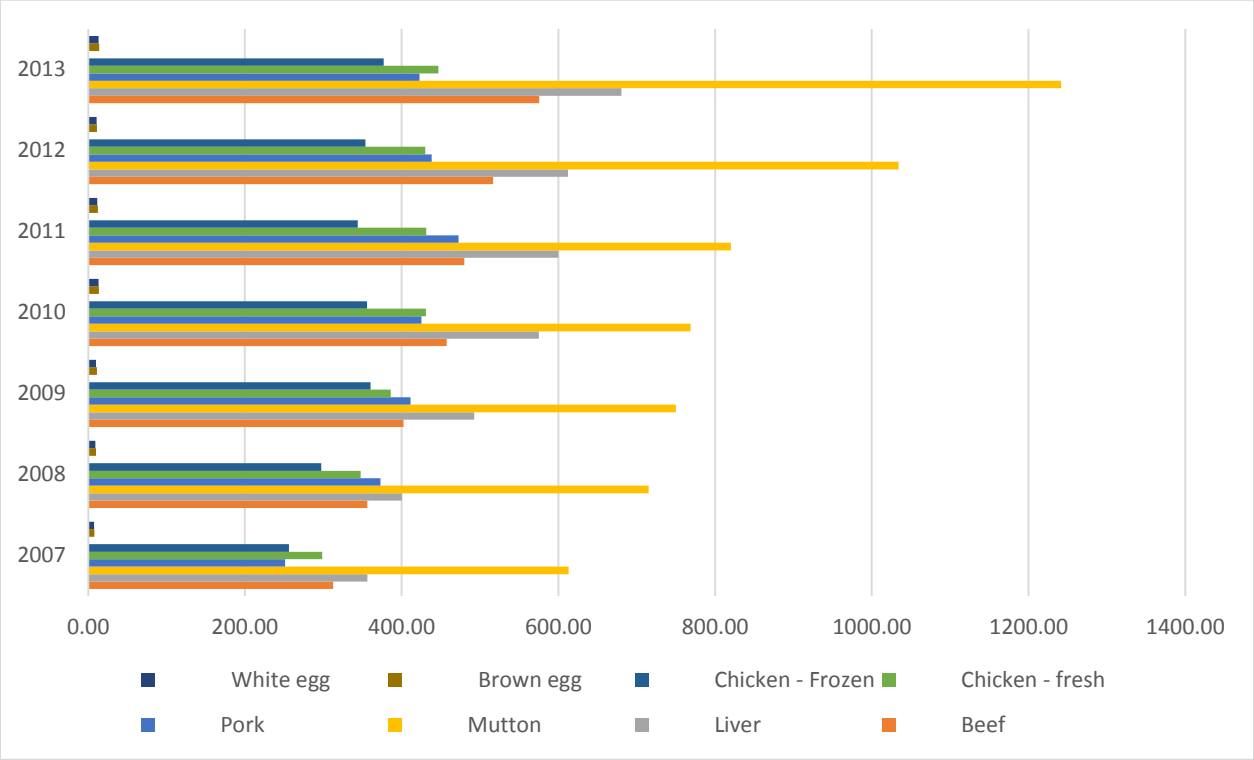


Figure 39. Livestock product prices since 2007 (Source: Department of Census and Statistics)

ii. Generic supply chain of livestock products to Colombo city

Manning market in Pettah is the main whole sale market of livestock products in Colombo. Other economic centers at Narahenpita mainly do retail business in a relatively small scale. Lorries from various districts with livestock products arrive Pettah market in early morning. Market has every livestock product such as Chicken, Mutton, Pork, Beef, and eggs. Commission agents in the market sell the products to whole sellers and retailers coming from various parts of Colombo and then settle money to their suppliers. These suppliers are either farmers or middlemen who sell the products on behalf of the farmers. Apart from Manning market, economic centers at Narahenpita, other markets, and small-scale retail outlets in Colombo sell livestock products they receive directly[50] (Figure 40).

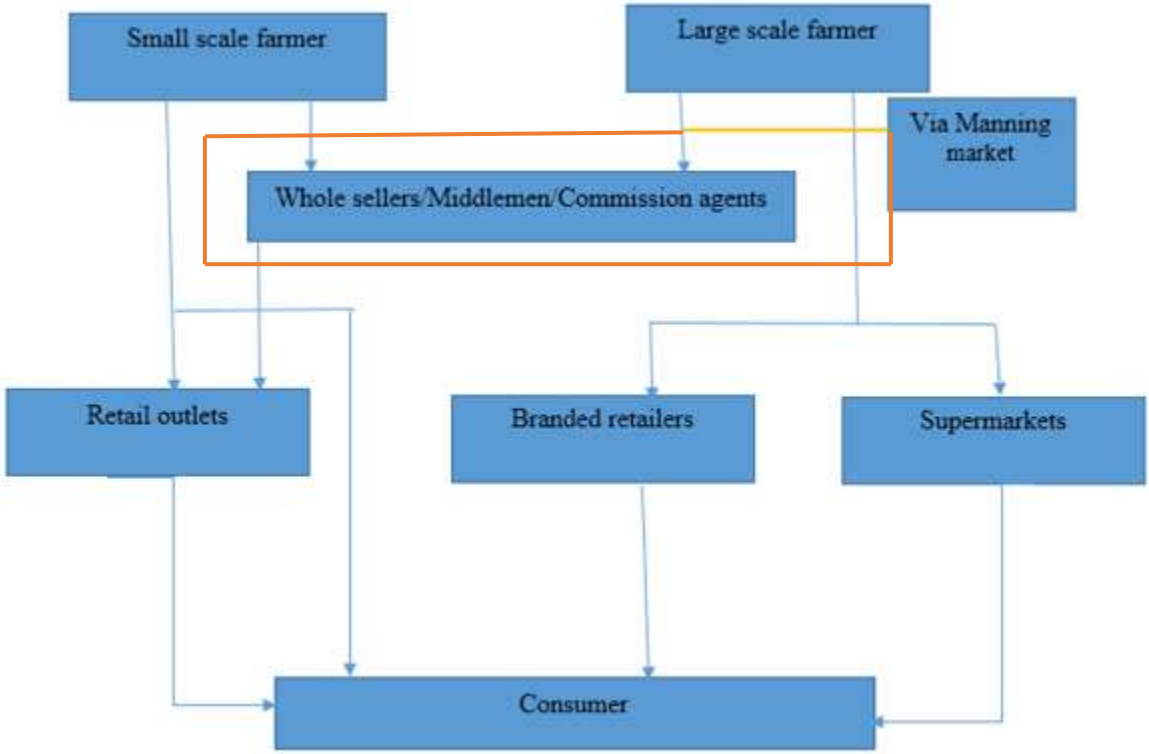


Figure 40. Generic supply flows of livestock in Colombo food system

According to supply chain of the livestock production, several stakeholders are involved in the process (Farmers who are engaged in livestock farms are significant in this regard). There are small-scale farmers and large-scale companies involved in livestock farming. Small-scale farmers mainly sell their products in local markets and some sell their products to large-scale middlemen with necessary infrastructure facilities to transfer those products to larger market/s[51]. Commission agents at Pettah market in Colombo are an example for such intermediate traders. Chicken is largely supplied live to Pettah market. Other types of meat arrive to market after been slaughtered by licensed slaughters and with certifications of PHIs of the respective municipal councils.

[50] Interview with sellers at Narahenpita Dedicated Economic Centre

[51] No quantitative data are available. Arguments were developed based on the interviews conducted with sellers and commission agents at Pettah and Narahenpita markets

In addition to livestock products coming through main market, there are high supplies of branded livestock products in Colombo. In recent years, companies like Keells, Maxies, Bairaha, Nelna, CIC, Pussalla, Prima, and certain other companies competitively entered the livestock market. Large-scale farms operated by companies have their own branded livestock products where they manufacture the final product by their own, and deliver to large supermarkets and/or own retail shops. High and middle-income families in Colombo used to buy branded livestock products from supermarkets and company owned retail shops, other than from Manning market or other livestock shops functioning under license from the municipal councils.

Livestock market at Pettah is not an attractive place to visit; especially on a rainy day the place become smelly and muddy where people cannot access. Even though the CMC attempts to maintain the quality of the products (by regular visits of their PHIs), customers have questions over the hygienic quality of livestock products being sold in the market. Customers tend to ask questions, "When supermarkets keep all meat items in refrigerated showcases, how does this market just keep meat in open shelves?" Discussion with livestock sellers in Jathika pola at Narahenpita and Economic centre of Narahenpita also indicated that they have a specific customer group buy from them. Generally, attracting new customers for their shops is scarce mainly due to this branded livestock products. Hence, the branded livestock product companies have a significant influence in Colombo city where a substantial portion of the livestock market is already captured by them.

Box 6.7

"Manning market was the only wholesale market in Sri Lanka before these economic centres and super markets. During that time, there was a control over price. Now there are companies in livestock business who spoil our business. Actually, business is not good as earlier. We need to work hard to sell our products. Poor people do not eat much meat. Rich people used to eat meat. However, nowadays companies have captured all rich people. People with money used to buy meat products from supermarkets. People think branded meat is good and what we sell here is of low quality. Actually, both are the same. We charge lower price but people do not come as earlier to buy from us. Many customers come to us when they have large gatherings like weddings or party. It is difficult to stay in business now. Municipal council also enforce all the rules and regulation to us, I do not know whether they do any checking for meat selling in supermarkets. From all ends we are the ones getting punishments."

- Statement of a commission agent at Manning Market about the rise of this branded livestock products.

6.3.2.3. Seafood products

Seafood is one of the most popular non-vegetarian food item in Sri Lanka. Generally, a majority of people prefer seafood to livestock products in Colombo. There are many fisheries districts in Sri Lanka, which provide sea fish for export and local markets. According to the latest available published statistics on seafood production in Sri Lanka, Galle, Matara, and Kalutara are the main seafood producers. There is a sizable volume coming from Negombo, Puttalam, and Chilaw districts. Meanwhile, Jaffna produces the highest volume in Northern Province followed by Kilinochchi and Mannar (Figure 41).

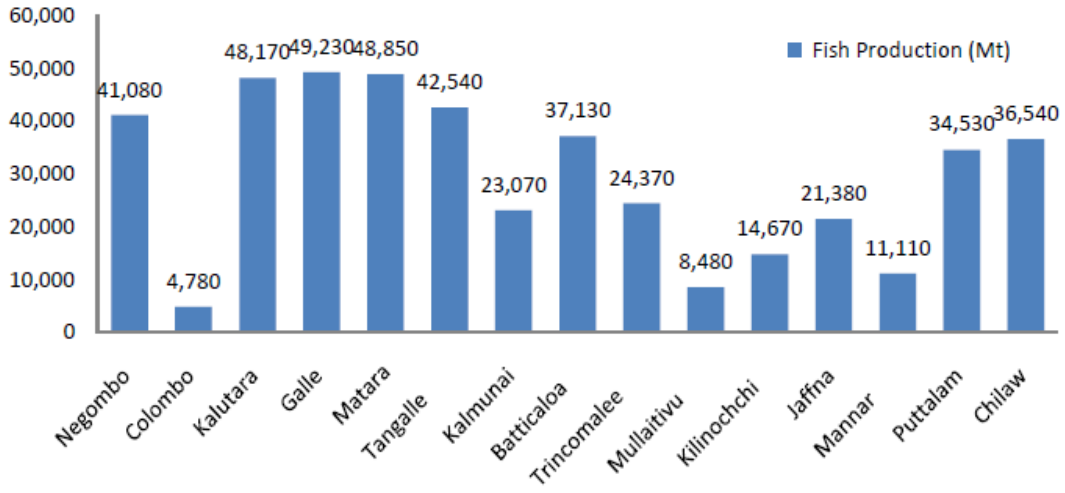
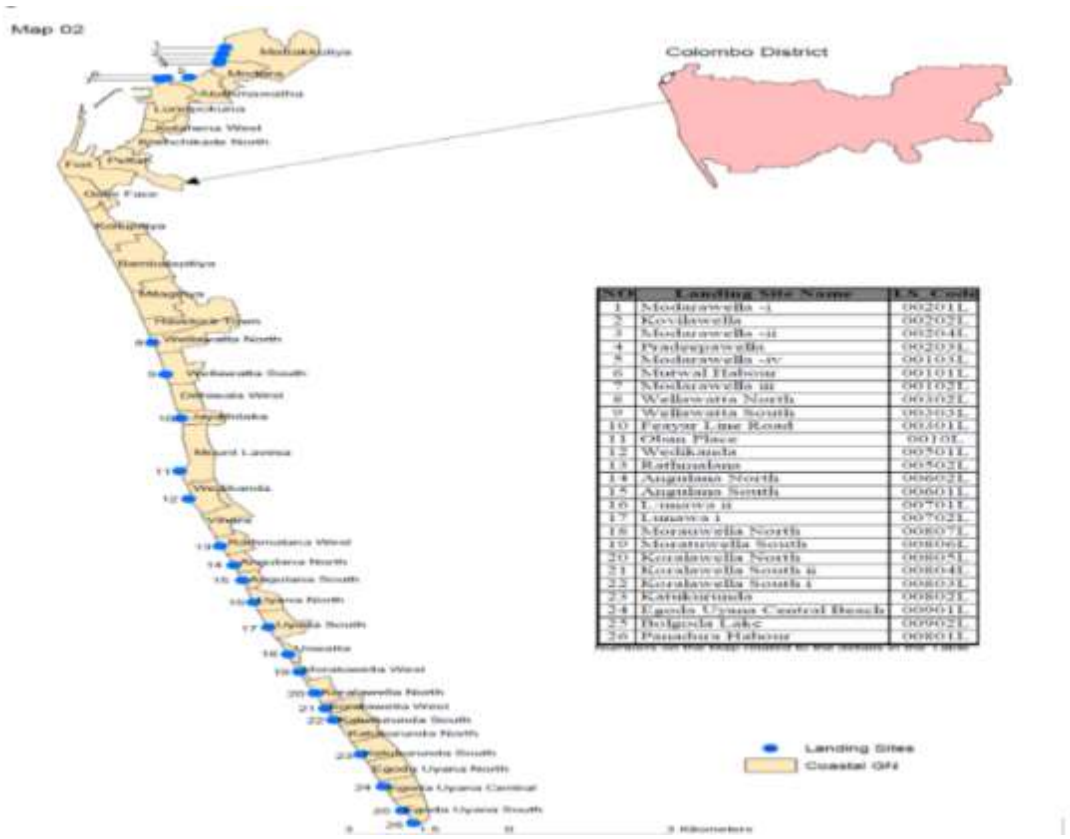


Figure 41. Fishery Industry Outlook 2013 (Source: NARA)

Unlike other food products, Colombo has many fish landing sites around the city (i.e. CMC is part of the fish production). Hence, part of the seafood products are directly coming from boats to Colombo fish markets as shown in Figure 42. However, Colombo is the lowest producer of seafood in Sri Lanka, but one of the highest consumers in the country (Figure 47).



SN	Landing Site Name	LS Code
1	Modaragella -i	002011
2	Kovilawella	002021
3	Modaragella -ii	002041
4	Pudugawella	002031
5	Modaragella -iv	001011
6	Mirwal Habour	001021
7	Modaragella iii	001031
8	Wellawatta North	003021
9	Wellawatta South	003031
10	Ferrar Line Road	003011
11	Oban Place	0010E
12	Wedikanda	005011
13	Rathmalana	005021
14	Angulana North	006021
15	Angulana South	006011
16	L-nuwa ii	007011
17	Lunawa i	007021
18	Moratuwella North	008071
19	Moratuwella South	008061
20	Koralawella North	008041
21	Koralawella South ii	008041
22	Koralawella South i	008031
23	Kattukurunda	008021
24	Egoda Uyana Central Beach	009011
25	Dolgoda Lake	009021
26	Panadura Habour	009011

Figure 42. Fish landing sites in Colombo Landing sites 1-7 (Source: NARA)

Certain districts produce inland water fish varieties mainly for local consumption. The total inland and aquaculture fish production in 2013 was 69,780 Mt and contributed 13% to the total fish production of the country[52]. Anuradhapura, Puttlam, and Polonnaruwa districts are dominant inland fish producing districts in the country and Tilapia and Catla are the dominant species (Figure 43).

[52] Annual performance report 2013 of Ministry of fisheries and aquatic resources

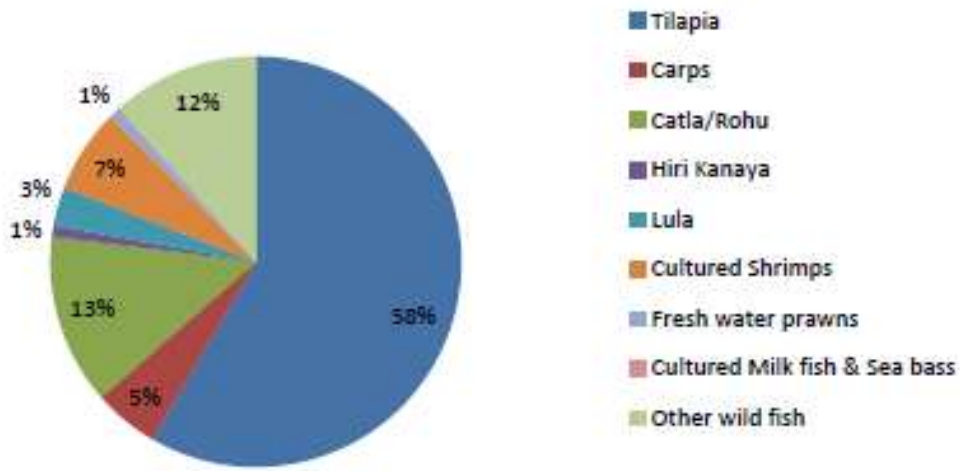


Figure 43. Composition of fresh water fish production by type of fish (Source: Ministry of fisheries and aquatic resources)

i. Seafood prices in Colombo

People have two main choices in selecting seafood: large fish and small fish. Large fish are relatively expensive than small fish. However, according to the market statistics from 2007 to 2013, prices of both fishes type have increased.

Seer is the most expensive fish in Sri Lanka. In 2013, price of one Kilogram of seer was Rs. 1231 in Colombo market. Gradually the price increased since 2007. Compared to other years, during year 2012 and 2013, there were significant price increases for every large fish (Figure 44).

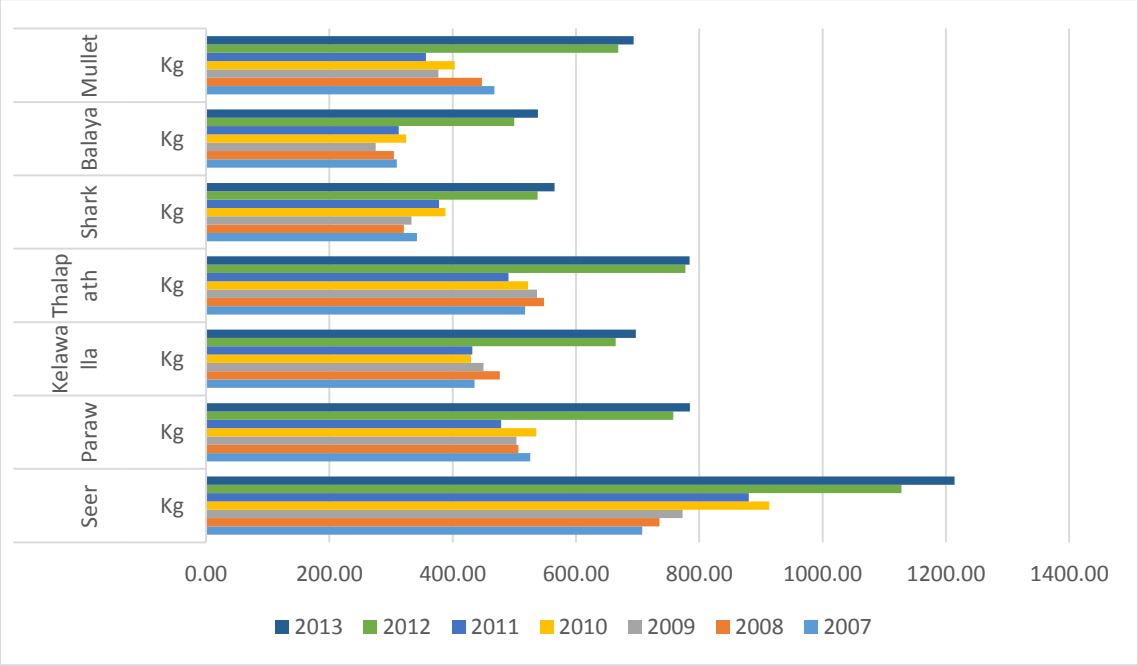


Figure 44. Retail Market prices of big fish (Source: Department of Census and Statistics)

Similar trend is observed in small fish prices. There are significant price increase in prawns and parati, while small mullet, salaya, and hurulla are the cheapest fish in the market (Figure 45).

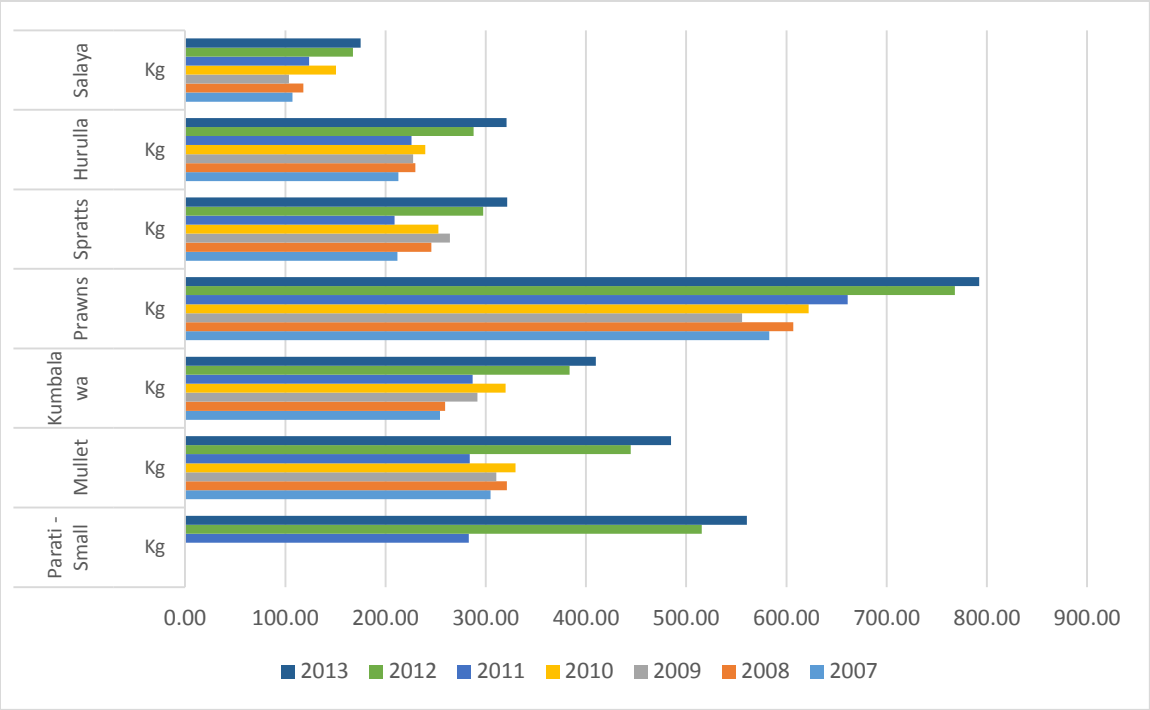


Figure 45. Retail Market prices of small fish

ii. Supply chain of the sea food in Colombo

There are multiple sources for seafood products in the CMC area. A large-scale fish market at Peliyagoda provides seafood for both wholesale and retail purposes. Apart from that, markets in Maradana, Grandpass, Dematagoda, Borella, and Wellawatta have retail seafood stores. Further, there are micro level fish stalls in small junctions and fish sellers who sell fish by going door to door. Supermarket chains have also rapidly entered to seafood market, but they do not dominate the market share as the livestock supply chain.

There is a relatively long supply chain in seafood industry (Figure 46). Large and small boats from fisheries districts go fishing in shallow and deep sea. Some boats are owned by big companies and large-scale businessmen who are involved in fisheries business. Most of the small boats are owned by small-scale fishermen who do fishing as the main income source. Most of the fish products harvested by these small-scale fishermen are sold to local retailers in the district for local consumption. Some of the small-scale fishermen sell their harvest to large-scale businessmen who play the role of middleman in fish supply chain. These large-scale middlemen mainly buy fish from multiday boats owned by individuals and sell the highest quality fish to fish exporters and five star hotels. The rest is normally transported to Peliyagoda fish

wholesale market by freezer Lorries. Larger volume of seafood products come from all fisheries districts to Colombo on daily basis through sea and land transportation (Pettah Fish Market was the largest wholesale fish market in Sri Lanka, which was relocated in Peliyagoda few years ago). There are selected commission agents for each large-scale supplier in the market. They supply their stock to these commission agents and the commission agents sell fish to both wholesale and retail buyers. Small-scale sellers at the market buy excess supply from the Lorries and sell them mainly to retail customers in small quantities.

Peliyagoda fish market has significantly different customer segments. Many customers visit the market regularly to buy the weekly seafood consumption. They normally purchase different types of fish in small quantities to consume during the week or two. Fish sellers from various parts of Colombo visit Peliyagoda fish market to buy fish for reselling in local fish stalls. Most of the hotels, restaurants, and other prepared food suppliers buy seafood from Peliyagoda market by themselves or through their agents.

Apart from this main supply chain, there are number of other markets, certain fish stalls, and supermarket chains that directly obtain fish from large-scale suppliers without going through Peliyagoda fish market. Even though supermarkets have introduced fish stalls in their outlets, demand for their fish products is relatively low. Since their fish products are mostly frozen and high in prize, people are reluctant to buy fish from supermarkets. Nevertheless, there are no reputed seafood companies like in livestock sector, supplying seafood for local consumption. Consumers prefer to buy fresh fish from the retail outlets. Hence, fish supply in Colombo is still dominated by the small retail fish stalls located in towns and junctions.

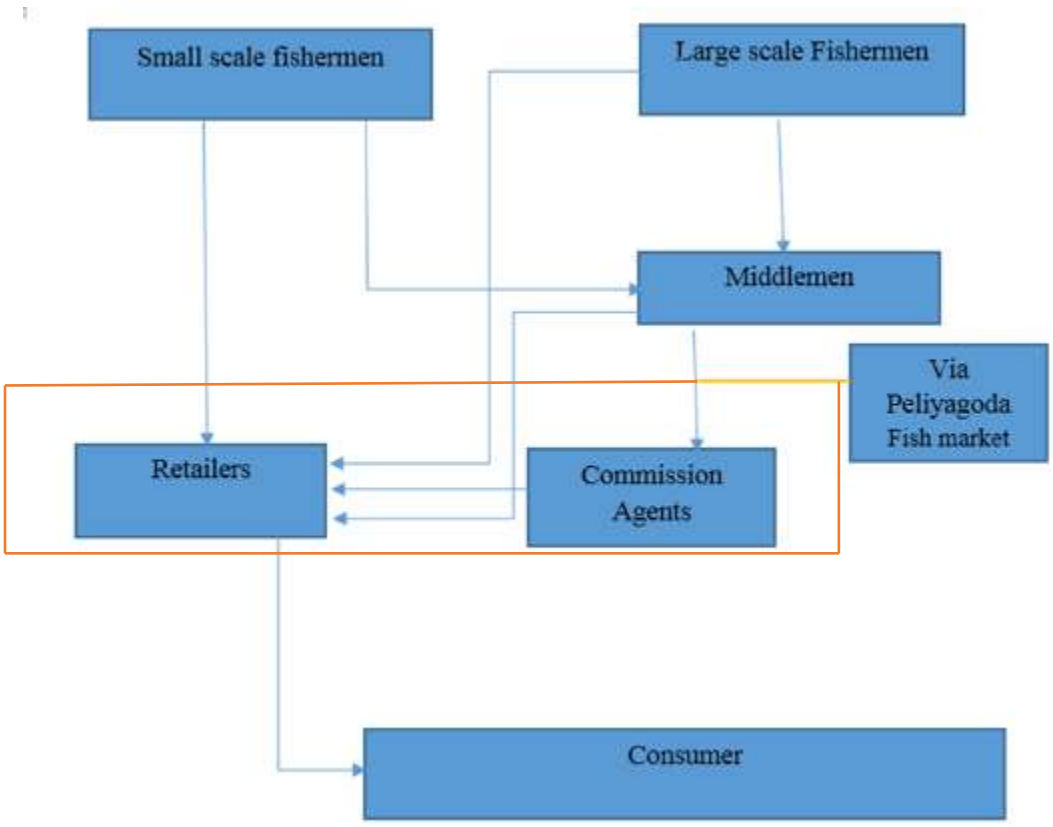


Figure 46. Seafood supply chain

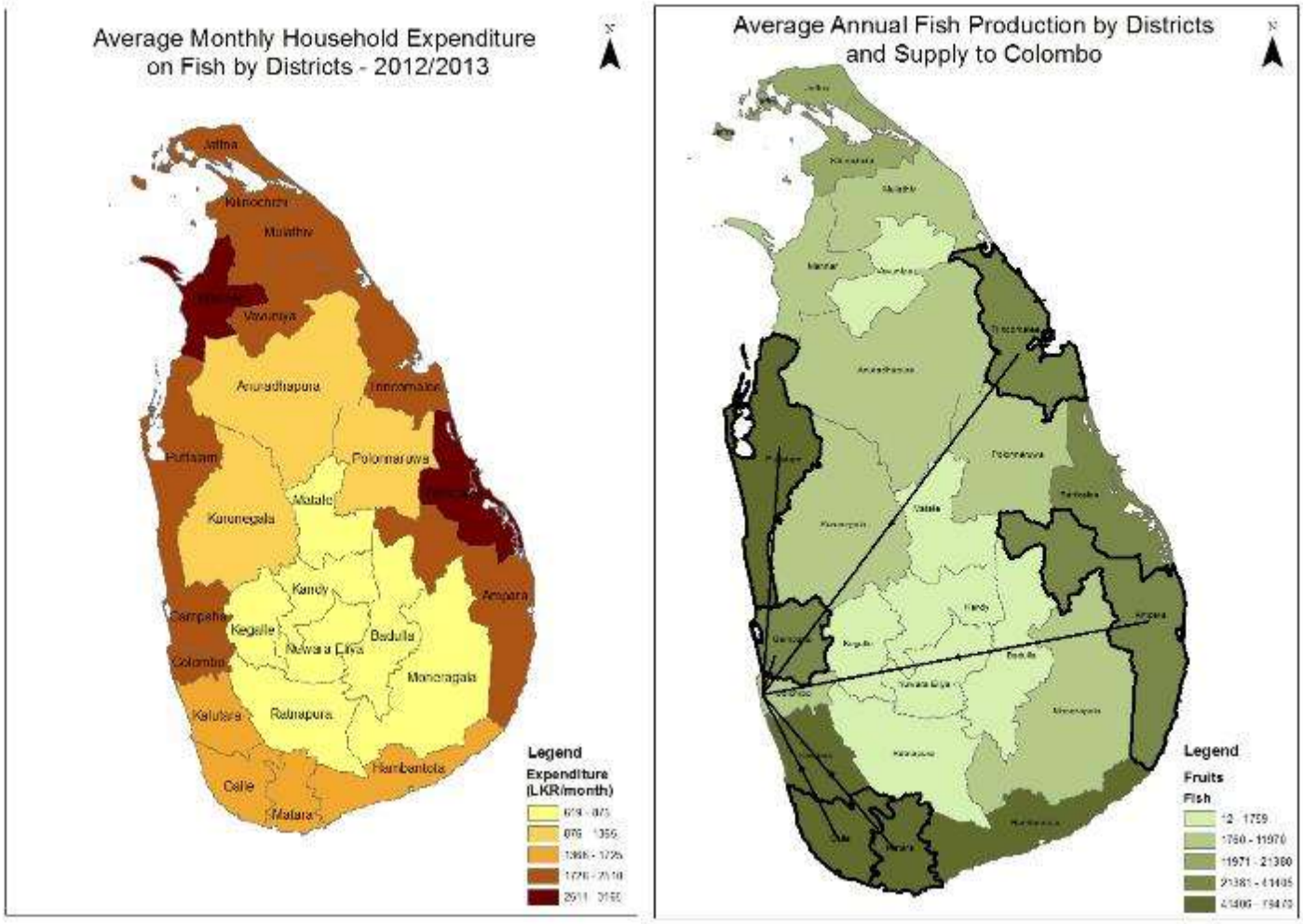


Figure 47. Fish consumption, production and supply to Colombo

6.3.2.4. Pulses

Pulses are recognized as popular vegetarian healthy diet in Sri Lanka and popular pulses are dhal, green gram, black gram, cowpea, soya, etc. According to past records of production, Sri Lanka has reached the self-sufficient level in pulses such as Maize, Gram, and cowpea[53]. According to the latest HIES records, an average Sri Lankan household spends Rs. 552 on pulses per month and its 3.5% from their total expenditure on food. Hence, pulses have become a significant aspect in Sri Lankan food culture.

There is a high demand for pulses in Colombo where an average household spend Rs. 579 per month, which is slightly above the national average expenditure. However, it is not the highest in the country. Average household expenditure on pulses recorded in Nuwara Eliya district is Rs. 737, which is the highest in the country followed by Jaffna (Rs. 663) and Kalutara (Rs. 649). Expenditure on pulses is relatively low in districts like Ampara, Batticaloa, and Mannar (Figure 48).

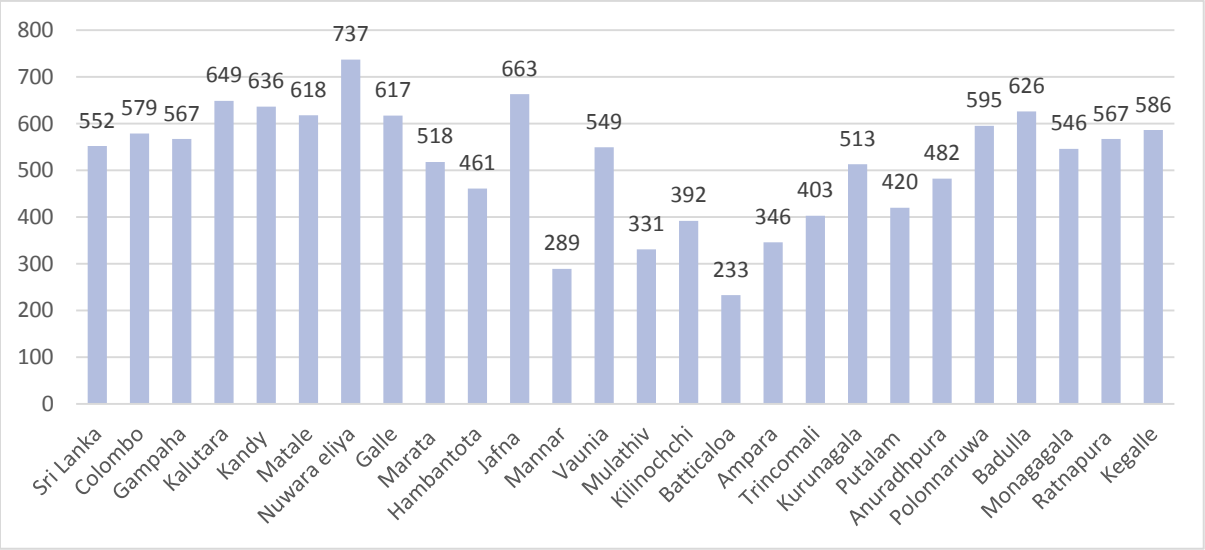


Figure 48. Average monthly expenditure on Pulses-2013 (Source: HIES 2012/2013)

[53] According to the Ministry of Agriculture, Sri Lanka produces 220,000 metric tons (MT) of maize per year while the need is 228,000 metric tons. The Ministry believes the balance quantity could be produced locally. The country's need for green grams is 24,000 MT per year and production is at about 26,000 MT per year. The requirement of black gram amounts to 12,000 MT while the production at present is around 15,000 MT (Source: http://www.colombopage.com/archive_12/Mar25_1332692259CH.php).

Table 13. Annual average open market prices of pulses in Colombo

PULSES	UNIT	2010	2011	2012	2013
GRAM DHAL	Kg	184.17	168.75	175.00	221.51
COWPEA - WHOLE WHITE	Kg	176.67	227.85	234.88	291.49
COWPEA - WHOLE RED	Kg	176.06	209.82	215.93	294.08
BLACK GRAM	Kg	315.00	298.89	303.06	274.55
GINGERLY SEED (CLEANED)	Kg	222.12	241.94	335.30	260.00
GROUND NUTS WITHOUT SHELL	Kg	214.97	270.76	315.45	426.46
MYSOOR DHAL	Kg	149.06	132.76	150.57	155.61

With the increasing demand, production costs, and importing costs, prices of pulses have continually increased in Colombo for the last few years in general and the price increase is provided in Table 13.

Compared to the open market prices of selected pulses, average monthly expenditure on pulses in Colombo (Rs. 579) indicates that an average household consumption is approximately 2-3 Kg, which includes dhal (one of the popular regular dishes in Sri Lanka). However, existing secondary data and statistics do not provide the consumption levels of individual pulse items in the list. Hence, it is difficult to discuss about the consumption patterns and demand for individual pulse item in detail[54].

The Ministry of Agriculture claimed that Sri Lanka is self-sufficient in pulses[55], but not all pulses are cultivated in Sri Lanka. For example, dhal is the most popular pulse in Sri Lanka but is not cultivated in Sri Lanka. Hence, the entire requirement of dhal is imported. Other pulses are produced locally and following section describe the extent of cultivation of selected pulses by districts.

Cowpea: Cowpea is an important legume crop in Sri Lanka. It is an inexpensive source of protein and a hardy crop well adapted to relatively dry environments. Cowpea is mainly cultivated in Ampara, Monaragala, Anuradhapura, Puttlam, Hambantota, Kurunegala, and Vavuniya districts (Error! Reference source not ound.). North and East districts cultivate cowpea, but in a lower extent. There is hardly any cowpea cultivation in Western province, where Colombo city is located. Hence, Colombo city heavily depend on cowpea supply from others who mass-cultivate.

Green Gram: Hambantota, Monaragala, Kurunegala, Anuradapura, and Vavuniya are major Green gram producers of Sri Lanka. In addition, Puttalam, Ampara, Kilinochchi, and Rathnapura districts have green gram cultivation to a lower extent (Figure 50). Colombo district including Gampaha and Kalutara do not have green gram cultivation. Hence, the green gram consumption in Colombo city entirely depends on other districts.

[54] Micro data file of the HEIS 2012/2013 would provide more detail information about the consumption of pulses; however, owing to financial constraints, it was not accessed during preliminary study

[55] http://www.itnnews.lk/business-news/sri-lanka-self-sufficient-in-pulses-suspends-importing-green-gram/

Black gram is one of the important grain legumes in the rain fed farming system in dry and intermediate zones of Sri Lanka. It can grow under low moisture and fertility conditions. It contains high content of proteins, vitamins, and minerals.

Presently, black gram is successfully cultivated in North central and Northern provinces, e.g. Anuradhapura, Polonnaruwa, Vavuniya, Killinochchi, Mulathivu, Batticaloa, and Jaffna districts and in Kurunegala and Puttlam districts (Figure 51).

There is hardly any cultivation in western province, hence Colombo city entirely depends on black gram cultivated in other parts of the country, which comes though the supply chains to Colombo city.

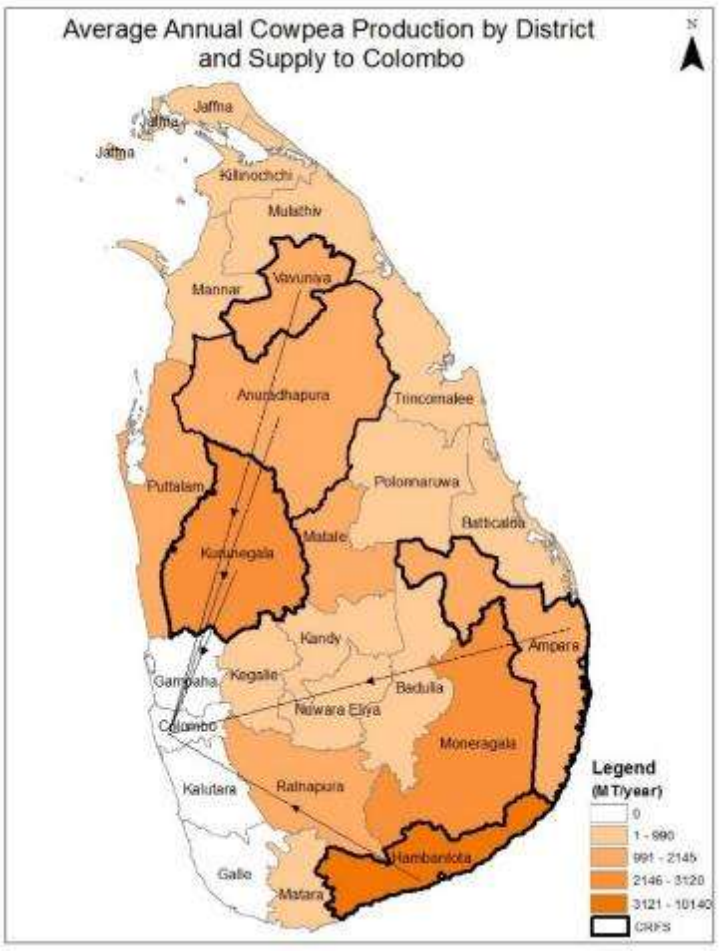


Figure 49. Cowpea production and supply to Colombo

Figure 50. Green Gram Production and Supply to Colombo

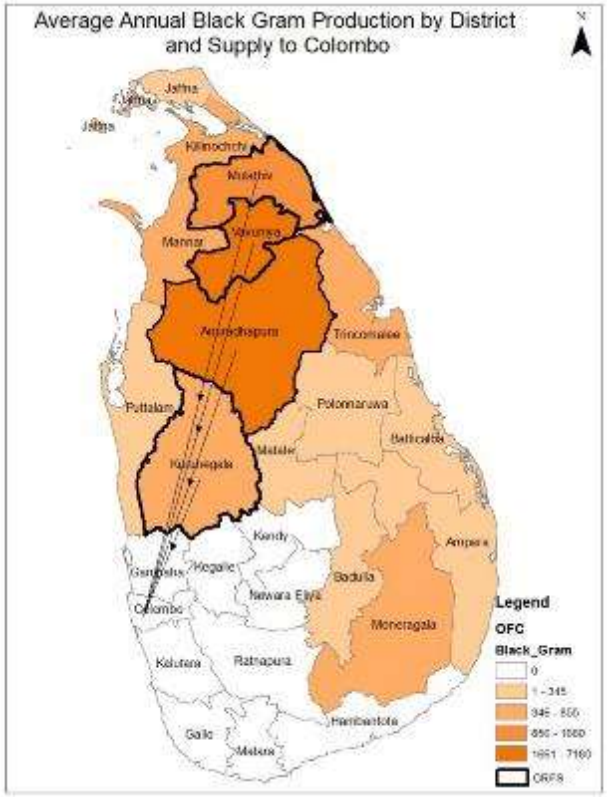


Figure 51. Black Gram Production and Supply to Colombo

❖ Generic Value chain of pulses received by Colombo city

Pulse farmers cultivate pulses largely using inorganic practices; however, with the recent development of discussions on organic farming, small extents have been cultivated under organic farming. Farmers have multiple options to sell their harvest: selling them to local collection centre, take them to distribution centres like Dambulla dedicated economic centre, or sell them to whole sellers who buy directly from farmers. Additionally, they can sell them to a super market chain after coming to an agreement with a super market. Pulse importers also have such variety of options to sell their products in pulse supply chain. Since there are number of intermediates engaged in the supply chain, retail prices increase at each stage (Figure 52).

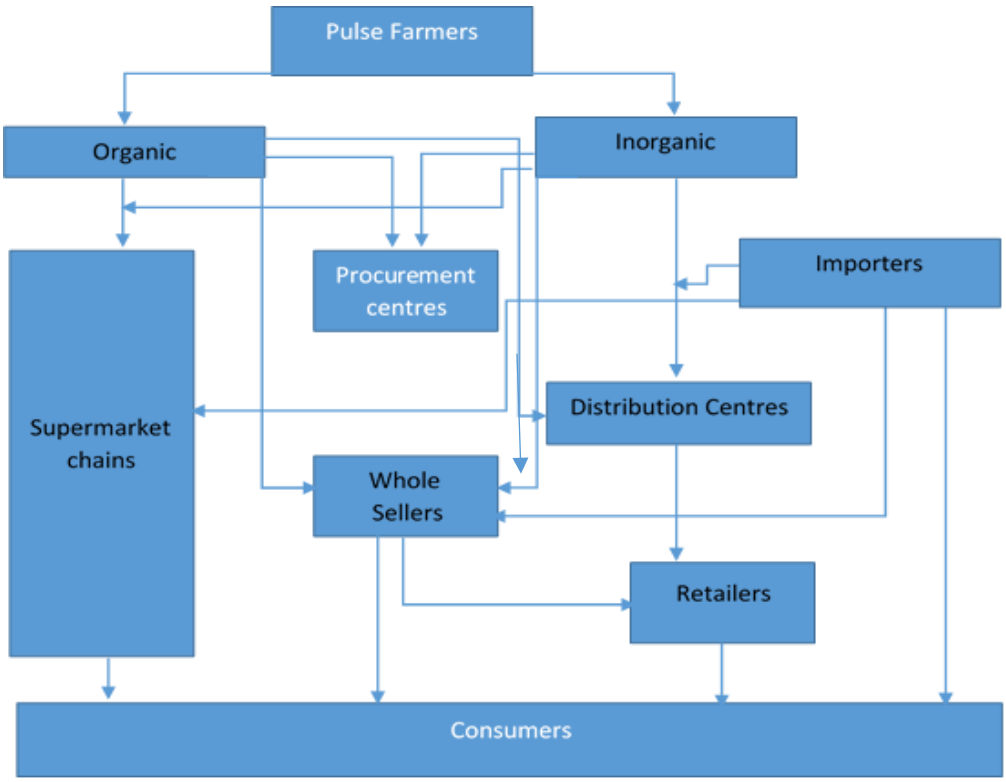


Figure 52. Supply chain options in Pulses

6.3.2.5. Dried Fish

Fresh fish is the main seafood product consumed in Sri Lanka. In general, the excess catch of the fish is converted to dry fish. Dry fish can be maintained without any special storages for months. There is a reasonable demand for dried fish and generally, it was the most popular non-vegetarian food among Sri Lankans owing to it unique salty flavor and comparatively low cost. Apart from the taste, dry fish are more popular and consumed by countryside dwellers due to lack of fresh fish supply because of lack of proper transportation and marketing facilities. The most popular dried fish is sprats, which has an average 129 g per-capita consumption per month. Balaya (type of tuna), keerameen (type of small fish), shark, and katta are other popular types among the Sri Lankans. Total dry fish demand of the country is fulfilled through local production and imports (Figure 53).

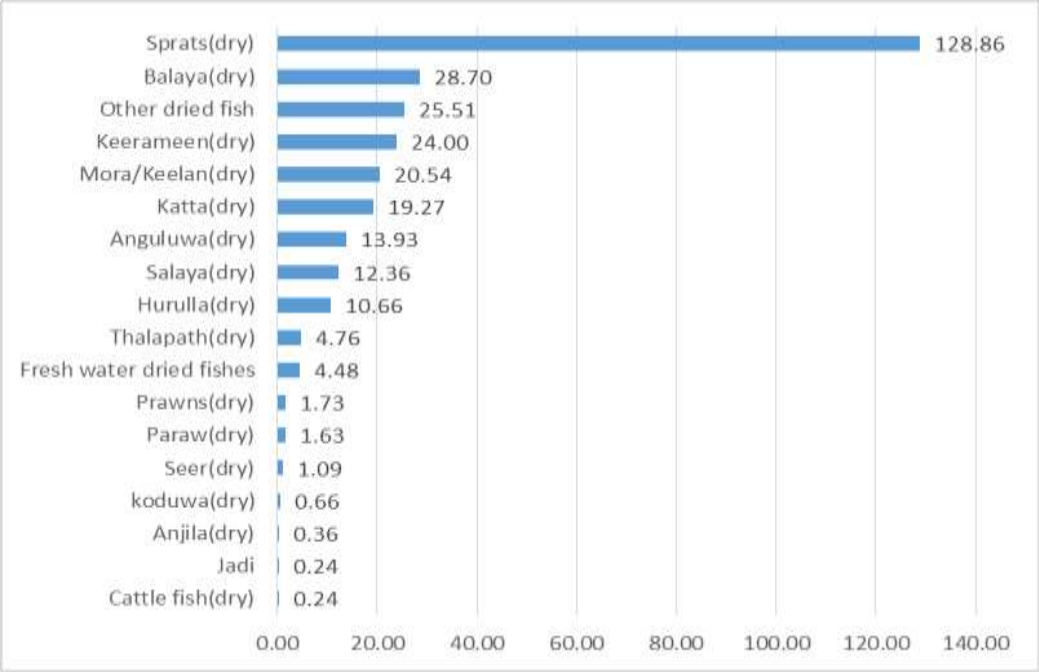


Figure 53. Monthly average per capita dried fish consumption by type

i. Expenditure on dried fish consumption

An average Sri Lankan household with four members spends Rs. 656 per month on purchasing dried fish. Household at Kalutara spends the highest amount Rs. 901 on dried fish, followed by Gampaha. However, average household monthly expenditure on dried fish in Colombo is only Rs. 706, which is the lowest in Western province but higher than the national average. In addition, Galle, Kurunegala, Kegalle, Puttalam, and Kandy districts record an expenditure higher than Rs. 700 on dried fish. Remarkably, dried fish making districts in Northern and Eastern provinces of the country have recorded the lowest spending on dried fish. Reason might be the presence of fresh fish for consumption than dried fish since they are the major printers of dried fish in Sri Lanka (Figure 54).

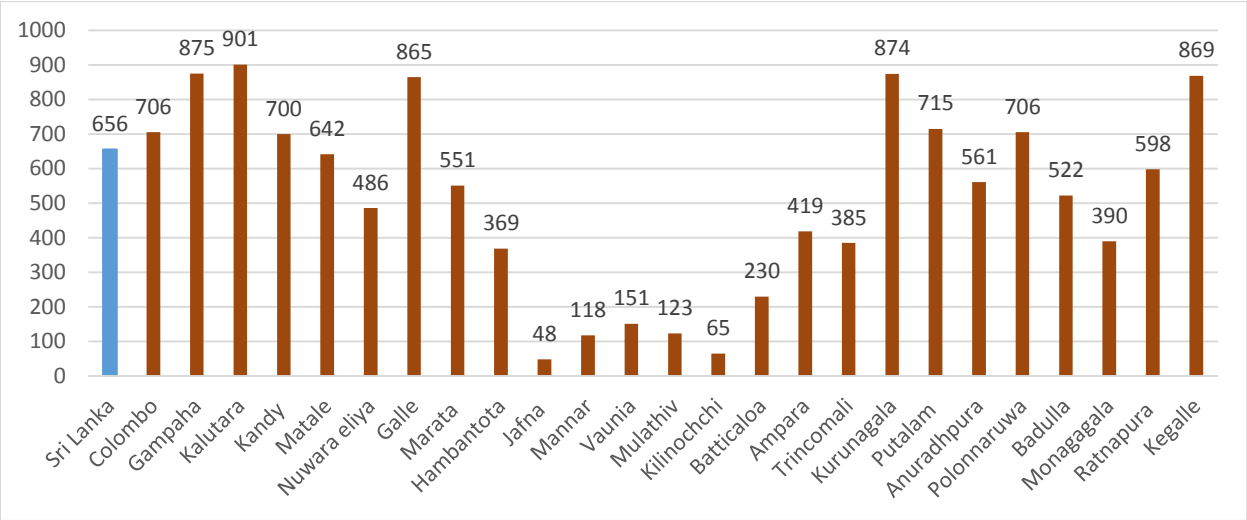


Figure 54. Average monthly expenditure on dried fish by district (Source: Department of Census and Statistics, HIES 2012/ 2013)

Among other food items, 1 kg of selected dried fish has recorded a relatively high price when compared with fresh fish, whereas minimum price of dry fish is Rs. 684 per Kg in Colombo open market. The mass content of the dry fish is higher than the fresh fish and since the consumption is in small quantities due to salty nature, price of dried fish is never get noted as high (Figure 55). Dried fish is not an inferior food item consumed only by poor in Colombo, though the consumption is common among poor.

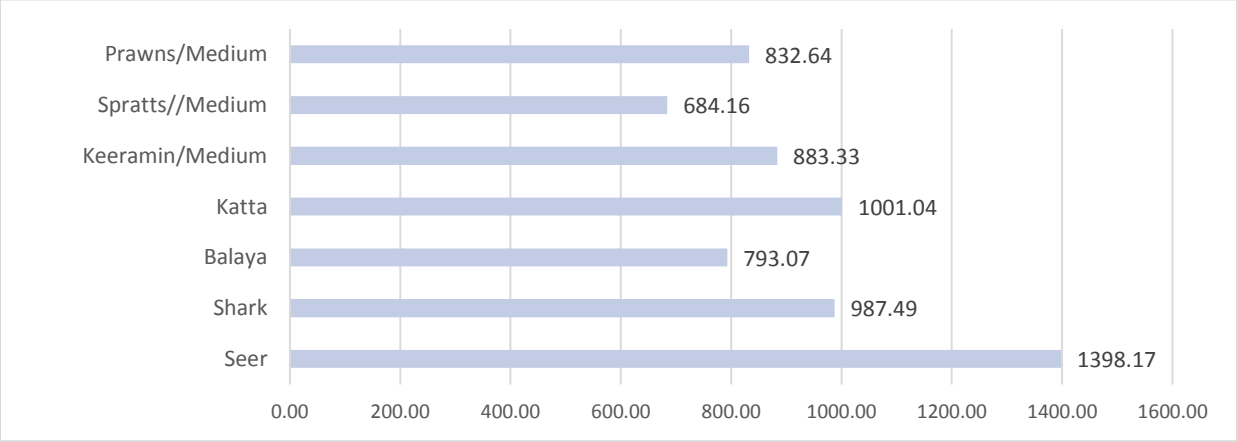


Figure 55. Open market prices for selected dried fish in Colombo (Source: Department of Census and Statistics, Bulletin of Selected Retail and Producer Prices, 2013)

ii. Dry fish supply to Colombo food market

Over 60% of dried fish demand is fulfilled through imports while the rest is from local production. However, the contribution of imports to the total demand has gradually declined since 2005. Because of that, in 2013, local dried fish production has contributed to more than 50% to the country's requirements. In detail, 30,410 tons of dried fish was imported in 2013 (Jan – Sep), which is about 39% of the total dried fish demand of the country. Among dried fish, Sprats are a major category and contribute around 24% to the total dried fish imports.

About 70% of local dried fish production of the country comes from Northern and Eastern provinces[56]. In addition, areas like Kalpitiya in Puttalam district and Negombo beach side in Gampaha districts are famous for dry fish industry. Dry fish industry in Southern province is relatively low. Apart from marine dry fish, districts such as Anuradhapura and Pollonnaruwa are popular for fresh water dry fish production, which is still not a large industry. The dry fish supply in Colombo district is presented in Figure 6.26.

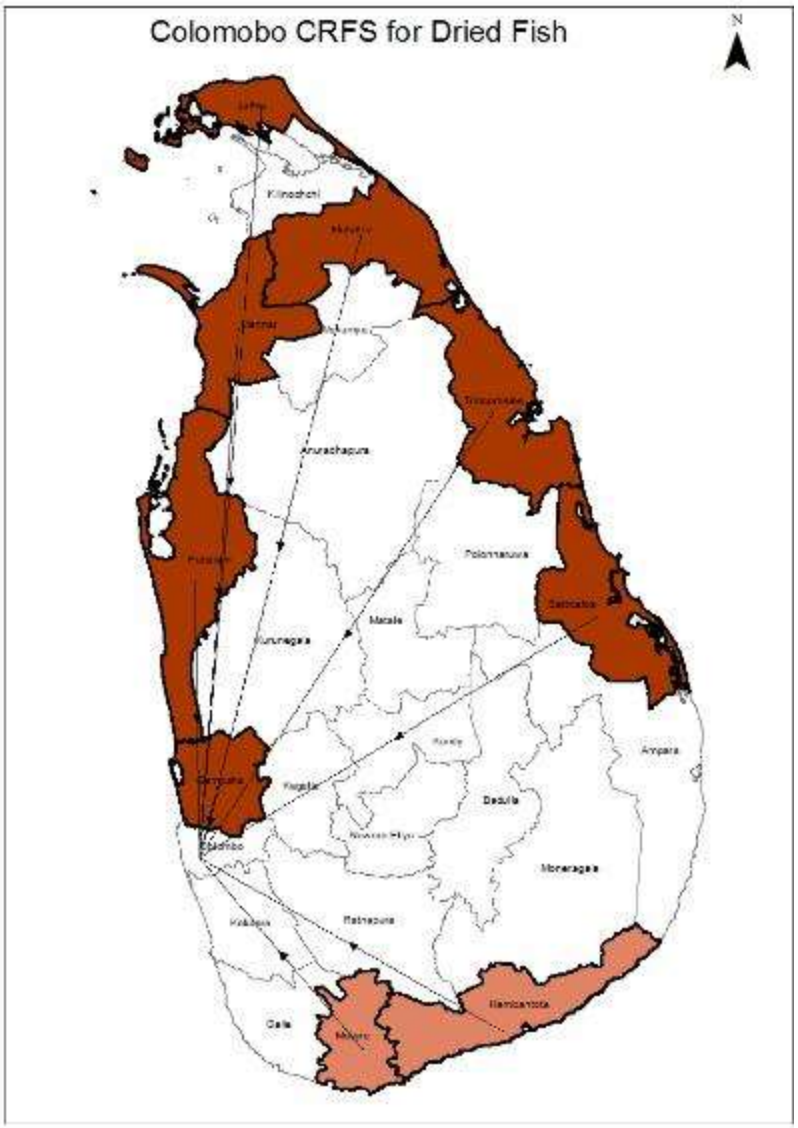


Figure 56. Dried fish supply to Colombo

iii. Dry fish value chain

Dry fish value chain in Colombo started with fish harvest, which comes mainly from coastal and deep fishing. There are large-scale and small-scale dry fish producers. Sri Lanka is a tropical country close to the equator with sunshine throughout the year and dry fish is produced using seashore and sun drying. In addition, a very few small-scale producers use smoking and traditional salt fish (called Jaddie) methods. There is an emerging trend of using dehydration machines for dry fish production (Figure 57).

[56] (Ministry of Fisheries and Aquatic Resource , 2013)

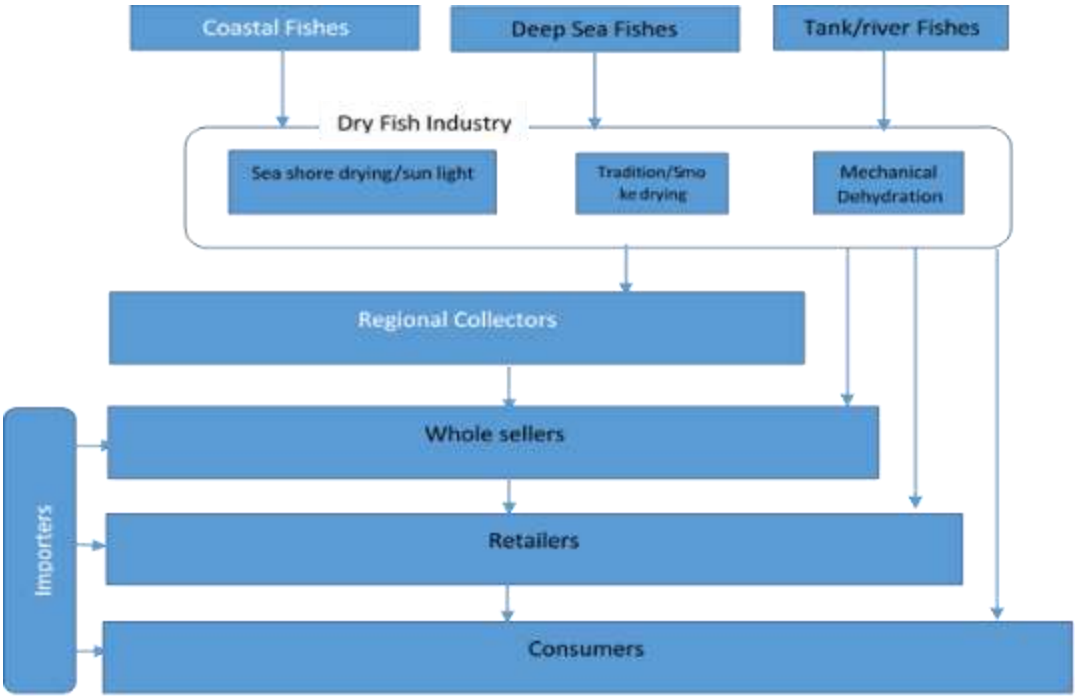


Figure 57. Dry Fish Value Chain and its partners

Once dry fish are made, there are few channels involved in transporting them to Colombo market. First, there are large-scale dry fish collectors in dry fish making areas who collect the production in order to sell them to wholesalers and retailers coming from other districts to buy dry fish. Apart from that, whole sellers and retailers are able to buy dry fish directly from the producers. Those who travel through dry fish making areas have the opportunity to buy dry fish in small quantities from the manufacturers, collectors, or wholesalers in the area. Apart from local production, many importers provide productions to whole sellers, retailers, and consumers in Colombo.

6.3.2.6. Cereals

According to HIES categorization, cereals include the major food items in Sri Lankan food culture, which includes rice, wheat flour, Kurakkan flour, Uludu flour, maize and the products made out of them. Irrespective of complex demographic diversity in Colombo, average person would consume ceareals in the main course of their three meals and snack they consume. On average household with four family members spends Rs. 2610 per month on cereals. Nuwara Eliya is a district with a larger Tamil community and has the highest spending on cereals which is Rs. 4076. In Colombo this amount is Rs. 2298, which is slightly less than the national average. The expenditure on cereals are remarkably high in districts where the major ethnicity is Tamil (Figure 58).

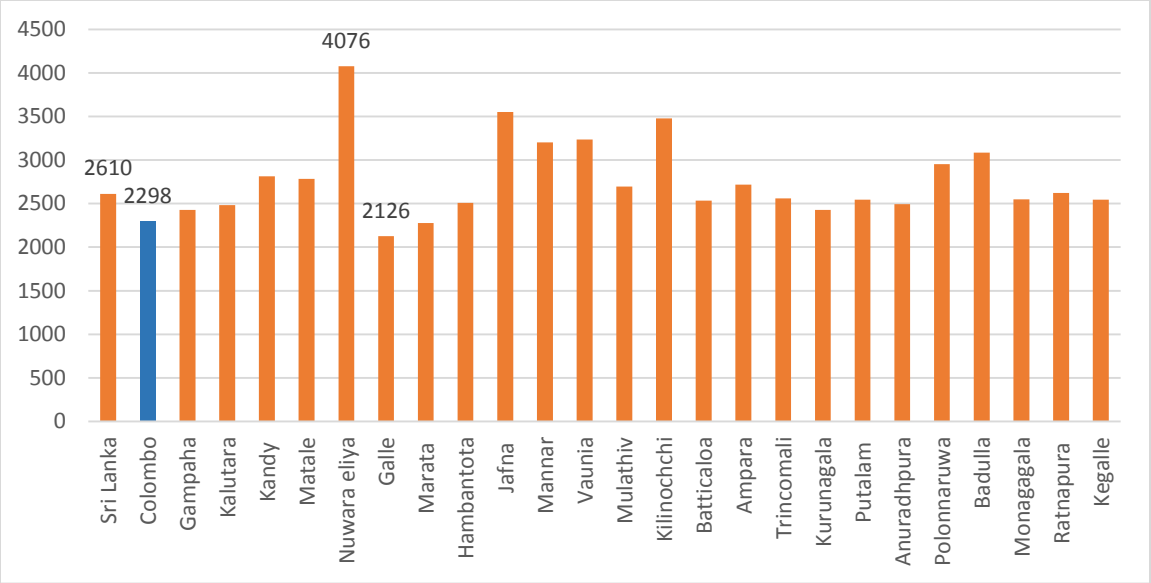


Figure 58. Average household monthly expenditure on Cereals

Rice is the main staple food item in Sri Lankan food culture and hence paddy farming has been the spine of Sri Lankan agriculture and has number of rice varieties (Figure 6.29). These varieties need different soil and climate conditions to cultivate. As a result certain rice varieties are cultivated in certain districts only. Hence the Colombo city rice supply is coming from various districts depending on the varieties in demand (Figure 59). Rice provides 45% total calories and 40% total protein requirement of an average Sri Lankan.

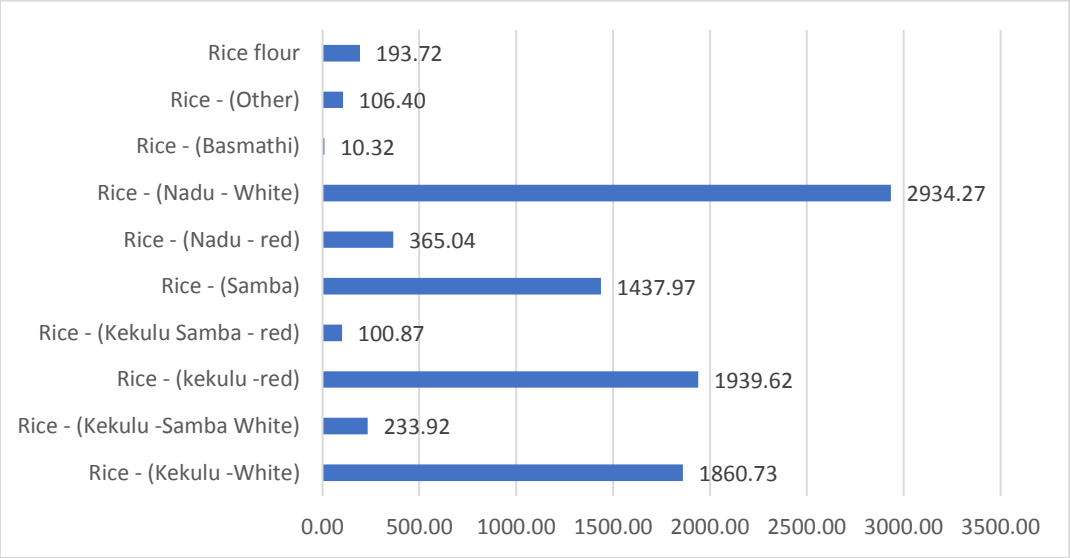


Figure 59. Monthly average per-capita rice consumption in Sri Lanka with variety (in grams)

Among all other cereals available in Sri Lanka wheat flour has shown high per capita consumption with 564+ grams per month. Second highest was noodles and pasta, which are also wheat flour based products. None of the other cereals have shown significant per-capita consumption level (Figure 60).

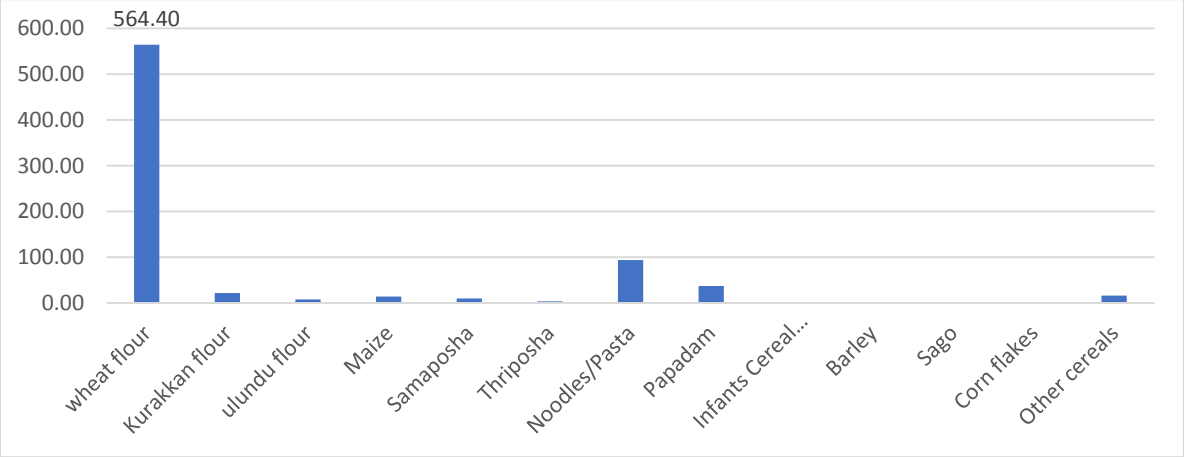


Figure 60. Average monthly per-capita expenditure on other cereals and cereal products (Papadam is an Ulundu based product, Smaposha is a mix of several cereals)

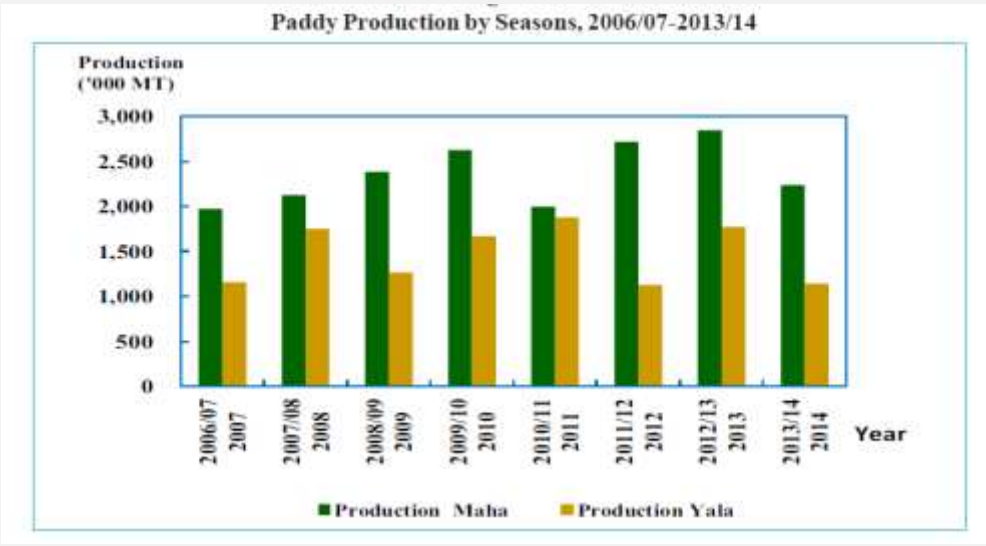
i. Rice supply

Rice is the single most important crop occupying 34% (0.87 million ha/yr) of the total cultivated area in Sri Lanka. As a result of the rain and water supply in the cultivation areas, seasonal variations in paddy farming shifts from region to region. However there are two major seasons of Paddy Cultivation as Yala and Maha based on two major rainy seasons in Sri Lanka in general (Figure 61). Most of the districts including Colombo involves in paddy farming, but there is hardly any paddy farming in CMC area. Hence total rice requirement in CMC has to be supply by either locally produced or imported rice. (Complete statistics about 2013/2014 Yala and Maha cultivation and yield[57] by district is presented in Appendix 1).

[57] Source: http://www.statistics.gov.lk/agriculture/Paddy%20Statistics/PaddyStats.htm

Box 6.8

"On average 560,000 ha are cultivated during Maha and 310,000 ha during Yala making the average annual extent sown with rice to about 870,000 ha. According to the past data, cultivation in general during the Maha season is higher than that of Yala season. About 1.8 million farm families are engaged in paddy cultivation island-wide. Sri Lanka currently produces 2.7 million t of rough rice annually and satisfies around 95% percent of the domestic requirement."



Paddy production by season 2006-2014 (Source: Department of Census and Statistics 2014)

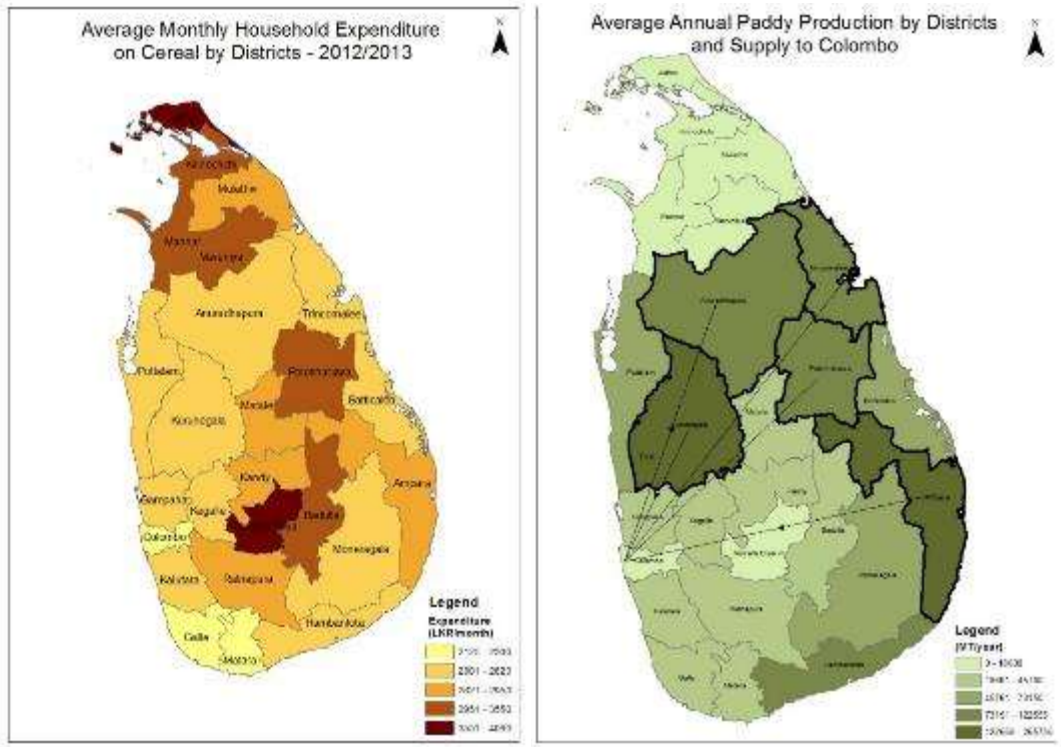


Figure 61. Average monthly expenditure on Cereals. Paddy cultivation areas and Supply to Colombo

ii. Wheat Flour

Wheat is not cultivated in Sri Lanka due to lack of the required climatic conditions. Hence the total requirement is need to be imported from other countries. The imports are mainly as grain wheat. Sri Lanka is known for its value added re-exporting of wheat (i.e. the grain wheat is imported and processed to wheat flour in Sri Lanka and exporting to countries like Indonesia).

Prima Group located at the Trincomalee port had the monopoly in supplying wheat flour to Sri Lanka till year 2008 and from 2008 Serendib Mills Company located at Colombo port has become the second supplier of wheat flour. Both companies import raw wheat to Sri Lanka and produce wheat flour at the plants located at Trincomalee and Colombo ports. These two companies have been the major suppliers of wheat flour in the country since 2008 (Figure 62).

Figure 62. Supply of wheat to Colombo Market and Sri Lanka

iii. Maize and Kurakkan

After rice and wheat consumption, maize and kurakkan are the two cereals which has some popularity in Colombo. Kurakkan has been promoted for its positive health effects against major non-communicable dieses such as diabetics common in Colombo city and in Sri Lanka. Maize is a popular food item in where road side sellers sell boiled corns to people who pass by.

Figure 63. Road side maize seller

Maize is the most important coarse grain, for which around 32,000 ha of land area devoted annually for cultivating maize; it is the second highest extent of land next to rice. Our annual maize requirement is about 200,000 mt from which we import about 125,000 mt at a cost of rupees 1169 million rupees, mainly to be utilized in the provender industry. Local consumption is estimated to be 33,000 tons and the estimated requirements for Thriposha (high nutrient cereal based food is distributed freely among children and the pregnant women by the government). In addition other maize products consumed such as corn flakes, corn oil, corn starch and corn flour are imported for different uses. Virtually maize is utilized for production of over 500 different products and bi-products worldwide[58].

The highest maize cultivation extent had recorded in Anuradhapura and Monaragala districts. Apart from those Ampara, Badulla, Kurunagala, Batticaloa and Trincomalee districts have somewhat higher extents of cultivations in year 2014. There are no specifically explicit wholesale and retail sellers who sell corns but there is more systematic supply chain with collectors, wholesalers and retailers for dried maize seed that are largely used as animal food rather than human food.

On contrary to maize, kurakkan is solely utilized for human consumption, gaining popularity as a relief food for diabetics. A shift in farming systems (traditionally rain fed to irrigate) for kurakkan cultivation as shown positive results and yields per unit area has increased. At the same time, the land area cultivated has continually dropped during past years. Kurakkan is mainly cultivated in Anuradapura district. Apart from that Monaragala, Kurunegala, Hambantota have somewhat higher extent of Kurakkan cultivations. There

[58] http://www.agridept.gov.lk/index.php/en/crop-recommendations/1026

are other districts like Jaffna, Ampara and Badulla have smaller extent of cultivations (Figure 64). There are collectors and whole seller in cultivating districts who collect the harvest and supply to branded mills or other local mills to make Kurakkan flour. Branded mills purchase in large quantities and packed kurakkan flour distribute to all over Sri Lanka under their brand name. Local and small scale mills grind and sell to local retailers. Specially prepared kurakkan food makers use such unbranded kurakkan flour in bulks to make their instant food items like string hoppers, pittu mixtures.

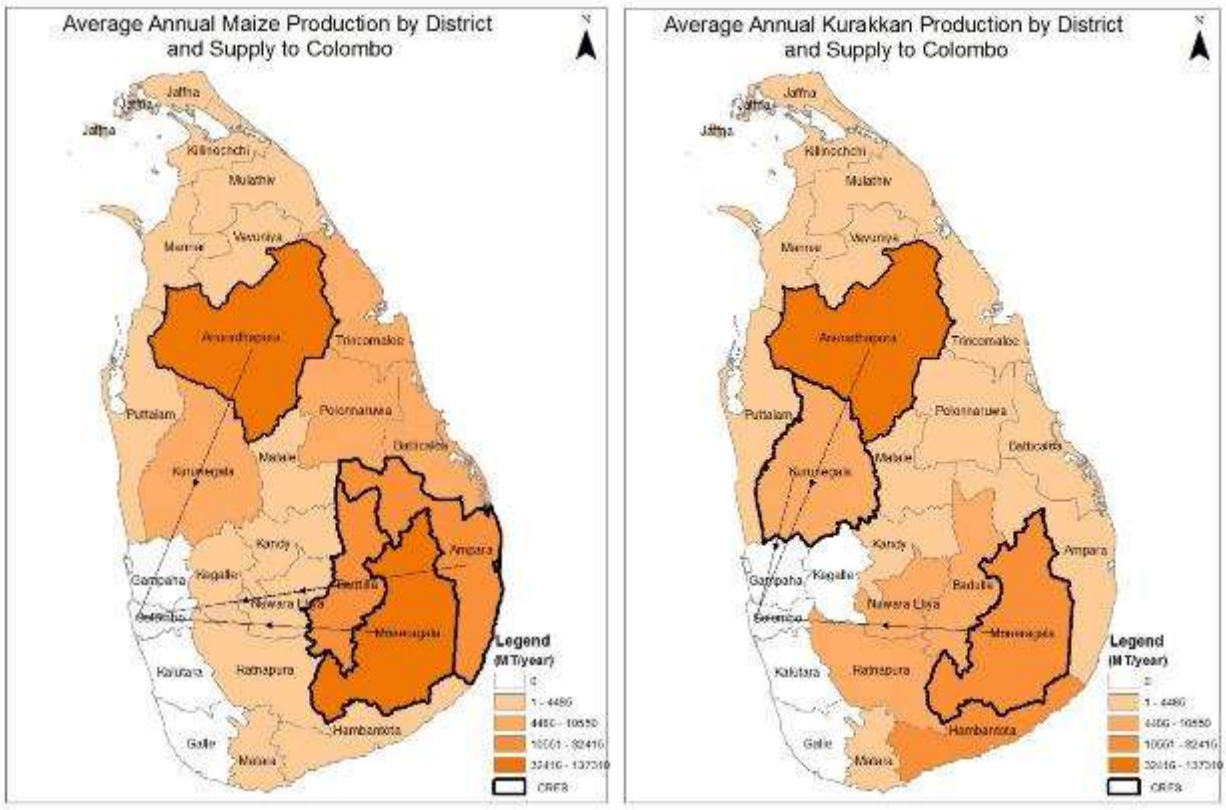


Figure 64. Average annual maize and Kurakkan Production and supply to Colombo

In cereal sector there are numerous intermediates playing different roles. Since cereal products need grinding and mills require large quantities to operate economically. There are collection centers which collect harvest from the farmers and either sell the collection to mills or use the mills to produce rice, maize, kurankkan flour etc. Since there are two entities which import the wheat, they own their own large mills and produce both branded flours and processed products.

The cereal value chain is presented in Figure 65.

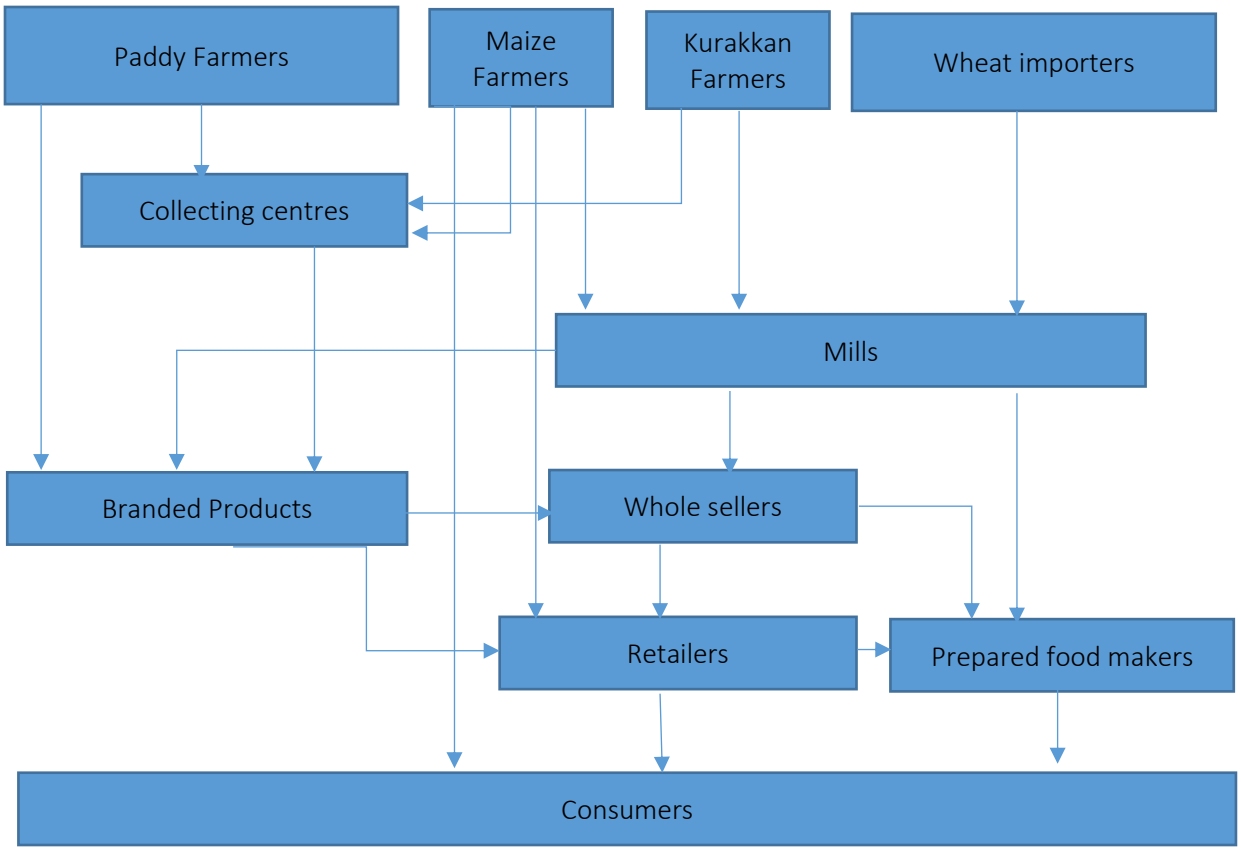


Figure 65. Combined value chain of selected cereal products

6.3.2.7. Condiments

There are many condiments are used in Sri Lankan food system and three major types are; Chillie, Red Onion and Big Onion. This three types are discussed under condiments. As a result of the seasonal local supply, these condiments have both local and imported supply avenues.

Chillie is one of the most important cash crops grown in Sri Lanka. It has become an essential ingredient in Sri Lankan meals. According to the latest statistics provided by the department of Agriculture, per capita consumption of chillie in the form of dry chillie is estimated 2.32 kg per annum and the national annual requirement of dry chillie is around 42,634 MT. The annual national production of dry chillie is about 18,616 Mt, therefore, an amount of 31,242 Mt is to be imported. Chillie contributes on an average Rs. 750 million to GDP and creates employment of 14 million work days annually.

Chillie is extensively grown for dry chillie production in the dry zone of the country, but part of the crop is harvested as green pods. The average extent under chillie at present is around 14,083 ha, of which 2/3 is cultivated in maha season. Major chillie growing

districts are Anuradhapura, Moneragala, Ampara, Puttalam, Vavuniya, Kurunegala, Hambantota[59] (Figure 66).

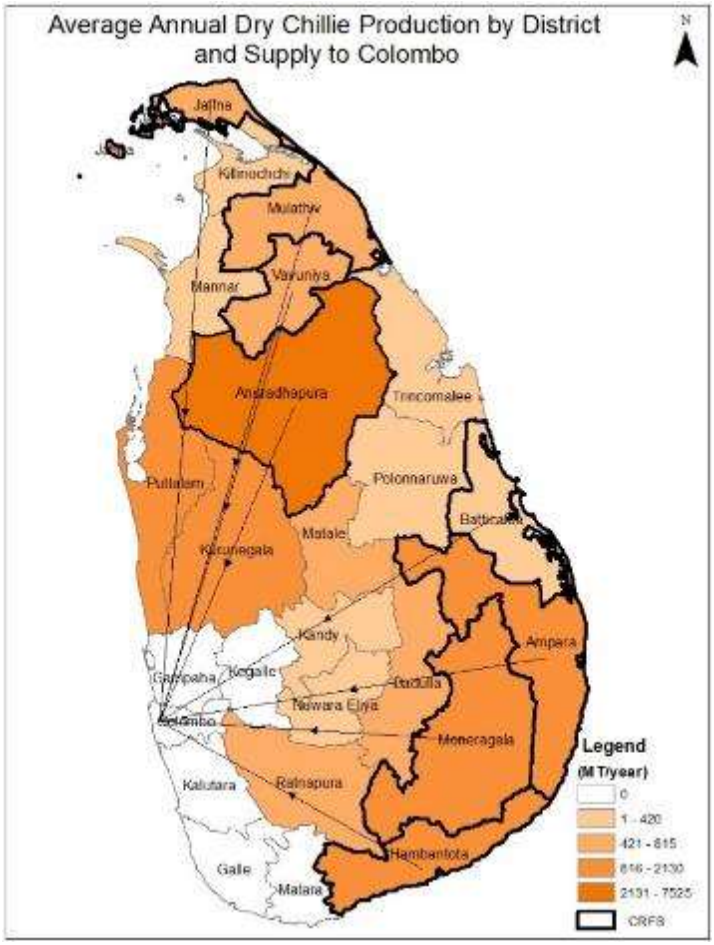


Figure 66. Average annual dry chillie production by districts and supply to Colombo

Red and Big onions are daily necessity in Sri Lankan Kitchen. Both onions are seasonal crops where in certain months there is large local supply. Rest of the time onions are importing from India and Pakistan in large quantities. However, Ministry of Finance continuously regulate the both local and import onion supply by imposing certified prices and import taxes against the onion imports. Red onion is mainly cultivated in Jaffna, Kilinochchi and Puttalum districts. Apart from those districts somewhat less extent is visible in Vavunia, Mulathivu, Trincomalee and Hambantota (Figure 67).

Supply chain of the Chillie and onions are similar with the parties and channels involved. There are two major supply channels; local and imported. Farmers have multiple options to sell their harvest to either collectors, whole sellers, dedicated economic centres and for low extent sell directly to the consumers. Imported Chillie and onions find the way to Colombo market through the importers and whole sellers. With the emerging super markets, there is demand for packet or branded onions which requires premium quality and selling at higher price than the market price. Prepared food industry in Colombo requires onion in large

[59] http://www.agridept.gov.lk/index.php/en/crop-recommendations/1470

quantities and they are mainly buying them from commission agents or whole sellers. Please refer the Figure 68.

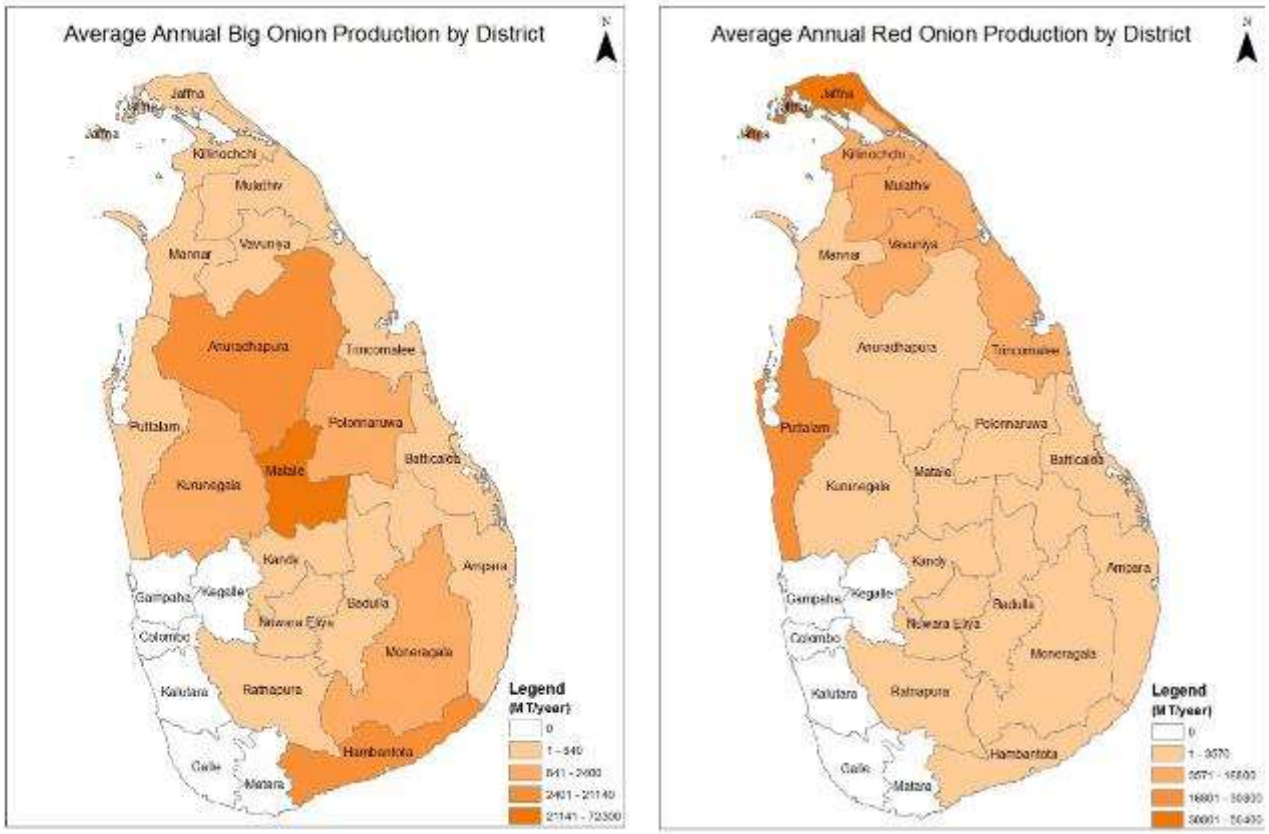


Figure 67. Major Big onion and Red onion cultivated districts (Source: Ministry of Agriculture, 2014)

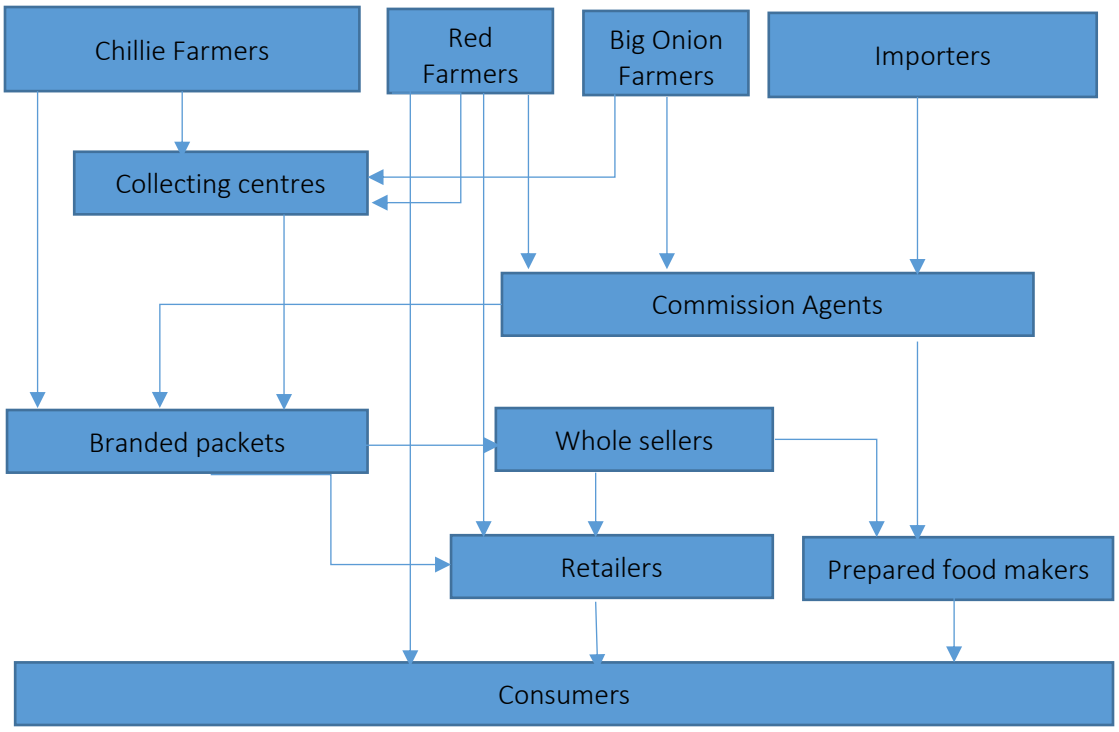


Figure 68. Condiments supply chain

6.3.2.8. Coconut, fat and oils

Sri Lankans spend 5.5-7.5% of their income on coconuts. Sri Lankan use coconut milk as the base to cook curries, which is a major part of the country's food culture. Coconut oil is the main cooking oil in use. Apart from that exported oils such as sunflower, olive, palm oils are in the market. Coconut consumption in Colombo district is 90 nuts and 6.9 bottles per capita per year and this is lower than the national average which was 104.8 and 7.2 per capita per year as of 2006[60] (Table 14).

Coconut palm need sandy soil and tolerate for salinity. Colombo-Kurunegala-Colombo called as the coconut triangle, which is the area consists of large coconut plantations (Figure 69). The Figure 70 shows the Colombo food system for coconut and the same represents the oil supply with additional exports.

Table 14. Monthly per capita consumption of coconut products (Source: Consumer Finance Survey, 2006-2007, Dept. of Census and Statistics, 2011)

Item	**Unit**	**Quantity**
Coconut oil	ml.	318.26
Vegetable oil	ml.	15.84
Coconuts	no.	8.18
Coconut milk powder	grams	0.56
Other processed coconut products	grams	0.14

[60] Source: http://www.cri.gov.lk/web/images/stories/statistics/satistics_on_coconut_oil_palm.pdf

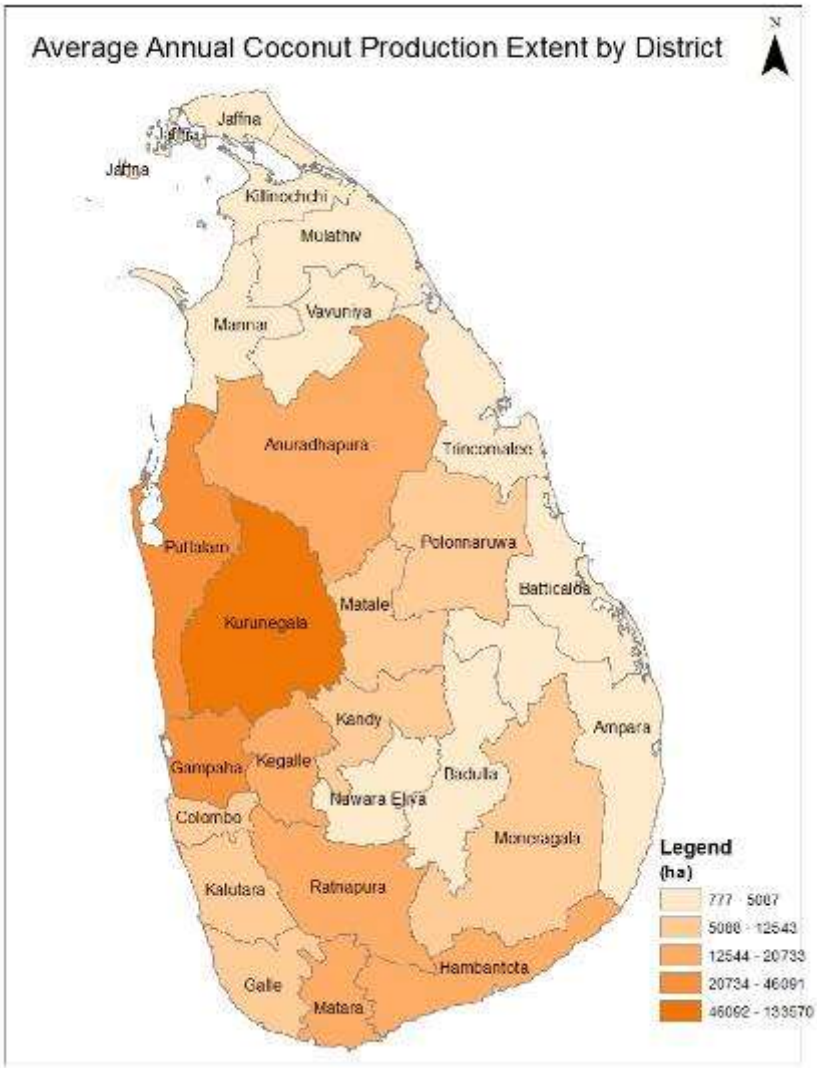


Figure 69. The annual Coconut Extent (ha)

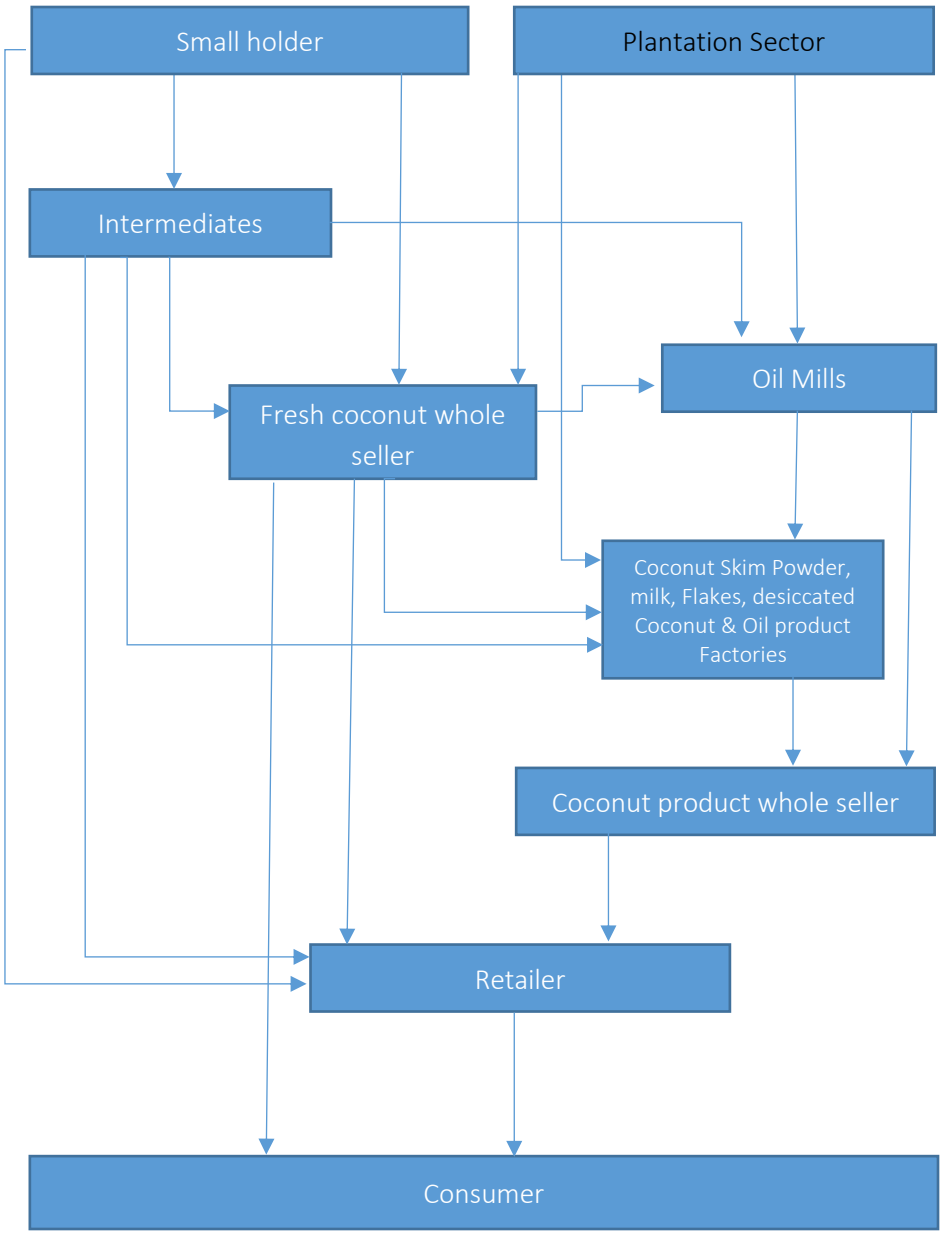


Figure 70. Generic value chain of coconut and oil supply in Sri Lanka

6.3.2.9. Sugar

Sri Lanka imports 94 percent of the sugar requirement, spending a colossal Rs. 55 billion in foreign exchange. The population increase and the increase in the incomes are likely to increase the sugar consumption significantly over the next 10-15 years. By 2020, the demand may approach one million mt. of sugar. Surprisingly Sri Lanka's second highest import bill is for sugar. Two large scale sugar cane factories in Sri Lanka Sevenagala and Pelwatte are only able to produce 6% of the total demand of the country[61] (Figure 71).

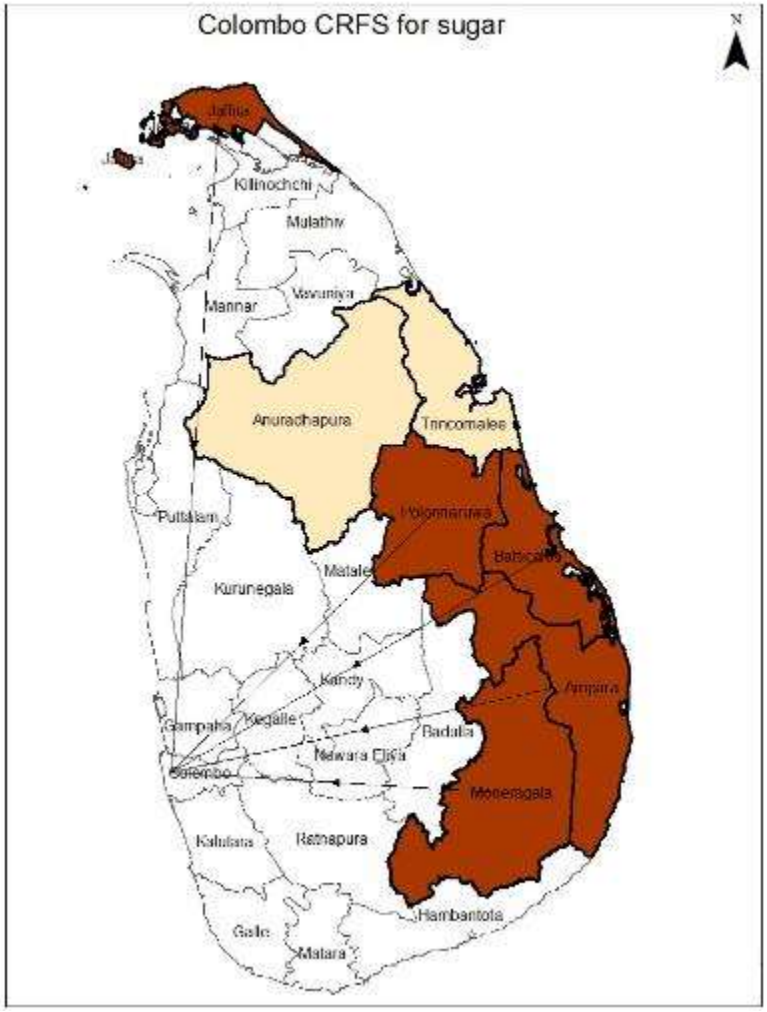


Figure 71. Sugar supply to Colombo
(Source: http://www.cri.gov.lk/web/images/stories/statistics/satistics_on_coconut_oil_palm.pdf)

[61] Source: http://www.sundayobserver.lk/2013/02/10/fea10.asp

6.3.2.10. Milk and milk products

The local milk production, (especially milk and milk products) is sufficient only to meet 33% percent of the requirement at current consumption rate. The balance amount is supplied by the import parity which cost around Rs. 27 billion annually. Per capita consumption of milk and milk products in Sri Lanka is low compared to other South Asian countries and at present per capita consumption of milk is 3.6kg/year (Figure 72). The cattle and buffaloes are reared in five major agro climatic zones; UP Country, Mid Country, The Coconut Triangles, Low Country Wet Zone, and the Dry Zone[62] (Figure 73).

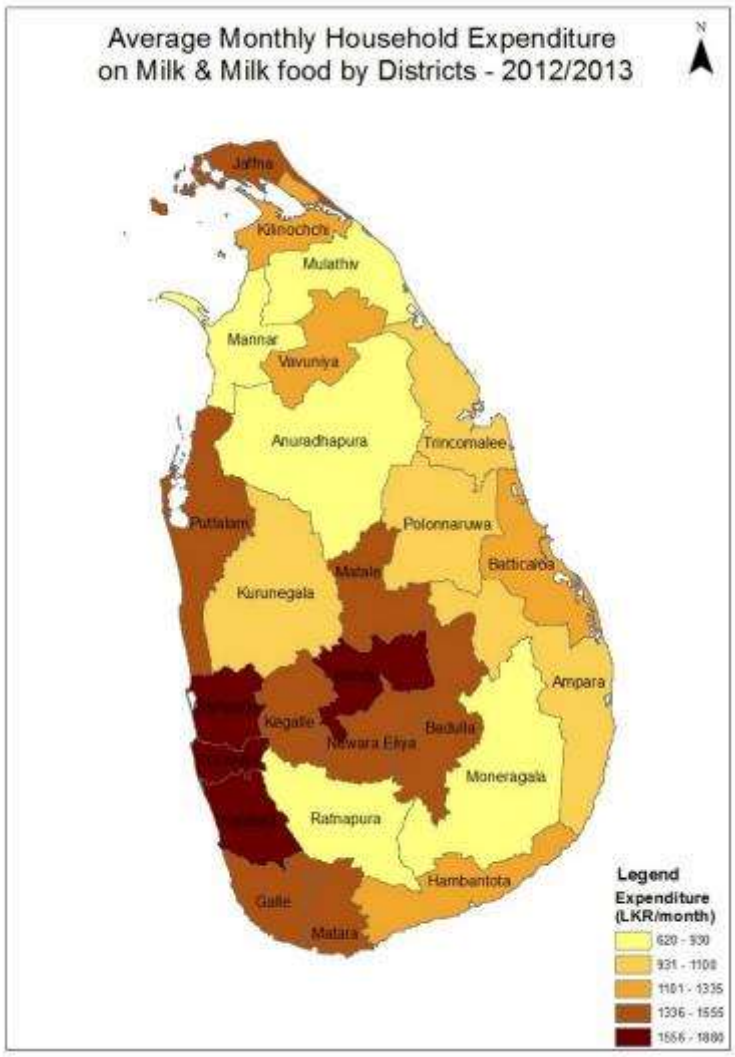


Figure 72. Monthly household expenditure on milk and milk food by district

[62] Source: http://www.livestock.gov.lk/site/images/stories/dairy_deve.project_rev_150_last.pdf

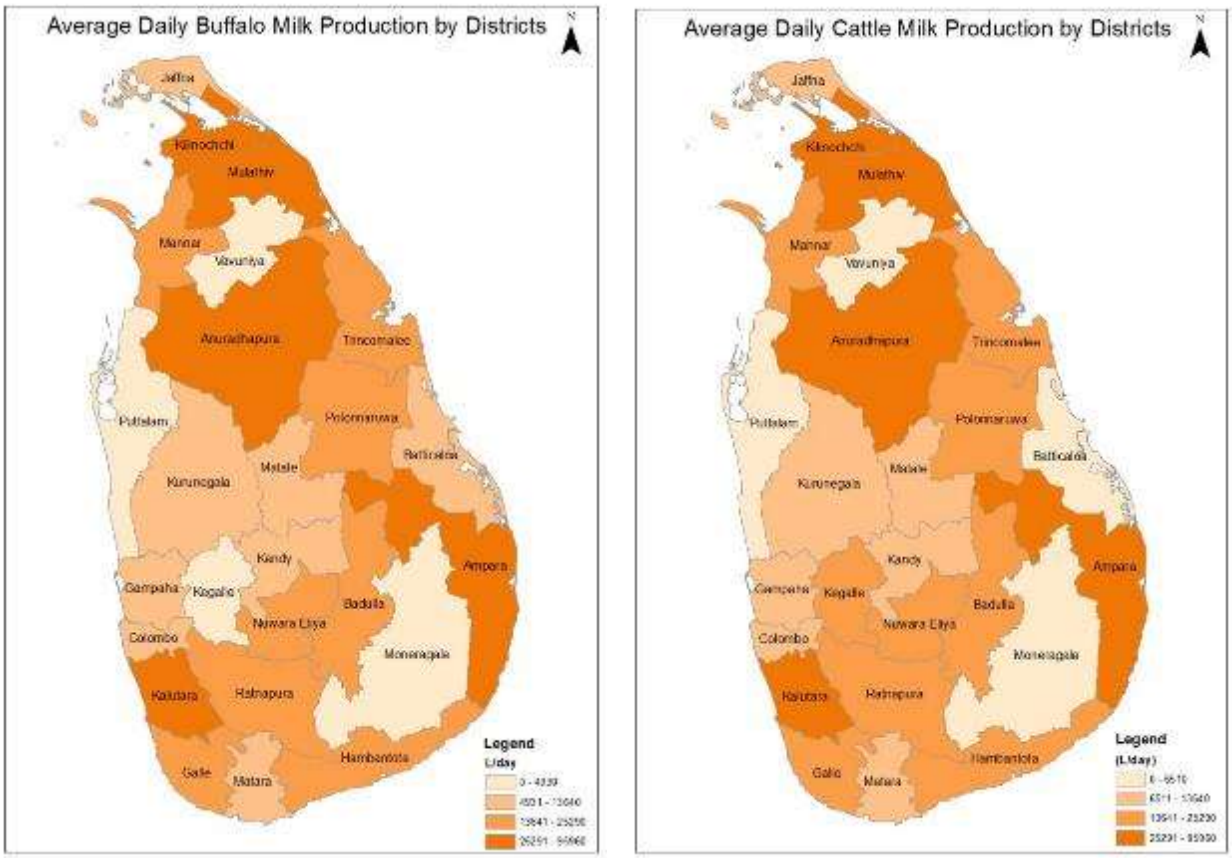


Figure 73. Milk supply to Colombo

6.4. FOOD STORAGE, PROCESSING AND WHOLESALE

6.4.1. Food Storage

Generally, a common storage facility lacks for fruits and vegetables. The usual practice of farmers is to harvest the product (especially fruits and vegetables), when there is way to transport the harvest directly to market. Normally, there are small and large scale vegetable and fruit collectors in farming areas, who collect the harvest from the farmers. Due to the absence of storage facilities with farmers, large volumes of vegetables and fruits from one area frequently arrive the market in same day. If the demand for the product is less, or the product is over-supplied, prices on that particular day are drastically reduced.

Commission agents and wholesalers in special economic centres at Dambulla or at Manning Market have no space to store surplus supply for a reasonable time. In case of excess supplies to the market, there is no post-harvest food processing centers close to economic centers or wholesale markets. Hence, vegetable and fruit prices are volatile than other food commodities in Sri Lanka and it directly influence low income earning buyers, farmers, and members of supply chain.

In Sri Lanka, rice is the only food commodity with reasonable storage facilities. As the paddy production is seasonal, it is inevitable that the surplus production needs to be stored to meet the demand during off seasons. Even if paddy is imported, still it needs to follow a storage period until released to the market. Although stored paddy is a durable agricultural commodity with low moisture content of about 13%, still it is subjected to deterioration by various external factors. Studies conducted in Sri Lanka have revealed that more than half of the storage losses of grains are due to insect attack. The government and private sector stores rice during the harvest period for the out-of-the season consumption, and the normal storage period is up to 6 months[63].

Box 6.9

Post-harvest loss of rice in Sri Lanka is around 15%. Among many factors generating post-harvest losses, the highest loss of 5 - 6% is caused by insect pest damage in storage. Some literatures claim that losses in stored rice due to insect pests could increase even up to 8.8%. Department of Agriculture recommends sun drying and spraying the recommended dose of prescribed chemicals to control storage pests in cereals and legumes. Some traders apply certain other toxic insecticides for pest control and for an example some studies have revealed malathion residues in the range of 5-6 ppm in cowpea.

Source: http://agrilearning.goviya.lk/Paddy/Paddy_Research/Paddy_pdf/PH5.pdf

6.4.2. Processing and Manufacturing

Apart from spices and some other pre-cooked products, the post-harvest food processing and manufacturing industry in Sri Lanka in insignificant. Around Dambulla, Meegoda, and Narahenpita economic centers, and in the Manning market, vegetable and fruit processing, and product manufacturing facilities are not available.

Note: However, there is an emerging fruit juice industry in Sri Lanka where a mix of large and small-scale manufacturers involved in providing bottled fruit drinks to the market.

[63] http://www.dailynews.lk/?q=2015/10/01/features/dilemma-stored-paddy-insect-pest-infestation
http://www.doa.gov.lk/index.php/institutes/142

Owing to the complex socio-demographic profile and busy life style, citizens in Colombo have diverse needs when it comes to prepared food. This complexity has paved way to well established prepared food supply chain in Colombo, where all the segments can satisfy their needs. Most common mode of getting prepared food is from hotels and restaurants, which ranges from five star hotels to small town hotels and restaurants. Since these hotels and restaurants are widely available in the city, households, workers, and the floating population have easy access to prepared food.

Box 6.10

There are five major types of prepared food suppliers in Colombo. First, there are international franchised food suppliers such as McDonalds, KFC, Pizza, Dominos, and Subway. Second, there are local prepared food suppliers such as Perera and Sons, fab, Steam boat, and Sen-sal. Third, there are institutional food providers who supply prepared food for schoolchildren, university students, armed forces, hospital patients, and prisoners. Fourth, the most common form of prepared food supply in Colombo standalone hotels and restaurants, which target different income segments. Finally, static small-scale food stores, who sell their prepared food, and the mobile units, who sell prepared food, with the use of vehicles.

6.4.3. Food Wholesale

Before introducing the concept of Dedicated Economic Centers, the Manning market[64] managed the entire vegetable and fruit harvest distribution throughout Sri Lanka. Currently, 12 dedicated economic centers in Sri Lanka act as wholesale markets, namely; Thambuththegama, Nuwaraeliya, Kappetipola, Kurunduwaththa, Welisara, Veyangoda, Narahenpita, Embilipitiya, Meegoda, Piliyandala, Dambulla and Rathmalana. Still the Manning market in Colombo acts as the wholesale market for fruits and vegetables to Colombo and many other regions. Traders and farmers throughout the island daily visit Manning market with their harvests. Apart from the Manning market, there are 18 other relatively large markets located in Colombo city limits including the markets in Maradana, Grandpass, Dematagoda, Borella, Wellawatta, Kirulapna, etc. Unlike the Manning market, these markets are largely involved in retail business of vegetables and fruits purchased from the Manning market.

[64] Interview with commission agents at manning market

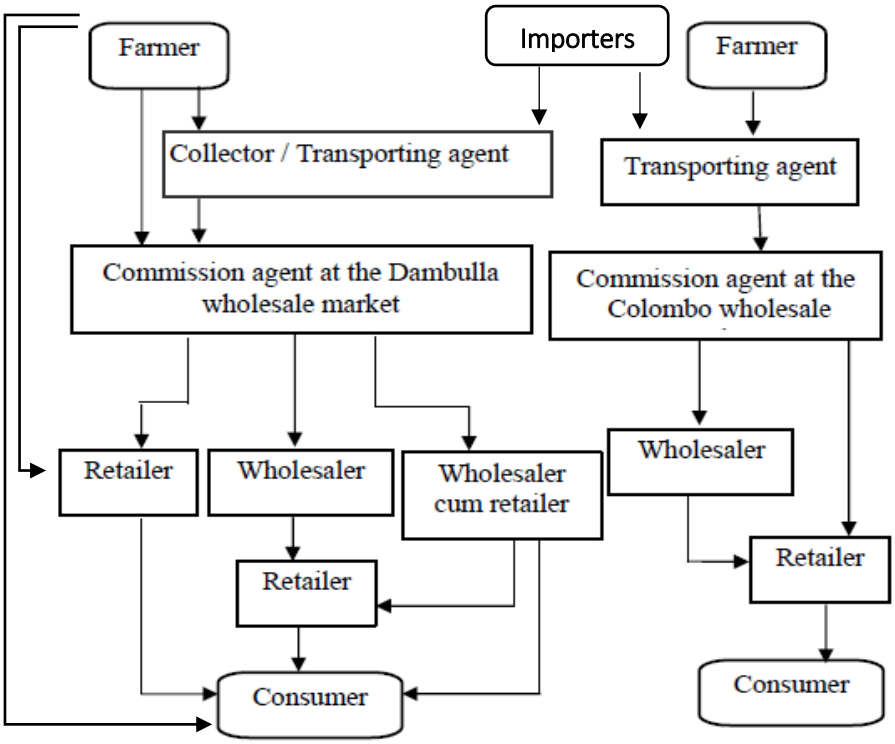


Figure 74. Traditional Food supply chains (Source: Adapted from Perera, Kodithuwakku, & Weerahewa, 2004)

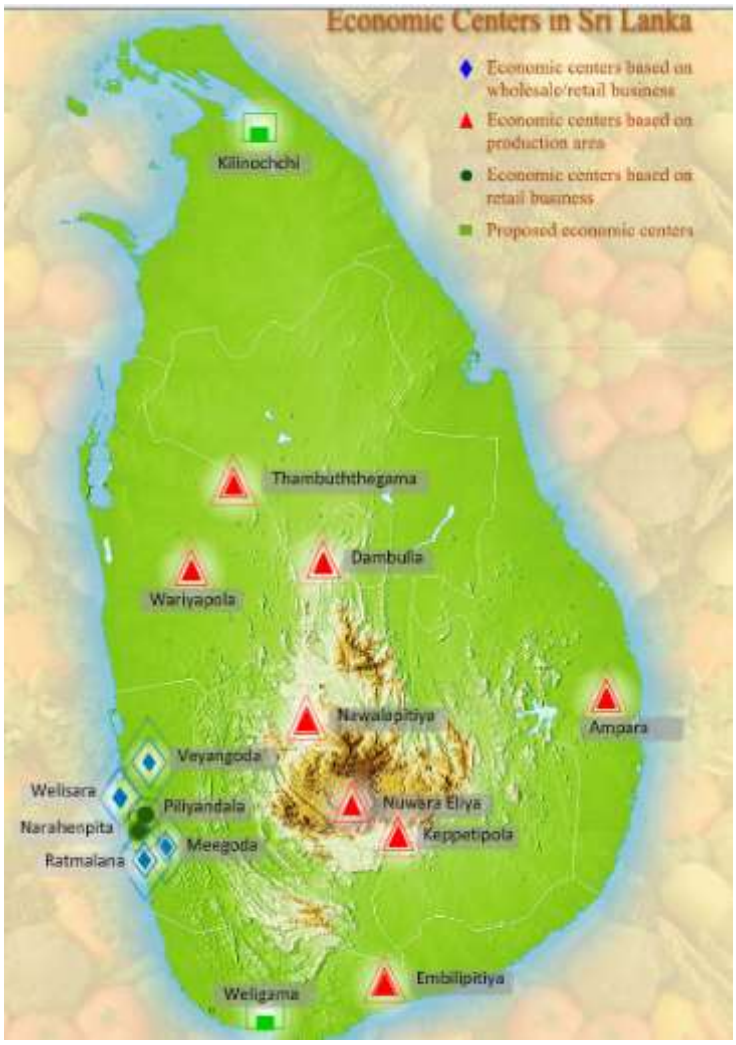


Figure 75. Economic centers in Sri Lanka (Source: http://www.mtdec.gov.lk/)

Colombo port is the main international harbour in Sri Lanka. Most imported food items are unloaded in Colombo and then distributed throughout the island (Figure 75). There are many private small to medium scale wholesale shops and storages for imported food items in CMC area.

Further details on food imports can be found in Annex 7.

Highlights

Hardly any agriculture food production is noted in Colombo city (CMC area). Even in its regions, large-scale food production is not available. Sri Lanka consists of eight different agro-ecological regions and each region cultivates crops specific to the region. Single city region food system area identification seems impossible. Each commodity is produced in different area of the country and the city region food system for each food type and in some cases for each commodity may be possible.

6.5. FOOD WASTE

Food waste is produced in each component of the food supply value chain. For this study however, it is important to discuss about the post-harvest losses. Food waste can classify into two categories:

(a) Food waste produced in CMC area;
(b) Food waste produced along the value chain.

6.5.1. Food waste produced in CMC area

Geographical extent of the CMC is 37.31 km^2 and it provides residence to 0.65 million people as discussed before. This makes current population density between 15000 to 18000 persons/km^2. In addition, there is a floating population of half a million people per day. Such high population density and population flow have created an enormous production of food waste and thus, food waste management has promoted into a challenge in the city.

It is difficult to differentiate food waste from municipal solid waste. The CMC is divided into 6 wards, and in each ward, the municipal waste is collected as mixed waste along scheduled routes. These routes are a mix of residential and commercial units. Residential units produce food waste during food preparation, after food consumption, and as unconsumed food items. Food waste from commercial institutes will change with the type of business and number of employees.

Table 15 provides the number of residential and commercial units in each ward. There, the commercial category broadly includes all non-residential properties from office blocks to hotels.
Distribution of residential and commercial units were extracted from the council tax database of the CMC (Table 15). As per the database, majority of the CMC districts consists of residential units except district 2A, where the city center Pettah and Fort (i.e. district 2A is accountable majority for commercial units) and the district 2B is relatively similar for both residents and commercial units. The waste from district 1,

3, 4, and 5 mainly seems to be of residential nature, district 2A of commercial nature, while district 2B a mix of both units.

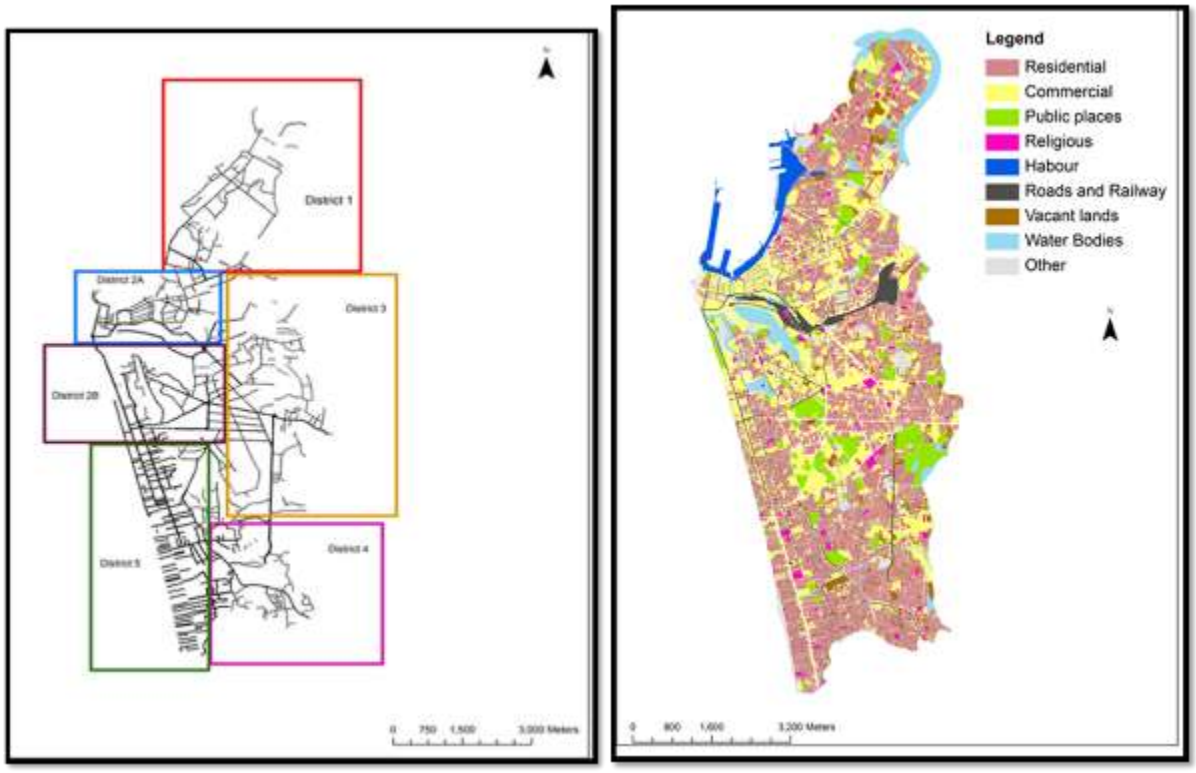


Figure 76 (a) and (b) shows the land use pattern and approximate district boundaries of the CMC. Table 16 presents the CMC area and major land use purposes.

Table 15. Residential and commercial units according to the wards (Source: CMC)

District	Residential		Commercial		Total
	Number	%	Number	%	
1	22699	83.45	4502	16.55	27201
02A	12785	39.98	19192	60.02	31977
02B	10230	56.30	7941	43.70	18171
3	11352	78.11	3182	21.89	14534
4	13786	81.61	3107	18.39	16893
5	19857	78.44	5459	21.56	25316

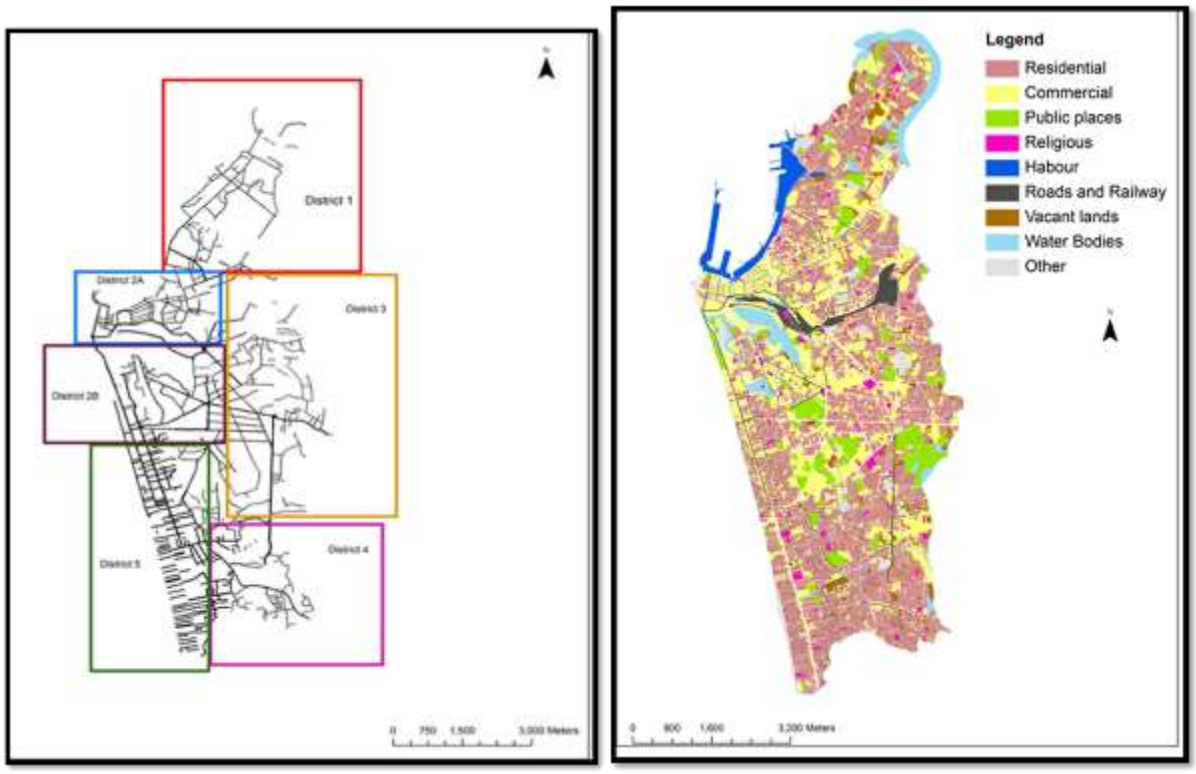


Figure 76. (a) Land use pattern in CMC (b) Approximate district boundaries of the CMC

Table 16. Land use pattern and the area in CMC

Land use type	Area (km^2)	Percentage (%)
Residential	15.49	41.51
Commercial	9.70	25.99
Public Places	2.74	7.34
Religious	0.97	2.60
Roads	0.0004	0.001
Harbour	1.01	2.71
Vacant Land	1.46	3.91
Water Bodies	2.28	6.11
Other	3.67	9.83

According to Table 16, the residential land use is still prominent in the Colombo municipal area which is 41.5 %, followed by commercial land use of 26 %. The roads and railway lines achieve least land use type. In the case of waste generation sources, residential, commercial, public places, religious places, and habour are prominent. Agricultural land use is negligible in this urbanized area and its accounts less than 0.01 km^2.

6.5.1.1. Composition of the waste

Major part of the solid waste is short-term biodegradable waste (63.6%) with a considerable proportion of food waste (Figure 77). In addition, grass clippings etc. may have deliberated as short-term biodegradable waste. The Long-term biodegradable waste most likely to be of wooden waste, coconut shells, and banana stems etc. In essence, a very high portion of the short-term biodegradable waste and a portion of the long-term biodegradable waste consists of food waste.

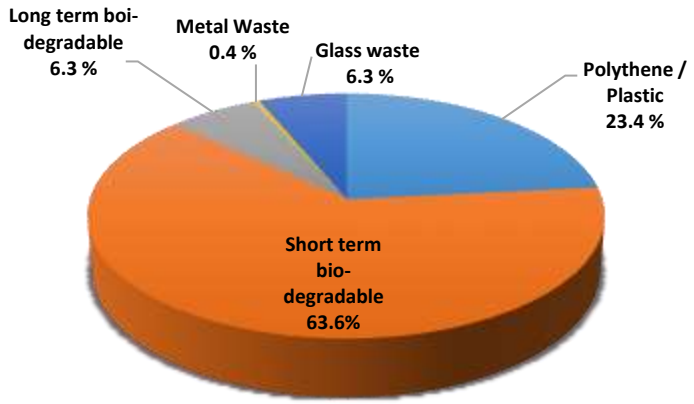


Figure 77. Composition of Municipal Solid Waste collection (Source: CMC, 2012)

6.5.1.2. Quantity of the waste

This study focuses on quantifying food waste production in the CMC area. It is hard to find secondary data on food waste generation in CMC and hence primary data collection was needed. The methodology used to estimate the waste was as follows:

- The dumpsite at Meethotamulla owns a weighing bridge and measures the waste from every dump truck that enters the site. For this study, the weighing bridge data was used to calculate waste quantities;
- The household waste collection is free and commercial users have to pay 150 rupees for a 40 Liter bin within CMC area. This waste collection fee data on commercial units helped to quantify waste amounts from large food waste producing institutes;
- Additionally, data gathering and interviews were conducted with District Solid Waste Engineers, District Solid Waste Managers, Market Supervisors, Ward Supervisors, Transport mangers, and Drivers and in-charge of the Meethotamulla dumpsite. Some primary data was collected over phone interviews (e.g. with Sri Lanka Prison, Superintendent of the Slaughter House).

Table 17 displays the identified major waste sources in CMC. Among these waste sources:

- Colombo harbor, military camps, and large hotels do not handover food waste to CMC, and the food waste is collected by the swine farmers. Food waste amounts from these large institutes are difficult to access without a primary data collection;
- Food waste from public parks, religious places are seasonal, and the seasonal and non-seasonal variation is difficult to estimate;

- Most schools have backyard composting and a least amount of waste is handover to CMC.

By considering above facts, the quantification effort was narrowed down to the sources, which produce high amount of food waste, and CMC handles the waste (i.e. obtainable data).

Table 17. Waste sources and major food waste sources in CMC

Municipal solid waste sources	Unmixed food waste sources	Mixed food waste sources
1. Hotels	1. Hotel	1. Residential units
2. Restaurants	2. Restaurant	
3. Markets	3. Markets	
4. Slaughter Houses	4. Slaughter House	
5. Prison	5. Prison	
6. Harbor		
7. Commercial units		
8. Public Parks		
9. Schools		
10. Hospitals		
11. Religious Places		
12. Industrial units		
13. Military Bases		
14. Grounds		
15. Residential units		

6.5.1.3. Selected food waste sources

(a) Hotels

About 100 hotels are located in CMC area, most in districts 2B and 5 in the coastal line. During early stage of this study, it was assumed that many hotels produce a considerable amount of food waste. However, according to the collected data, most of the kitchen and food wastes from hotels are collected by swine farms. Each day, vehicles collect the wet waste from the hotels, though most of the swine farms are located outside the CMC area. The amount of food waste from large hotels is hard to calculate without proper primary data collection as the waste is not handled by the CMC or CMC-appointed private party.

(b) Restaurants

During daytime, food waste from restaurants is collected as mixed waste from residential and commercial units. Though the restaurant waste is mainly food waste, it is difficult to quantify the amounts of food wastes. However, during the night, mainly food waste, is only collected from night time open restaurants. Hence, the night shift food waste production from every district was calculated. Results of data calculation are presented in Table 18.

Table 18. Restaurant Wastes

	District, MT/Day						
	D1	D2A	D2B	D3	D4	D5	Total
January	13.784	39.255	8.421	2.3	3.4	35	102.16
February	17.535	40.721	8.427	2.788	3.887	33.55	106.9
March	17.417	46.816	16.07	12.84	8.19	32.084	133.41
April	13.861	37.338	10.056	3.479	5.548	25.991	96.27
Average							109.68

As of Table 18 and Figure 78, district 2A (Pettah and Fort) produces more waste. It is obvious that district 2A is a non-sleeping region and averagely 41 MT is produced. Ultimately, food waste from restaurants at night time is nearly 110 MT per day. It should be noted that less number of restaurants are in business during night as compared to daytime. Food waste from restaurants at daytime should be much higher than the night time figure.

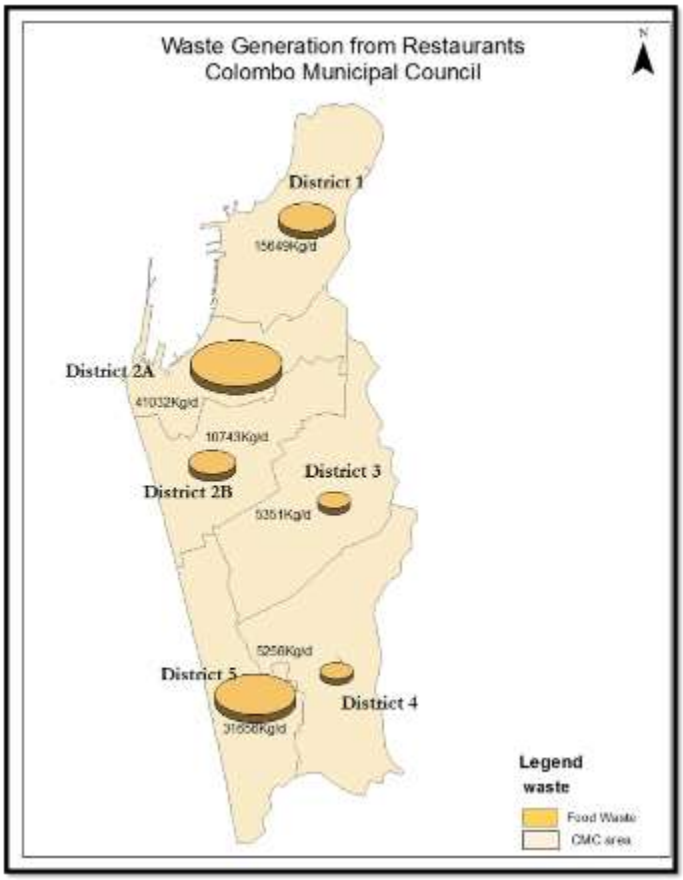


Figure 78. Restaurant waste quantities according to district

(c) Markets

There are 15 markets spread over the CMC municipality area (Figure 79). These markets mainly sell vegetable, fruits, meat, and fish. Some markets consist of farmhouses (Farmhouses, where a butcher slaughters live animals as per consumer needs). Farmhouses are very common on poultry but not on

other meat or fish. The livestock waste is collected separately in poly bags and a sealed vehicle collects these wastes and dump in an excavated pit at Meethotamulla every day.

Table 19. Market Solid Wastes

District	Type of major waste	Market name	Veg. waste (kg)	Carcasses (kg)
1	Mix	Kotahena	100	76
1	Mix	Nagalagama Street	100	50
1	Mix	Wystvyke	10	35
2A	Mix	Manning	20000	5000
2A	Meat	Ginthupitiya	5	30
2A	Mix	Kosgashandiya	220	600
2B	Mix	Kollupitiya	300	250
2B	Vegetable	Dean's Rd	1200	700
2B	Meat	Maligawatta	60	600
3	Meat	Borella	25	150
3	Vegetable	Dematagoda	20	15
4	Mix	Kirulapona	1250	100
4	Mix	Jathika pola	1000	100
5	Mix	Wellawatta	400	600
5	Mix	Bambalapitiya	10	170
		Sub Total	**24700**	**8476**
		Total per day	**33176**	

Table 19 shows the highest waste amount is produced at Manning market, which is the hub of food distribution to CMC and beyond. According to the interviews with market supervisors, less quantity of waste is produced in other markets, because a majority of the food (vegetable) is transported from Manning after removing wasted and damaged portions.

These markets have no functioning waste treatment method. Few years ago, a biogas unit functioned at Jathika Pola but now it is out of order due to lack of supervision.

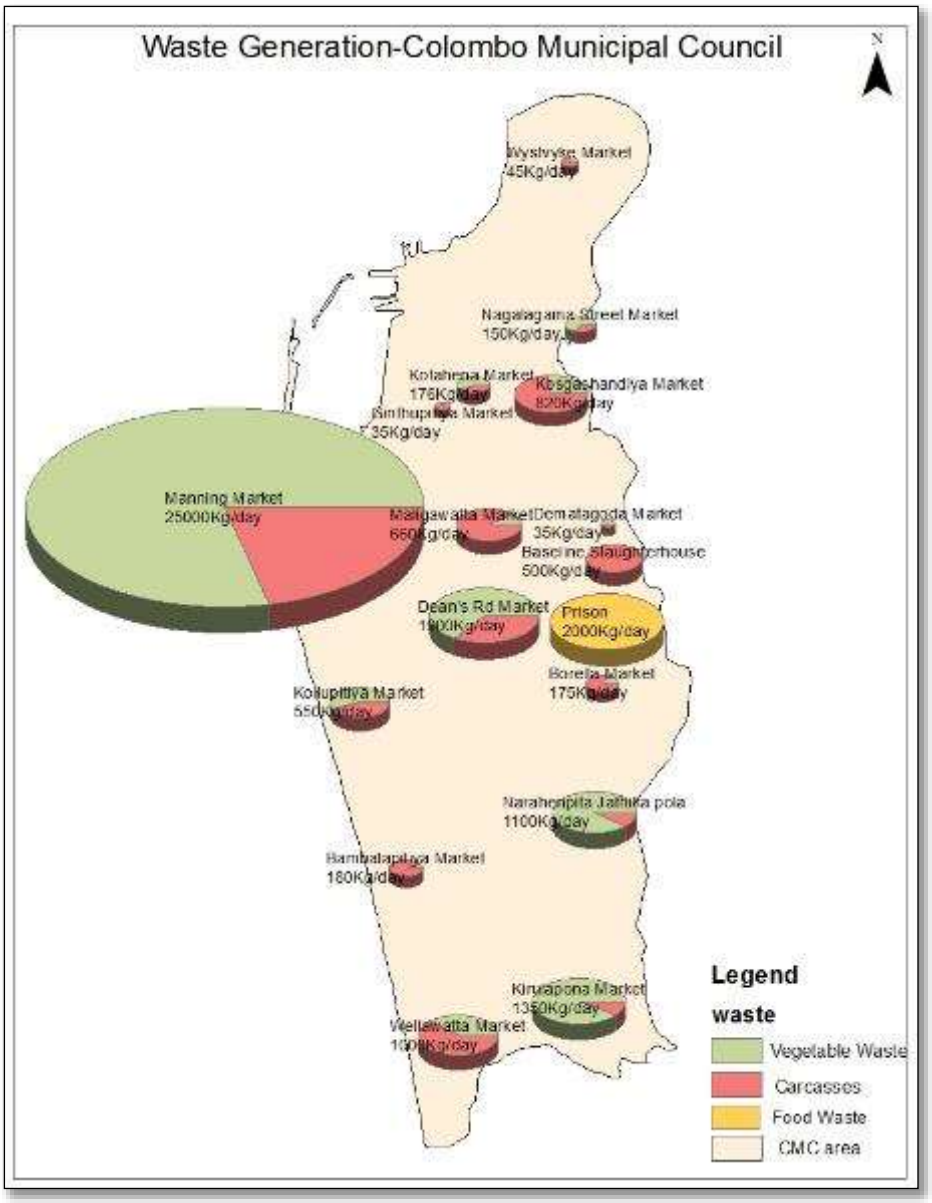


Figure 79. Waste Generation from markets and Slaughter Houses in CMC

(d) Slaughter Houses

There is a well-known slaughterhouse in Dematagoda, which provided meat to the city (Figure 79). Presently, it is banned to kill cattle within CMC and beef is transported to the city from outstations. Other livestock animal products such as pork, mutton, and chicken processing is in practice, and produces about 500 kg of daily wastes. Part of livestock waste is collected to produce fish feed, chicken feed, and soups.

There is no large-scale fish market within CMC area. Primary data collection is vital to identify the amount of vegetable, fruit, and fish wastes from small stalls.

(e) Prisons

Prison produces food wastes from over 4000 prisoners (from Welikada prison) and hand it over to CMC. In addition, Remand, Remand Hospital, and Prison Quarters produce food waste as shown in Figure 79.

6.5.1.4. Waste Flow

Waste generation from the identified segregated food waste sources and their flows are illustrated in Figure 80. All collected waste is open dumped at Meethotamulla dumping site and there is no significant waste recycling initiatives at CMC, apart from informal reuse of food waste in piggeries.

The waste collection coverage in CMC area is 100% and the waste quantity exceeds 700 tons per day. The total annual budget of the CMC is 9.2 billion and out of which, 1.3 billion (14%) is allocated for solid waste management (Anon, 2013). Almost all this money is spend on waste collection and transportation. Private companies and CMC collectively involved in waste collection. Waste collection in CMC area is well organized, but final disposal is unsustainable. There is a huge pressure from public to find for a sustainable solution for solid waste disposal.
Table 20 emphasize food waste amount can be collected in segregated manner as high as 146 t/day. However, this should upgrade by food waste contribution from residential, commercial, and other institutional wastes, which are received in a mixed manner. In addition, food waste from schools, hotels, harbor, etc. may not seek CMC service. However, the amount of waste produced by institutes who do not seek CMC collection services need to be included when calculating the food waste print by Colombo food systems.

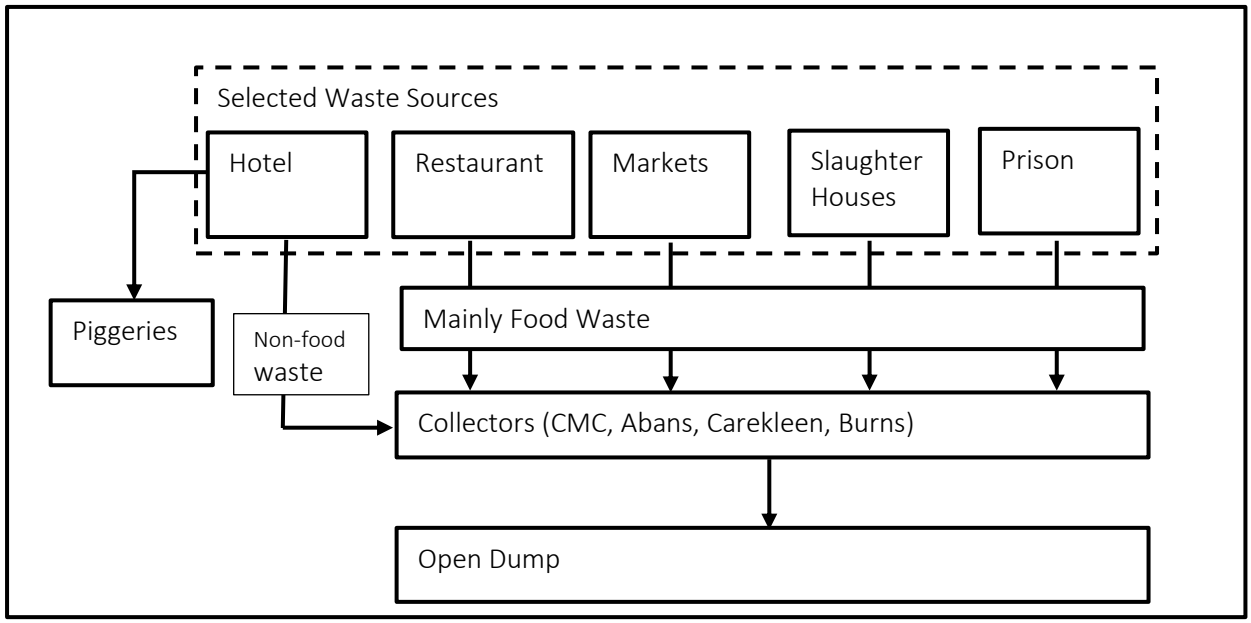


Figure 80. Waste Flow

Table 20. Segregated food waste amounts from selected sources

Source	Amount (MT/Day)
Restaurants	110
Markets	25
Slaughter Houses and meat shops	9
Prisons	2
Average	**146**

Box 6.11

CMC is the source for 25% of the garbage collected in the country and 42% of the garbage collected in Western province. CMC faces huge pressure from public to manage their waste sustainably.

"*A tense situation has developed in Meethotamulla, Kolonnawa due to a protest staged demanding the immediate removal of the 16-acre garbage dump site in the area. A massive crowd has gathered before the gates of the Meethotamulla garbage dumpsite few hours ago, chanting slogans and urging the authorities to immediately put a stop to dumping garbage in the site. The protest organized by a group named 'Peoples Movement against the Meethotamulla Garbage Dump' claims eight villages in the area have been severely affected due to the garbage that is being dumped in the site daily. "Close to 90% of the villagers are suffering from various contagious diseases and the residents are not even able to obtain clean water due to the waste mixing into the local water sources," the protestors said. Meanwhile, Rahula Vidyalaya, a school located close to the garbage dumpsite had to be closed about three months ago as a result of the adverse impacts of the garbage dump site. Security has been tightened in the area and a large number of police personnel have been dispatched near the garbage dumpsite at present*.

(Source: http://www.dailymirror.lk/27768/tense-situation-in-meethotamulla-over-garbage-dump#sthash.KDGiq7Xr.dpuf)

6.5.2. Food waste produced along the value chain

Due to its perishability and improper postharvest handling practices, postharvest high losses of the food commodities has been discussed. Among the commodities, the post-harvest losses in fruits and vegetables are considered high due to their perishable nature. A limited number of small-scale studies has been conducted on vegetable and fruits during the supply chain activities in Sri Lanka by the Institute of post-harvest technology (IPHT); however the studies on post-harvest losses on other commodities are hard to find. Dissanayake (2015) claims that post-harvest losses rise to 30-40% in fruits and vegetables, which directly contributes to low income earned by farmers and high market prices for the consumers. IPHT further claims that nearly 75% of the total loss occurs during transportation and mainly due to use of improper packages.

Limited studies have been conducted on identified vegetable and fruit types and the findings are listed in Table 21. It seems there is a huge gap of data in this area. It is hard to find any credible data on post-harvest losses, with reference to each component of the value chain.

Table 21. Post-harvest losses along the supply chain

Type of the commodity	Percentage of the losses	Methodology	Remarks	Reference
Banana	Mechanical damage 21.82% Physiological weight loss 9.34%	Studying the quantitative losses and quality deterioration of banana fruits at farmer, transporter/whole seller, retailer and consumer stages	Overall visual quality from farmer to consumer changed from excellent to poor Use of improper packaging techniques was identified as the main cause of postharvest loss of banana	Wasala *et al.* (2014)
Leek	15.7%	Existing transportation package which wrapped with poly sack and tight with a rope at the middle was used.	Plastic coated wire packaging showed better performances by reducing wilting %, physical damage and weight loss (%) while retaining higher in visual quality rating	Wijewardene *et al.* (2014)

In order to minimize this loss, the Institute of Post-Harvest Technology (IPHT) conducts a development project since 2006 to promote suitable packaging methods and transportation. To reduce post-harvest losses in fruits and vegetables, plastic crates were introduced at subsidized rates. Recently, various other governmental and non-governmental organizations also initiated popularization of using safe packages for fruit and vegetable transportation. The government then passed a rule to ensure use of safe packages for transporting fruits and vegetables, but it failed due to the protests of supply chain actors.

Dissanayake (2015) conducted a study to assess the present status of the use of safe packages for fruit and vegetable transportation, to identify stages and types of safe packages used, and the benefits and constraints of using safe packages in transporting perishables. The study revealed that all beneficiaries were aware of the benefits such as prevention of losses and quality retentionin using safe packages in perishable transportation. Unlike for vegetables, safe packages are used for packing and transporting fruits such as mango, papaya, and guava. Mostly used safe packages were plastic crates, corrugated fiberboard boxes, and wooden boxes.

Use of safe packaging was limited due to many constraints and limitations. Most common were the unavailability of plastic crates for purchase, high cost of transportation, less amount of load able to be

transported per journey, and no assured mechanism of returning safe packages moving through the supply chain.

Jayalal (2015) claims that annually, Rs. 25 billion is wasted due to poor packing and improper transportation. About 20-30% of fruits and vegetables go waste, while another 10% is discarded, as they do not meet the standard sizes. As Jayalal (2015) explains Lorries can only hold 5,000 kg of vegetables, but are loaded with 10,000 kg of vegetables, leading to massive spoilage. However, president of All Ceylon Wholesale Traders Association claims that government's claim of 40% of the vegetables get spoilt due to improper packing is incorrect and in fact, it is only about 5%. They pointed out that a gunny bag can hold about 50 kg of vegetables, while a plastic crate can hold only about 28-30 kg.

Highlights

Food waste along the value chain vary for each commodity. The vegetable and fruit waste along the value chain (from farm to consumer) has been estimated between 20-40%, depending on the commodity. From this, nearly 75% of the total loss occurs during transportation, mainly due to use of improper packages. Overall visual quality from farmer to consumer changes from excellent to poor in most cases.

CMC is the source for 25% of the garbage collected in the country and 42% of the garbage collected in Western province. CMC faces huge pressure from public to manage their waste sustainably. There is no record on food waste within the CMC area. However, 63.6% of the 700 t/day MSW in CMC area is short term biodegradable and the high proposition of this waste could be food wastes. A 6.3% of the long-term biodegradable waste should include waste derived from food supply or productions such as coconut husks, coconut shells, etc. The market waste total to 33 t/day and surprisingly, nighttime restaurant food waste is 110 t/day.

Box 6.12

Plastic caters could be a solution to reduce post-harvest losses. Opinion of different value chain actors on plastic caters are presented below;

W.M.C.B Wasala, IPHT - 100% of farmers supplying fruits and vegetables to super markets use plastic crates. Due to the use of plastic crates, farmers' income have increased by 15-150% and postharvest losses reduced from 10-20% to 2-5%. At collection centers, farmers receive 20-40% higher prices than the outside market. The income has increased by 20%.

P. Ranbanda of Anuradhapura, a farmer cultivating winged beans, beans, and bitter gourd for over four decades stated, "The crate law will affect small-scale farmers severely. Plastic crates have to be returned, which would be an extra cost. Even if the crates are given free, transporting vegetables in it would be a difficult task."

According to Rathnapala, a farmer in Dambulla, "The crates do not have a cover; therefore, there is a possibility of vegetables being stolen while being transported. I use a rented Dimo lorry to transport my vegetables, and carry 15 gunnysacks in one trip. I tried with crates and found I have to do two trips."

A.A. Sugathapala, a farmer in Dambulla remarks, "We transport our vegetables by bus. The plastic crates cannot be transported by bus because it needs lot of space. We lost of Rs. 5,000 per day to hire a vehicle."

Members of the Pettah Manning Market Trade Union said, "We don't like the concept because it will see more Lorries coming to Colombo, or making more trips which would result in additional transport cost."

Lorry driver Dinesh Amarathunge states, "About 1,200 gunny bags of vegetables can be loaded in a lorry, only half that amount can be accommodated if the change is affected. The change should have been done methodically, not overnight."

As per Lorry driver Mahindasena, "This concept of plastic crates is not profitable for us, because we have to transport the crates back."

Porters K. Nathan, Devan Rasa, and R. Peter declare, "Gunny bags are easy to carry, while a crate would be a painful task."

- From Sunday Observer 01 November 2015

6.6. FOOD SAFETY

Food safety is defined as the food that will not cause harm to the consumer while it is prepared and/or consumed according to its intended use (ISO 22000 FSMS Standard). During the process from farm to folk, the food can be contaminated and become unsafe for consumption due to multiple reasons. This is known as food safety hazard, which is defined as Biological, Chemical, or Physical factors causing adverse health effects (Codex Alimentarius Commission).

In Sri Lanka, there is a growing fear of food safety and quality risks in recent years. Though there are relatively less number of incidences reported, the density of issues probably tend to become increased. Recently, choronic kidney diseases are spreading through some parts of Sri Lanka, which is suspect to be due to agro chemical contamination of food and/or water. According to the findings, not only food items but also water is contaminated through over use of fertilizers and pesticides. Some farmers intentionally apply pesticides on harvested or near-to-harvest crops as a strategy to extend storage lifespan of the harvest. Conversely, Sri Lankan common farming practice heavily depend on mono cropping and monoculture, which usually escalate pest attacks and plant deceases; hence extensive agrochemical use is inevitable. Farmers tend to believe that higher the usage of fertilizer, higher the yield, though not the case in reality. Over usage of synthetic fertilizer results in subsequent leaching while polluting the ground water, a phenomena common in many agricultural areas.

Box 6.13

Imported food items and related food safety is a concern. Melamine contaminated imported baby food and milk (2008), and E-coli contaminated canned fruits and vegetables imported from Europe (2011) are a couple of incidents on food safety issues. In addition, imported expired food relabeling for sell has been raided in many occasions.

Fears were also raised concerning the importation of contaminated cookware and locally produced low quality aluminum cookware. For example, in 2012, a shipment of stainless steel- and aluminum-based cookware with exposure to cobalt 60 (a radioactive material) was detected at the port by the Atomic Energy Authority.

Source:
http://www.sundaytimes.lk/081005/Plus/sundaytimesplus_00.html
http://www.island.lk/index.php?page_cat=article-details&page=article-details&code_title=74690
http://www.island.lk/index.php?page_cat=article-details&page=article-details&code_title=93029
http://www.sundaytimes.lk/140209/news/supermarkets-targeted-in-latest-food-raids-85082.html

Appendix 10 of this report present some case studies on food safety appeared in national news papers in recent years. According to the cases, food safety and health issues connected to various aspects on food chain in recent times are:

1. Safty issues in ingredients;
2. Safety issues in prepraration;
3. Safety issues in surveing.

Colombo is one of the cities in the country with many food markets and prepared food stores. Hence vulnerability to be a victim of food borne illnesses in Colombo is high. Therefore proper regulations and implementation mechanisms are necessary to protect consumers suffering from food borne illnesses in Colombo. In Colombo city, regulations of Food Act are executed by the MOHs, Food inspectors, and

PHIs attached to Colombo Municipal Council and Ministry of Health. CMC by-laws on food safety aspects are better comprised with proper implementation structure and equippied better with resources (such as laboratry facilities and trained staff).

CMC as the governing body of the food safety issues in Colombo have accomplished a commendable job in finding safety issues related to food system. CMC conduct a close inspection of all animals (except poultry) that are slaughterd in CMC by a qualified officer and all meat transport (except poultry) from other areas has to be certified by the CMC officials for their safety before reaching the market. All vegetable and fruit markets are under the control of CMC with regular inspection by the public health officers and an allocated supervisor from the CMC.

All catering services and food outlets in CMC limit have to obtain a certificate to initiate a catering service and renew their certificate annually after an inspection. Before issuing the certificate, the CMC has to conduct a thorough review. After obtaining the certificate, throughout the year, the CMC continues random and sheduled inspections to confirm the catering food safety. In CMC area, there were 901 catering food traders and 303 has not been registerd (i.e. operated informally without having any approval by the CMC) as of 2014. Table 22 presents details of the catering food services in CMC area and the summarised CMC inspection outcome as of 2015. It should be noted that annual inspection reports and random inspection reports by the CMC would contain valuable indepth insight to the safety of catering food industry in CMC. However, to conclude this, summarised and analysed data is not readily available and micro level data analysis is needed.

Table 22. Easing houses in CMC 2014

	Registered	Not in trade list
EATING HOUSES	598	303
NO. OF PROSECUTED U/L EH	434	
NO. OF CONVICTED	167	

Box 6.14
According to a study conducted on University students, food posioning affected students in the University of Colombo had the highest consumption of tap water (87.76%). Majority of the non-affected students from Colombo University used bottled water. According to the remedial actions taken by them, 132 students took home remedies as treatment, while 32 visited general practitioners, 61 visited the outpatients department of hospitals, and 8 students were admitted to hospital. This shows only 42% of the students have seeked medical treatments and majority relied on home remidies.

Food poisoning at household level are not reported often, hence there is no much evidences to believe there are hygiene concerns in homemade foods. Further, incidences of food poisoning of people who regularly eat food prepared outside such as in hotels, food stalls, and restaurants are rare. Sri Lankan food habits mostly consist of well cooked food items instead of raw food items and this may be a possible reason for lesser number of food poisoning incidents. One reason for low number of recorded incidences may be due to non serious nature or personal treatments using easily accessible medicines

in market and auravedic (traditional) medicines. Many of the foodborn illnesses are taken as their personal illnesses and such incidences are not reported as described in Box 8.2. Most reported cases involve many consumers becoming victims of food poisoning in large gatherings such as school children, factory workers, and participants of social functions.

Figure 81 summarize the food safety issues in CRFS, and the issues highlighted are highly applicable to other urban areas and occasionally, to rest of the country.

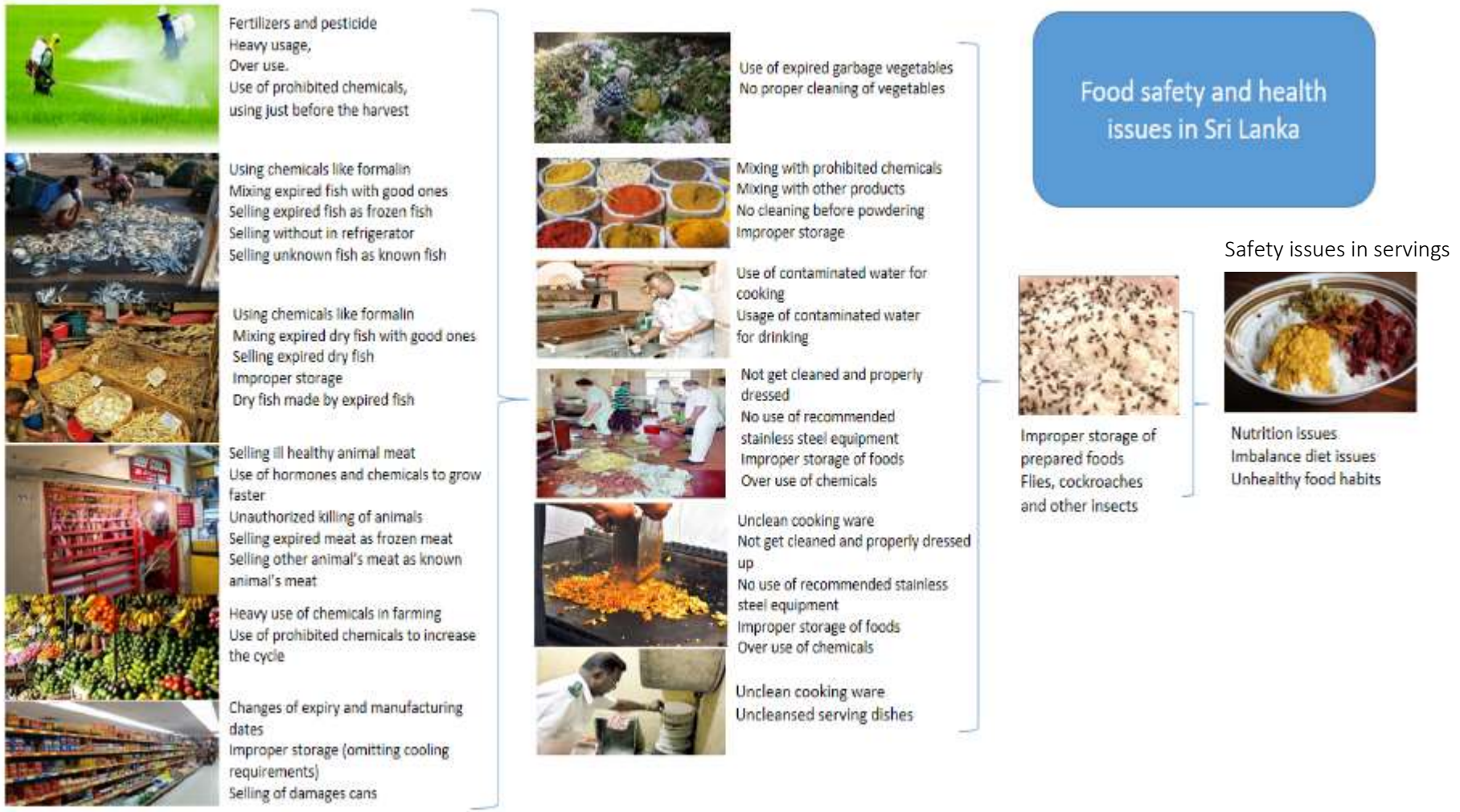


Figure 81. Food safety concerns in Colombo CRFS

❖ Other non-communicable diseases related to food consumption

Colombo city is the highest urbanized city in Sri Lanka, with a busy life style. As a result, people and the food suppliers pay less attention to the quality of food. There is a relatively high intake of bread, wheat flour products, and prepared food outside home, mostly carbohydrate based. Staple food in Sri Lanka is rice and curries, and rice consists of high carbohydrates. Especially, members who are involved in studies and employment tend to have fast food items as their main meals. This lifestyle can be observed among poor as well as middle class segments of Colombo.

High diabetic condition among Sri Lankans is considered as a silent epidemic in the country. Diabetes affects 366 million people worldwide, and 2.1 million of them are Sri Lankans, which is 10% of the total population of the country. To visualize the scale of the issue, 8.2% of urban youth under 20 years and 22.1% between 20-40 years have abnormal glucose tolerance level while 60% had abnormal lipids that could lead to diabetes if left uncorrected[65].

❖ District level food poisoning situation in Sri Lanka

Due to the presence of Aurvedic, homegrown, and commercially available medicines for food poisoning, many a cases of food poisoning do not get reported to health authorities. As per the records by the ministry of health, there are 59 food poisoning cases reported in Colombo district in year 2013. Nuwara Eliya, Jaffna, Galle, and Batticaloa districts have reported large number of cases on food poisoning according to the latest available statistics (Figure 82). By considering the high population in Colombo district and the reported number of cases, it can be assumed of a high level of food safety within the district.

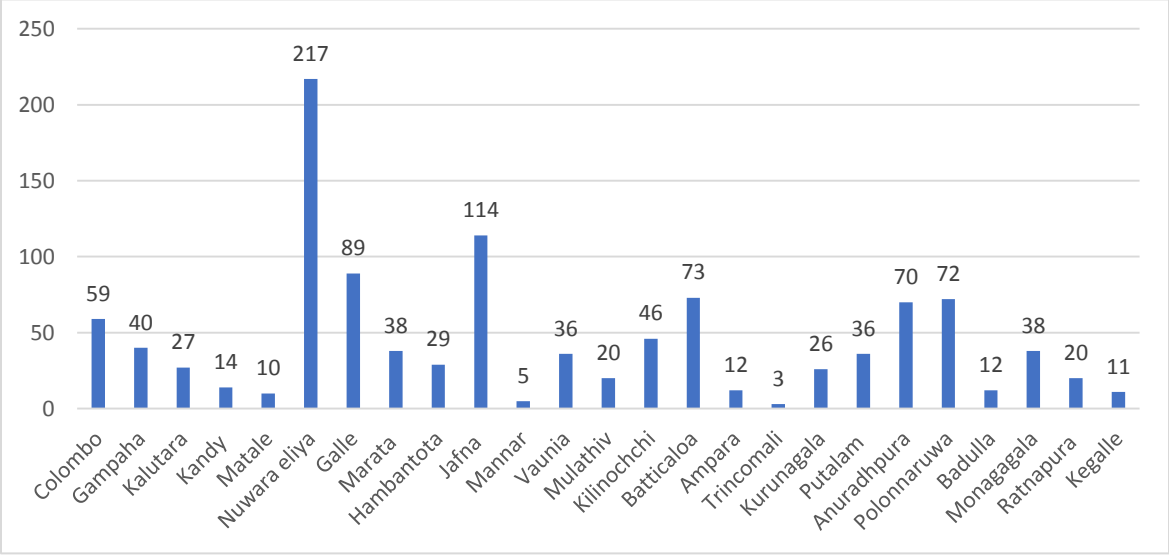


Figure 82. Reported Food poisoning cases in year 2013 [Source: (Epidemiology Unit Ministry of Health, 2013)]

[65] http://www.island.lk/index.php?page_cat=article-details&page=article-details&code_title=65977

Highlights

Colombo CRFS seem to face many challenges on safety issues of food such as agrochemical contamination, other chemical contamination, relabeled expired products, etc. and most of these contaminations are printed out of the city region. These contamination challenges are common to entire Sri Lanka, which demands national level attention. Catering food safety is one aspect where CMC is solely responsible and has successfully embarked. Food consumption habits have challenged community health in big way; high diabetics and cholesterol in urban local community. This area may have to tackle with, though not related to, contaminated food commodities.

6.7. Natural Resource Management and Climate Change

6.7.1. Holistic perspective of Food system in Sri Lanka

Sri Lanka is a tropical island nation with diverse geological and climate patterns within its 65,610 square kilometers. The country does not possess many valuable natural resources such as petroleum, but is rich with water, a diverse climate that suits diverse agriculture and farming, and vast acreage of suitable lands for agriculture. Even though the country is relatively small, it has diverse climate and weather patterns.
Sri Lanka is divided into three climatic zones as presented in Figure 83. In addition, specific weather and soil conditions have created geography-based specific food production, or in other words, more specialized food production regions in the country. The country is divided into seven agro ecological zones as shown in Figure 84 with more details in Box 6.15. Consumers throughout the country mainly depend on harvests of specialized produces from specific zones brought into cities and towns.

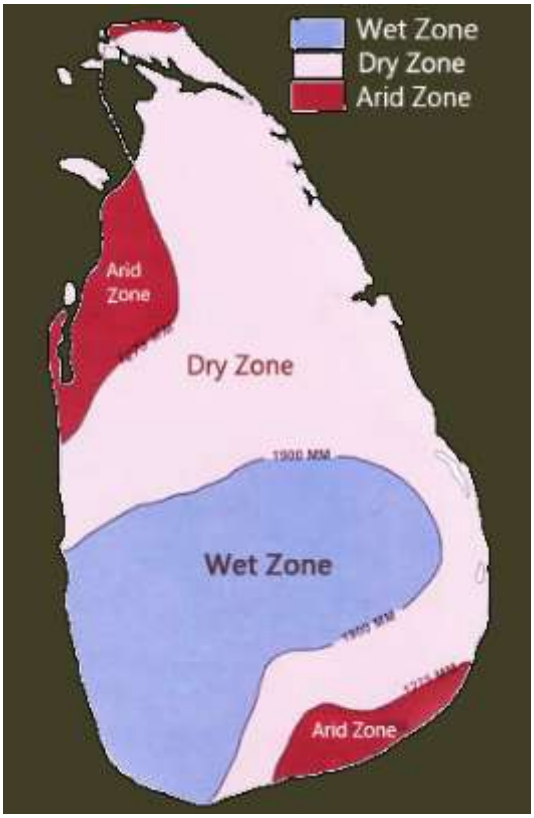


Figure 83. Climatic zones

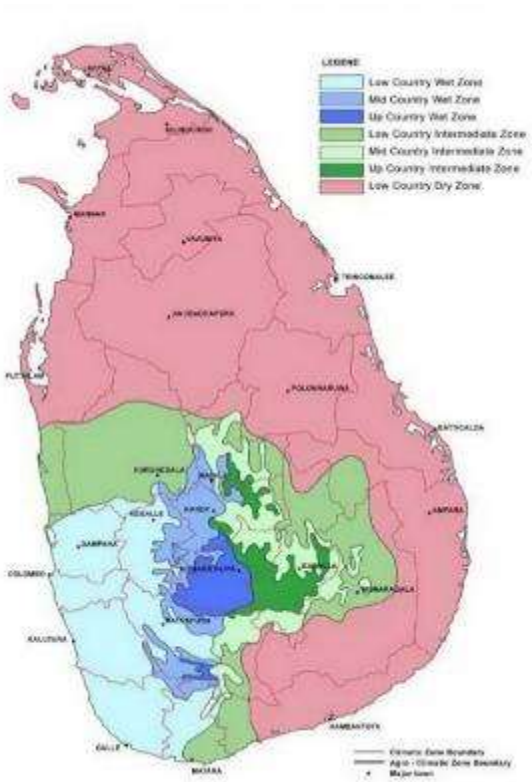


Figure 84. Agro ecological zones in Sri Lanka

Box 6.15

Climatic Zones

Sri Lanka consists of three main climatic zones:

Wet zone - Annual rainfall is above 2500mm, most common soil is Red Yellow Podsolic, and rainfall received actively by southwest monsoon.

Intermediate zone - Annual rainfall is 1750- 2500mm, most common soils are Red Yellow Podisoloc and Reddish brown latasolic soils, minimum contribution from Southwest monsoon rain.

Dry zone - Annual rainfall is 1750mm, most common soils are Reddish brown soil, and Red yellow latasolic soils. Southwest monsoon provide less rainfall and Northeast monsoon deliver high rainfall. During Southwest monsoons in wet zone, dry zone receives a dry wind known as "Kachchan."

Two third of land extent in Sri Lanka belongs to the Dry zone. In some months, rainfall will not be uniform and dry periods may occur in some months.

Agro Ecological Zones

According to latest identification, there are 46 Agro ecological regions. This classification is based on two scenarios:

Scenario 1 (Rainfall) - Wet (W), Intermediate (I), Dry (D)

Scenario 2 (Height from mean sea level)

a) Low country (L) < 300m

b) Mid country (M) 300 - 900m

c) Up country (U) 900m<

As per the above two scenarios (monthly rainfall and elevation), there are 7 Agro climatic zones in Sri Lanka namely; Wet zone low country (WL), Wet zone mid country (WM), Wet zone up country (WU), Low country intermediate zone (IL), Mid country intermediate zone (IM), Up country intermediate zone (IU), and Low country dry zone (DL)

Note : According to new Agro ecological region classification, 15 sub regions in wet zone, 20 sub regions in intermediate zone, and 11 sub regions in dry zone are identified by introducing a third scenario of soil moisture range.

Sources: http://www.navagoviya.org/index.php?option=com_content&view=article&id=7&lang=en
http://jayaneththi.blogspot.com/2011/03/trunk-of-rubber-tree.html

Sri Lanka coastal fringe consist of estuaries, peninsulas, beaches, and offshore islands that support 90 percent of fisheries of the country. The island has a total land area of 65,000km^2 and a coastline of about 1,585 km, of which, 300 km are beaches and sand dunes (GSL, 1985; Lowry and Wickremaratne, 1989; Olsen *et al*., 1992). The maritime area of 230,000 km^2 belonging to Sri Lanka is about three times larger than the land area[66]. The coastline plays a significant role in the Colombo food system as well as the entire country. Though Colombo is a coastal city, high percentage of fish harvest comes to Colombo from neighboring coastal cities

The upcountry area of the country consists of mountains situated in middle of the country. They play a significant role in the water cycle and ecosystem, which directly influence the agriculture system in Sri Lanka. All major rivers in Sri Lanka start from these upcountry mountains and flow to sea from different locations. All major agriculture farming is established around these rivers and lakes, which are developed based on these natural water lines and/or rain. Until recently, plantation agriculture such as tea, natural

[66] http://www.fao.org/docrep/x5627e/x5627e09.htm

forests, and grasslands covered the upcountry region, but presently, these areas also consist of rubber, eucalyptus, or pine. In addition, high percentage of high value upcountry vegetables such as carrot, cauliflower, cabbage, potato, beetroot, leeks, and some other vegetables grow in upland areas. Evidence of upland soil erosion and overuse of pesticides and fertilizers creates potentially serious, but still poorly understood problems for downstream land and water use, including water for drinking, and irrigation. Even though the short-term influences reflect in food prices, the health concerns, and long-term vulnerabilities of Colombo food system owing to such changes in natural environment in upland areas are not addressed nor assessed properly.
Mahaweli River, which drains about 16 percent of the island, is one of Sri Lanka's most important agricultural attributes whereas Mahaweli development project is the biggest development project so far implemented in Sri Lanka, which aims to improve Sri Lankan agriculture sector[67].

6.7.2. Natural resource Management in Sri Lanka

The main natural resources required in agriculture activities are Water, Sunlight, and Soil. Natural resources can define as all that exists without the actions of humankind. In the point of view of food production, water and land receives the priority and multiple bodies (including an array of ministries and authorities) work on different aspects of natural resource management in Sri Lanka. Apart from these stakeholder agencies, a number of divisions and institutions provide supporting services to achieve the mission of the country. Since multiple stakeholders have overlapping interests, Natural Resources Management & Monitoring are complex areas in regulatory and stakeholder aspects.

6.7.2.1. Soil/Land

Sri Lanka is an island with 65,610km^2 surface area, including inland waters and forests. A 4.4% of the total land area is under surface water bodies and 25% of the land is covered by forests, as presented in Figure 85. According to the latest available statistics, only 62,705km^2 can be considered as land area (including forests).
Among the 65,610 square kilometer land area in Sri Lanka, the highest percentage is utilized for agriculture, which is 43.7% during 2010-2015 period[68]. This percentage is divided between plantation (tea, rubber, and coconut) and food production farming.

[67] more details can be found in http://mahaweli.gov.lk/en/index.html
[68] World Bank indicators available at http://data.worldbank.org/indicator/AG.LND.AGRI.ZS

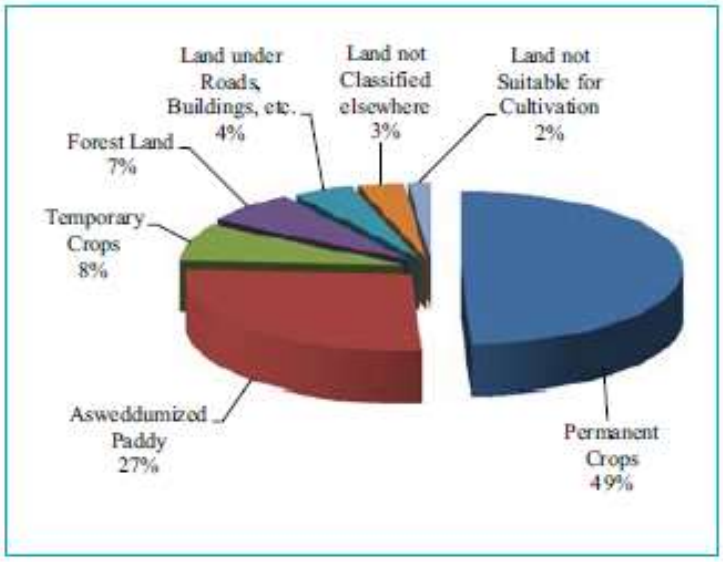


Figure 85. Land use in Agriculture sector in Sri Lanka

Largely specialized food printing activities are spread within Sri Lanka, except in highly urbanized districts such as Colombo. Especially North central, North Western, Central, Uva, North, and East provinces are agrarian regions that print high percentages of foods consumed in Sri Lanka. With the growing population and industrialization, land area demand for residential and commercial purposes has increased drastically and the land spaces for agriculture rapidly diminish in many areas.

Even though Colombo district has a high population and industrial densities, it is the smallest district in the country with a surface area of 699 km^2 . Out of this area, 23 km^2 are covered with inland water and 15 km^2 with forests. Thus, only 676 km^2 can be used for human activities.

Table 23. Area of forests and inland waters (Source: Central Bank Annual Report 2014)

Province / District	Total Area Sq. km.	Inland Waters Sq. km.	Forests Sq. km.	Land Area (a) Sq. km.
Western	**3,684**	**91**	**195**	**3,593**
Colombo	699	23	15	676
Gampaha	1,387	46	14	1,341
Kalutara	1,598	22	166	1,576
Central	**5,674**	**99**	**1,402**	**5,575**
Kandy	1,940	23	317	1,917
Matale	1,993	41	599	1,952
Nuwara Eliya	1,741	35	486	1,706
Southern	**5,544**	**161**	**932**	**5,383**
Galle	1,652	35	236	1,617
Matara	1,283	13	187	1,270
Hambantota	2,609	113	509	2,496
Nothern	**8,884**	**594**	**3,946**	**8,290**
Jaffna	1,025	96	3	929
Kilinochchi	1,279	74	351	1,205
Mannar	1,996	116	1,024	1,880
Vavuniya	1,967	106	889	1,861
Mullaitivu	2,617	202	1,679	2,415
Eastern	**9,996**	**635**	**3,030**	**9,361**
Batticaloa	2,854	244	517	2,610
Ampara	4,415	193	1,696	4,222
Trincomalee	2,727	198	817	2,529
North Western	**7,888**	**382**	**1,002**	**7,506**
Kurunegala	4,816	192	185	4,624
Puttalam	3,072	190	817	2,882
North Central	**10,472**	**731**	**3,326**	**9,741**
Anuradhapura	7,179	515	1,979	6,664
Polonnaruwa	3,293	216	1,347	3,077
Uva	**8,500**	**165**	**2,000**	**8,335**
Badulla	2,861	34	683	2,827
Monaragala	5,639	131	1,317	5,508
Sabaragamuwa	**4,968**	**47**	**765**	**4,921**
Ratnapura	3,275	39	648	3,236
Kegalle	1,693	8	117	1,685
All Island	**65,610**	**2,905**	**16,598**	**62,705**

(a) Total land area excluding inland waters.
(b) Based on Census of Population and Housing – 2012.
(c) Provisional

Organic matter is well recognized for its soil fertility enhancing capacity, especially in poor tropical soils as found in large parts of Sri Lanka (Wickramasinghe and Wijewardena, 2003). The reddish-brown earth (i.e. Rhodustalfs according to the United States Department of Agriculture - USDA Soil Taxonomy), is the predominant soil type found in the dry zone, which is low in its Phosphorus content and organic matter (1-2%), whereas the organic matter content in a typical agricultural topsoil is expected to be around 5% (DOA, 2014). Among the nutrients, Wijewardena (1994) pointed out that Phosphorus is the most limiting plant nutrient in Sri Lankan soils. The important rice growing soils in Sri Lanka in particular, have a very low content of Phosphorus and organic matter and thus respond favourably to additions (Wijewardena 1993; 1994).

Organic matter and Phosphorus deficient land percentages are shown in Table 24. In Sri Lanka, areas of organic matter and Phosphorus deficiency largely overlaps as presented in Figure 86 and Table 25 (i.e. 88% of the OM deficient soils are also deficient in P).

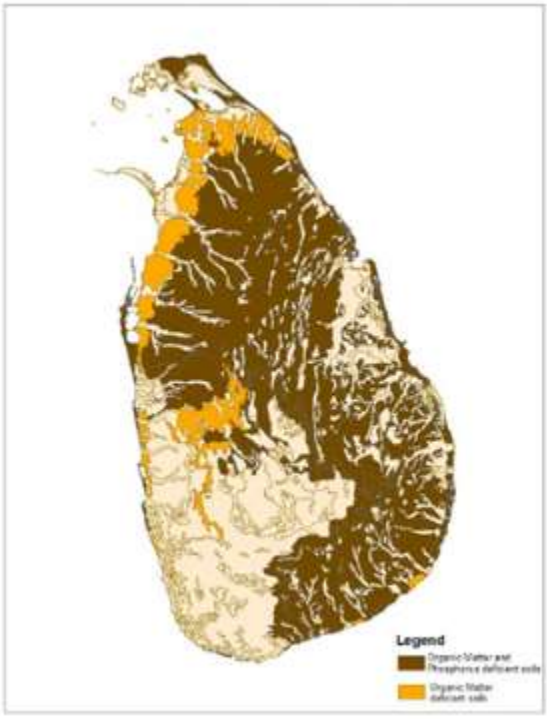


Figure 86. Organic matter and phosphorus deficient soils in Sri Lanka (Based on Department of agriculture, Sri Lanka, 2014)

Table 24. Percentages of Phosphorus (P) and organic matter (OM) deficient soils in Sri Lanka

	KM^2	% FROM TOTAL AREA
OM+P	**33214**	**50.6%**
OM ONLY	**4474**	**6.8%**
TOTAL AREA	**65610**	

Sole nutrient inputs for agricultural lands in Sri Lanka limits to application of synthetic fertilizers in almost all cases. Synthetic fertilizers can supply major nutrients, but does not help increasing micronutrients or organic content in soils. Chemical fertilizer usage in each province is provided in Table 9.3. Colombo district is part of a Western province and the data reveals gradual reduction of the usage, confirming reducing agricultural activities in the region.

Table 25. Chemical fertilizer usage

Province	2009			2010			2011		
	Urea	TSP	MOP	Urea	TSP	MOP	Urea	TSP	MOP
Southern	31.0	10.3	11.7	31.7	11.6	12.1	25.8	9.0	9.2
Western	8.3	3.9	5.6	7.6	3.7	5.5	6.3	3.3	4.4
North Western	35.0	10.8	9.6	41.6	13.2	11.1	44.5	13.2	11.3
Central	11.3	4.4	3.6	16.9	6.5	5.4	13.2	4.5	4.2
North Central	77.4	25.3	20.5	86.1	28.1	22.7	83.2	26.8	23.1
Uva	25.9	10.6	7.2	27.0	8.9	6.2	20.8	7.2	5.9
Sabaragamuwa	9.8	3.4	3.5	9.3	3.4	3.5	8.1	3.3	3.3
North	5.0	1.5	1.3	15.0	5.2	3.7	22.2	6.3	6.2
Eastern	53.8	15.4	12.9	63.3	20.2	15.3	55.8	17.1	15.3
Total	257.5	85.6	75.9	298.5	100.8	85.5	279.9	90.7	82.9

Source: National Fertilizer Secretariat, (2013)
Note: The table was made from summarizing the data received from fertilizer secretariat
2010 indicates 2009 Yala + Maha 2009/2010
2011 indicates 2010 Yala + Maha 2010/2011
2012 indicates 2011 Yala + Maha 2011/2012

6.7.2.2. Water

Water in terms of quality and quantity has a great impact on agricultural production. Water scarcity is not a concern except in few parts of the country and wastewater in agriculture is still not in practice though polluted water in agriculture is a growing concern. The quality and the quantity of water for agriculture reduce with competitive use while threatening the livelihood of farmers.

Rainfall in Sri Lanka has multiple origins, and Monsoonal, Convectional, and Expressional rain accounts for a major share of the annual rainfall. The mean annual rainfall vary from below 900mm in the driest parts (southeastern and northwestern) to over 5000mm in the wettest parts (western slopes of the central highlands) in the country (Figure 87). Climate year of Sri Lankan divides in to four seasons: The conventional-convergence inter monsoon period from March to mid-April, the south–west monsoon period from late May to late September, the conventional inter monsoon cyclonic period from October to late November, and the North-East monsoon from December to February. Climate year of Sri Lankan divides in to four seasons: The conventional-convergence inter monsoon period from March to mid-April, the south–west monsoon period from late May to late September, the conventional inter monsoon cyclonic period from October to late November, and the North-East monsoon from December to February .

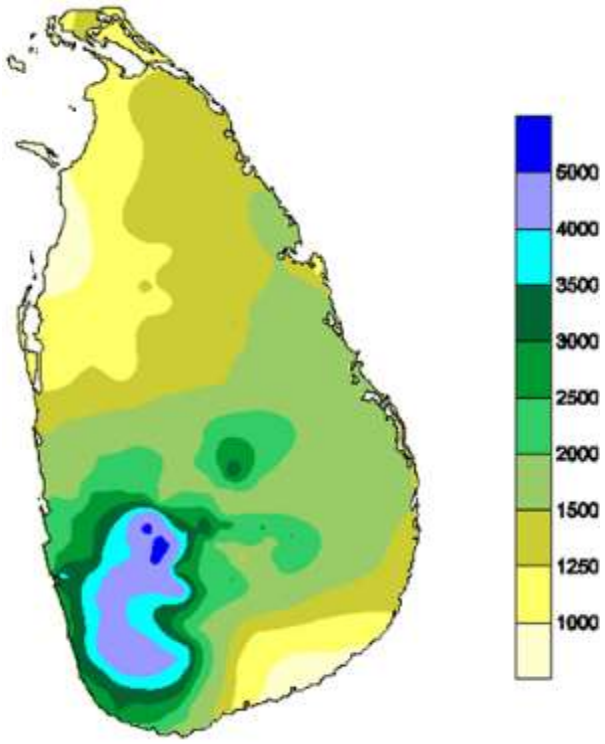


Figure 87. Average Annual Rain fall in Sri Lanka (Source: Department of Meteorology Sri Lanka)

Demand for agricultural water is higher than industrial and domestic water demands as shown in Figure 88. Approximately, agricultural purposes consume 87.34% of freshwater withdrawals. The share of agricultural water demand is higher in Sri Lanka when compared to many other countries in the world. The reasons for this increase in demand for water could be due to low efficiency of water use in farms, poor adoption of water saving techniques, high losses associated with storage, distribution and on-farm utilization of water, and the lack of incentives for conservation due to free state water supply of irrigation[69].

[69] Source: http://www.ips.lk/talkingeconomics/2016/03/22/better-water-sustainable-agriculture-and-better-lives-for-sri-lanka/

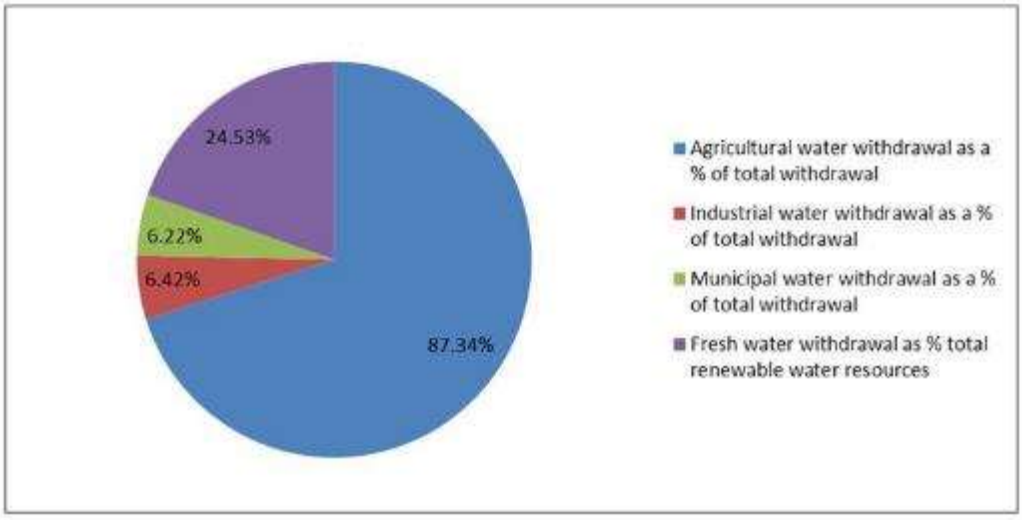


Figure 88. Water demand by sector (Source: Aquastat_Database)

The collective length of the 103 rivers in Sri Lanka is estimated as 4,560km (UNEP, 2005), as presented in Figure 89. In Sri Lanka, two cultivation seasons associate with two major rainy seasons, the south-west monsoon period from May to September, and the northeast monsoon period from December to February. These two seasons are named as Yala and Maha respectively. The total volume of surface water is assessed as 43,000-45,000 MCM annually and the annual runoff is estimated to be around 35-40% of the annual rainfall[70].

[70] Source: http://unesdoc.unesco.org/images/0014/001476/147683e.pdf

Figure 89. Major reservoirs and hydropower plants (Source: Irrigation Department)

Groundwater resources in Sri Lanka are considered lesser than surface water resources, with an estimated groundwater potential of 7,800 MCM per annum (UNEP, 2005). Demand for groundwater development is mainly for domestic water needs. However, the coastal sand aquifer area in the northwestern region and north of Sri Lanka is extensively used for agriculture. Industrial estates in the wet zone heavily depend on groundwater (

Figure 90).

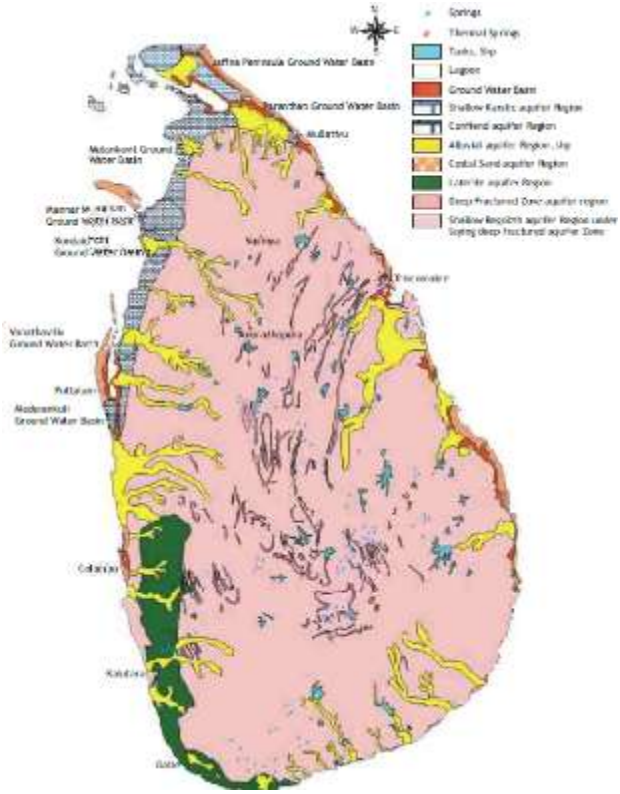


Figure 90. Different types of ground water aquifers in Sri Lanka (Source: Water resources board)

Quantity as well as quality of water affects crop growth and harvest, which determines farmer income and product safety. Various pollutants and other contaminants affect surface and ground water sources, thereby reducing the quality of water available for agricultural livelihoods and domestic use. Surface water contamination in Sri Lanka is mainly due to agriculture runoff, improper disposal of urban waste (solid waste, septage, and wastewater), and unmanaged waste from industries, etc. The other reason is agricultural pollution related to pesticides, nutrients, and other agro chemicals.

Historically, Sri Lanka is famous for rainwater harvesting for irrigation purposes. Manmade tanks store water during rainy season for the use during dry season. Ancient rulers of Sri Lanka during early kingdoms built thousands of such tanks throughout the country, especially in the dry zone. Cascade tank systems, which allow water reuse is one unique feature of the ancient irrigation systems. Apart from traditional water tanks, more recently developed Galoya and Mahaweli projects have created water reservoirs and irrigation networks to store and use water for agriculture (Figure 91).

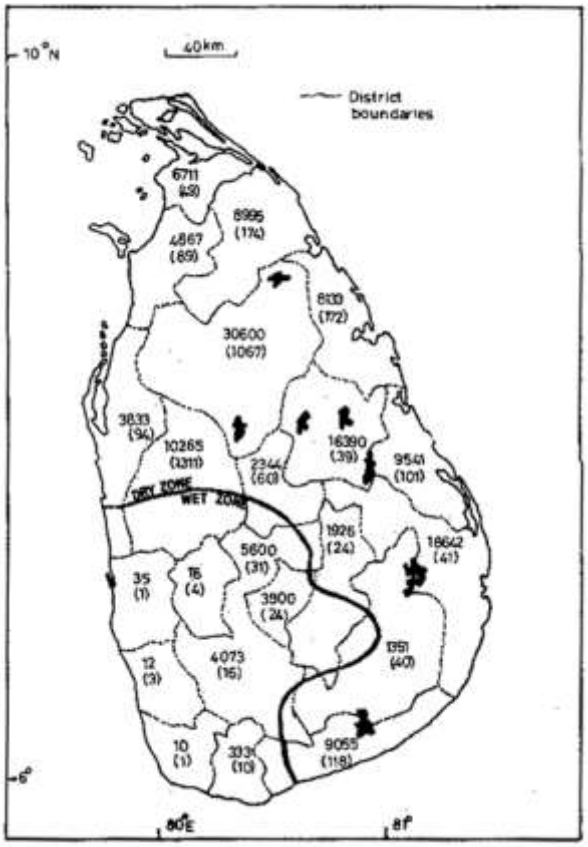


Figure 91. Reservoir surface area (in ha) and the number in each administrative district of Sri Lanka

6.7.2.3. Sunlight

Sri Lanka is a tropical country situated close to the equator with a 7.8731 latitude to South. Sunlight is available in all parts of the country, normally for 12 hours per day, throughout the year.

6.7.3. Other agricultural inputs

Major agricultural inputs needed for food production in Sri Lanka are seed, fertilizer, and agrochemicals.

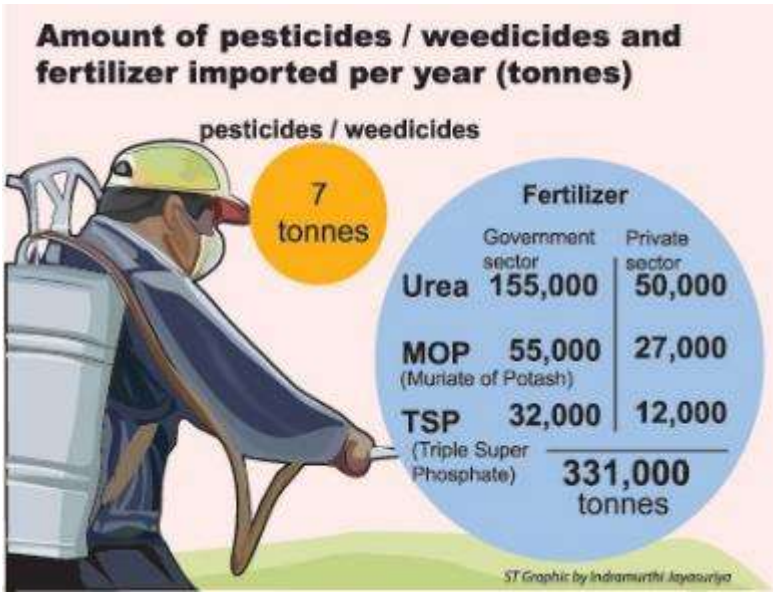
- ❖ Seeds

Majority of the seed requirement for vegetable and fruit farming are imported to Sri Lanka; however, there is a rapid increase in local seed production recently, where Department of Agriculture in Sri Lanka encourage farmers to produce their own seeds for cultivation. Paddy, onion, cashew, potato, papaya, banana, and some other crops are rapidly moving towards local seeds, but other vegetables and fruits still need imported seeds. Several private sector companies in Sri Lanka are engaged in production and import of seeds.

Most of the imported vegetable and fruit seeds are hybrid seeds, which demand more agro chemical inputs to produce higher yields. This is one of the problems related to high usage of agro chemicals and reduced interest in using organic fertilizer in Sri Lanka.

- Fertilizer and agro chemicals

There is a heavy usage of fertilizer and agro chemicals in agriculture in Sri Lanka. According to the available statistical sources, 331,000 tonnes fertilizer is used per year. Latest available data suggested that Sri Lanka is the fifth highest country, with the amount of fertilizer usage per hectare[71]. Almost all fertilizer and agro chemicals are imported either by the government or private sector companies. Department of Agriculture has the authority to approve fertilizer and agrochemicals import to Sri Lanka through their registered suppliers.



Until 2016, the Sri Lankan government provided a fertilizer subsidy for farmers, but since 2016, it has converted to a money subsidy to discourage fertilizer and agrochemical usage in farms. Since organic farming (organic fertilizer in agriculture) has recognized as a government priority, a national level initiative exist to increase organic fertilizer usage.

6.7.4. Climate Change

Sri Lanka is a tropical country with a consistent high temperature and rainfall. Even though rainfall and temperature vary due to geographical reasons and monsoon rains, generally, the temperature can be considered as constant with a minor variation, except for upcountry districts.

[71] http://www.indexmundi.com/facts/indicators/AG.CON.FERT.PT.ZS/rankings

Table 26. Mean temperature in Sri Lanka since 2004 (Source: Department of Meteorology)

Mean Temperature 2004 – 2013

Degrees Celsius

Meteorological Station	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Anuradhapura	28.3	28.6	28.4	28.2	28.1	28.6	28.5	28.3	28.6	28.3
Badulla	24.5	24.8	24.4	23.8	23.1	23.5	23.5	23.2	23.5	23.2
Bandarawela	21.2	21.2	20.8	20.8	20.7	21.1	21.1	20.7	21.0	20.7
Batticaloa	28.4	28.8	28.5	28.1	28.2	28.6	28.5	28.2	28.5	28.4
Colombo	28.0	27.9	27.7	27.8	27.5	27.9	28.0	27.9	28.0	28.0
Galle	27.4	27.5	27.3	27.2	27.2	27.5	27.4	27.3	27.3	27.3
Hambantota	27.8	28.0	27.8	27.6	27.6	27.8	24.1	28.0	28.0	28.0
Jaffna	27.9	28.2	28.6	28.2	28.1	28.5	28.4	28.2	28.5	28.2
Katugastota	24.9	24.7	24.5	24.8	24.9	25.2	25.2	24.9	25.1	24.9
Katunayake	27.8	27.8	27.7	27.9	27.6	27.9	27.9	27.8	27.8	27.7
Kurunegala	27.8	27.8	27.5	27.4	27.3	27.3	27.3	26.9	27.7	27.5
Maha Illuppallama	27.7	27.9	27.5	27.3	27.3	27.8	27.7	27.7	27.9	27.6
Mannar	28.4	28.5	28.6	28.6	28.3	28.3	28.3	28.0	28.3	28.1
Nuwara Eliya	16.3	16.4	16.1	16.1	16.2	15.9	16.5	16.5	16.1	16.0
Pottuvil	n.a.	28.8	28.5	28.1	28.1	28.6	28.6	28.2	28.6	28.4
Puttalam	28.0	28.2	27.8	27.8	27.7	27.9	28.0	27.8	30.6	27.9
Ratmalana	28.2	28.1	28.1	28.1	27.9	28.3	28.4	28.2	28.3	28.3
Ratnapura	27.4	27.5	27.2	27.4	27.1	27.3	27.5	27.4	27.6	27.6
Trincomalee	28.5	28.9	29.1	27.2	28.6	29.1	28.0	29.9	29.2	28.5
Vavuniya	28.3	28.1	28.0	28.1	28.0	28.3	28.4	28.0	28.4	27.9

Source : Department of Meteorology

As in 2013, average temperature in Colombo was 28°C, and ranked as one of the highest in the country. Temperature in Colombo district marginally varied from 27.5°C in 2008 to 28°C in 2013. The temperature has not changed substantially during the last 10 years as per Table 6. The rainfall data is collected according to the location of the weather station, and not respect to the districts as for temperature. The rainfall has a significant change as illustrated in Table 26. For an example, the rainfall in Colombo in 2011 was 1774mm and the year before (in 2010) 3370mm, which was almost double.

Colombo remains as the one of the area with highest rainfall in the country. According to the temperature and water availability (because of wet zonal climate), Colombo has appropriate climatic conditions for agricultural activities. However highly industrial, commercial, and urban nature have reduced agricultural activities drastically and only a limited livestock activities remain.

Table 27. Rainfall in Sri Lanka since 2004 (Source: Department of Meteorology)

Rainfall and Rainy Days – Selected Stations 2004 – 2013

Meteorological Station	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
	Annual Rainfall, Millimetres									
Anuradhapura	1,444.3	1,099.0	1,324.4	1,380.9	1,485.5	1,075.1	1,665.4	1,815.9	1,878.1	1,193.9
Badulla	1,982.0	1,683.4	2,370.1	1,632.7	1,864.3	1,582.9	2,176.0	2,525.1	1,516.2	1,865.1
Bandarawela	1,590.8	1,615.5	2,080.8	1,638.0	2,103.6	1,319.5	1,687.7	1,947.5	1,895.5	1,559.0
Batticaloa	2,594.7	1,372.9	1,306.3	1,570.2	1,987.3	2,056.0	1,760.6	3,581.3	1,786.4	1,973.7
Colombo	1,958.1	2,814.0	2,722.9	2,085.8	2,622.1	2,134.4	3,369.9	1,774.2	2,464.6	1,990.6
Galle	2,252.3	1,879.7	2,552.9	3,091.2	2,776.8	2,303.5	3,049.1	2,308.5	2,367.2	1,799.1
Hambantota	1,164.7	977.9	1,333.5	1,017.8	1,139.8	880.6	875.2	1,014.8	1,294.4	966.3
Jaffna	1,868.9	1,235.3	159.1	1,168.3	1,811.8	1,270.9	1,496.6	1,470.7	943.2	1,033.3
Katugastota	1,565.3	1,783.6	2,120.7	1,827.6	1,848.6	1,944.0	2,665.6	1,776.6	1,990.9	1,925.5
Katunayake	1,672.0	2,396.0	2,594.8	1,659.9	2,516.1	1,690.9	2,585.6	1,446.1	1,945.2	2,057.1
Kurunegala	1,998.3	2,006.0	2,316.1	1,618.4	2,404.8	2,050.8	2,434.3	1,958.0	1,961.9	1,805.4
Maha Illuppallama	1,383.9	1,134.4	1,529.0	1,494.2	1,545.7	1,010.7	1,600.9	1,706.4	1,486.0	1,161.7
Mannar	1,152.8	1,190.8	938.8	642.8	1,219.2	964.5	1,074.9	1,203.2	923.5	918.6
Nuwara Eliya	1,741.1	1,347.1	2,555.3	1,674.7	1,587.0	1,639.9	2,181.4	1,699.6	1,771.1	2,157.7
Pottuvil	1,300.3	381.0	1,607.2	1,368.5	1,727.5	1,473.1	1,224.9	2,196.8	1,400.2	1,613.0
Puttalam	1,219.9	990.0	1,520.8	918.3	1,341.7	956.9	1,333.9	826.3	1,141.2	905.1
Ratmalana	2,108.5	3,207.1	3,082.3	2,084.4	2,967.2	2,476.2	3,404.9	2,042.9	2,272.3	2,128.2
Ratnapura	3,741.6	3,404.8	3,735.6	3,104.5	3,883.5	3,394.2	4,561.1	3,430.0	3,380.3	3,575.7
Trincomalee	1,926.1	1,791.6	77.6	483.2	1,844.5	1,888.9	1,419.5	2,906.5	1,810.4	1,492.5
Vavuniya	1,411.2	1,167.2	1,028.2	1,504.3	1,224.3	1,369.0	1,359.6	1,869.2	1,559.3	1,304.5

Box 6.16

There is ample evidence to suggest that climate of Sri Lanka has changed. During 1961-1990, the country's mean air temperature increased by 0.016 °C per year, and mean annual precipitation decreased by 144 millimeters (mm) (7%) compared to that of 1931-1960.

However, in future, the agricultural (i.e. production) districts such as Nuwara Eliya, Badulla, Monaragala, Ratnapura, and Anuradhapura are predicted as more sensitive to climate change than rest of the country. Coupled with their low infrastructural and socioeconomic assets (or low adaptive capacity), and high level of exposure to historical hazards, these areas are the most vulnerable to adverse impacts.

(Source: IWMI, 2010)

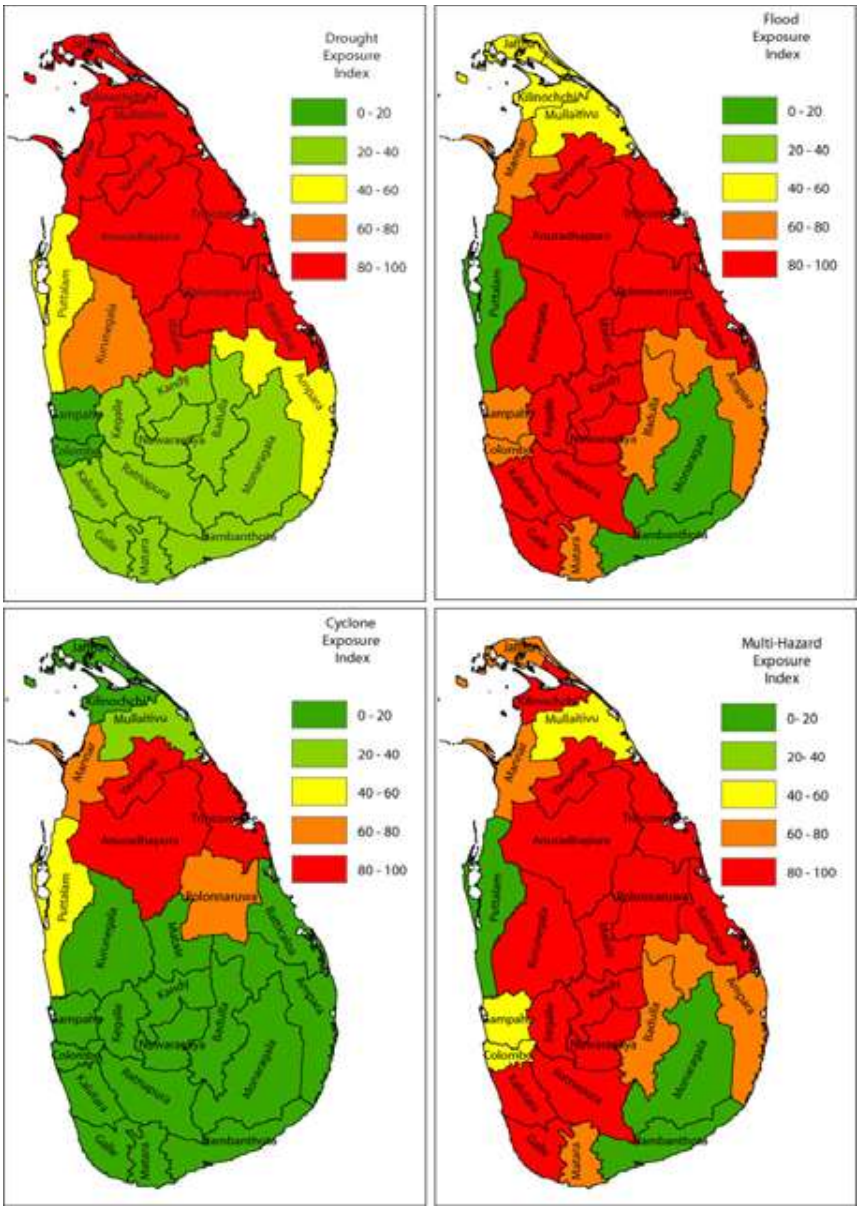


Figure 92. Exposure indices for droughts, floods, cyclones, and multi-hazards for each district in Sri Lanka (Source: IWMI, 2010)

According to Figure 92, many districts in the country are exposed to high level of climate hazards due to climate change: the number of districts within the 80 -100 range in the Multi-hazard Exposure map is high. Therefore, it is reasonably expected that these districts will be exposed to same or higher levels of climate extremes in future.

Human Sensitivity (or population density) is extremely high in Colombo and Gampaha, in sharp contrast to rest of the country. Although Colombo have low livelihood sensitivity (due to higher levels of nonagricultural employment), and higher adaptive capacity (higher socioeconomic and infrastructure levels), crowding poses a threat to their climate resilience. Typical farming areas such as Nuwara Eliya, Badulla, Monaragala, Ratnapura, and Anuradhapura have a higher Sensitivity Index than rest of the country because of their higher livelihood sensitivity to climate change (IWMI, 2010).

In essence, the expected impacts on water resources and the agriculture sector may in turn trigger serious impacts on country's food production, livelihoods, and the economy. A recent study found Sri Lanka to be one of the hotspots of food insecurity in the Asia-Pacific region (ESCAP, 2009), while another study suggests further decreases (0-15%) in agricultural productivity by 2080 (Nellemann *et al*., 2009). However, significant changes in recent weather patterns indicate climate change impacts in the country, which change conditions for farming and agriculture production. Droughts, floods, continuous rain, and irregular pattern of rain have influenced food system in the country; thereby food prices in Colombo city region have increased remarkably.

Additionally, the fish populations in fresh, estuarine, and marine waters can be affected by climate change (Ficke *et al*., 2007; IPCC, 2014; Roessig *et al*., 2004). Climate change leads to an increase in water temperature, which leads to the reduction of population size or even the extinction of sensitive fish species. Furthermore, climate change can cause more frequent and severe floods. Sediment loads carried by the floods can reduce water quality, which is especially problematic for coral reef habitats. Finally, sea level rise as a consequence of climate change, increases saltwater intrusion in the coastal areas and can severely impact aquatic species (Wickramasinghe, 2010).

Highlights

Natural resource management – In the view of agriculture, the most important components of natural resources are water, soil, and sun light. Availability of water in Sri Lanka is apparently high, comparative to many other countries. Surface water is the main water resource for agriculture, whereas in some areas, there is an increasing tendency to use ground water. Two major monsoon rains fulfill a major proportion of water requirement in the country, and compared to other countries, agricultural water requirement in Sri Lanka is high with a consumption of 87% of the total water content. The amount of organic matter and Phosphorus in Sri Lankan soil is low; over half of the agricultural lands have less organic matter and 2/3 of the land with organic matter deficiency suffers from P deficiency. As a tropical country close to the equator, Sri Lanka benefits from long day sun light throughout the year. In addition, the Sri Lankan maritime area of 230,000 km^2 is about three times larger than the land area.

6.8. STRENGTHS AND VULNERABILITIES OF THE CITY REGION FOOD SYSTEM

6.8.1. Vulnerability

Food production of a country directly links with the economy. Sri Lanka was self-sufficient in rice and other food items during most eras of its extended history. From the ancient times, agriculture has a deep relationship with the social, cultural, and economic life of Sri Lanka. In 1970s, the highest percentage contribution for GDP came from agriculture. However, during last 40 years, composition has drastically changed and according to year 2014 estimates, its contribution has reached down to 10.8%. Even though the relative contribution declined drastically, still, over 1/3 of the labour force is engaged in agriculture or related activities, hence one of the most important sector in livelihood aspects.

Owing to the drastic decline of significance of agriculture, food imports has increased. According to the statistics in year 2014, 13% import cost were spent on food and beverages, which is one of the top five import expenditures of the country as per Table 28. More details on food imports can be found in Annex 7.

Table 28. Food Imports

Item	2009	2010	2011	2012	2013	2014
Food and Beverages	171,003	215,107	283,010	268,770	278,225	333,750
Mineral Products	235,002	261,006	487,862	549,812	619,058	651,431
Chemical and Resins	149,509	190,012	266,961	281,819	286,893	321,920
Leather, Wood and Paper	40,433	51,715	65,001	63,524	65,879	83,492
Textiles	178,029	207,058	263,087	298,837	276,072	326,373
Precious Stones	31,889	42,690	118,971	74,577	61,733	22,910
Base Metals	77,661	87,468	120,732	154,460	156,387	166,886
Machinery and Equipment	141,151	168,278	269,882	324,117	317,528	302,243
Transport Equipment	61,007	131,889	244,492	188,120	167,141	221,040
Other	36,878	39,996	58,470	78,618	88,489	82,788
Total	**1,122,562**	**1,395,219**	**2,178,468**	**2,282,654**	**2,317,405**	**2,512,833**

Source: Sri Lanka Customs

Only 676 km^2 land area belongs to Colombo city region, which is the lowest land area for a district in Sri Lanka. High proportion of this land area is mainly used for commercial, industrial, infrastructure, and residential purposes. Therefore, most food requirements in Colombo city are farmed and manufactured in other regions or imported from other countries, thus creating a serious food dependency in Colombo.

Though this dependency creates serious vulnerability, overall food security in Colombo city region has not identified as vulnerable so far. When assessing the potential food security in Sri Lanka due to erratic weather in 2014, Colombo and other districts in western province have not even been surveyed[72] as showed in Figure 9.10. Furthermore, the state of the food insecurity map of Sri Lanka 2002 has also rated Colombo as least vulnerable cities in the country. Hence, even though Colombo City region is highly dependent on other provinces and imported products, overall food security in Colombo is considered as

[72] World Food Program report on the key Findings of a survey conducted in April 2014 to assess the severity of the 2014 *Maha* season drought, and the impact this had on food security and livelihoods.

high. However, this status is rapidly changing with the latest climate changes, vulnerability of the other regions, and increased pricing.

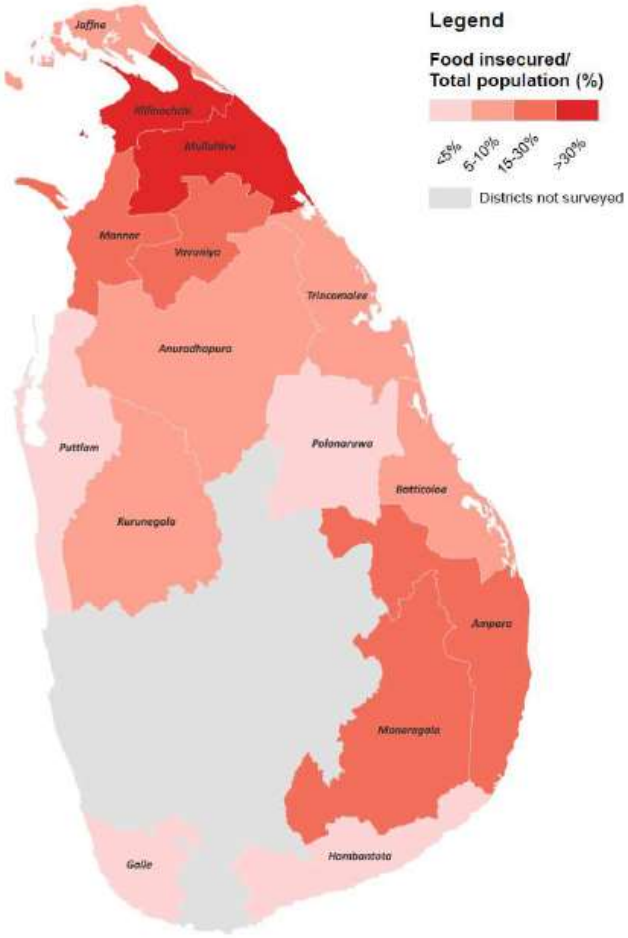
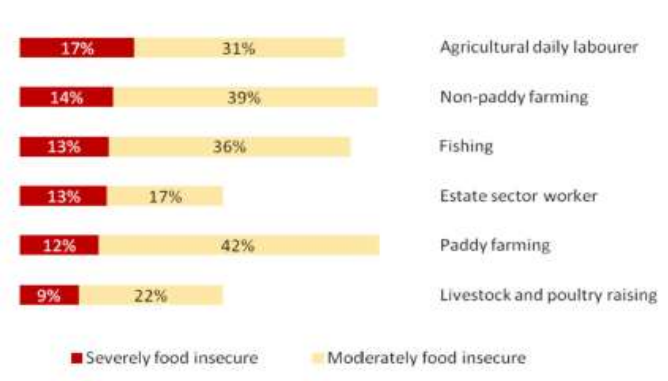


Figure 93. Food insecurity (2002)

Box 6.17

According to the latest available statistics, food security is a serious concern among food printers. Majority of the agrarian areas are rural places where farmers suffer from poverty. Farmers usually practice mono cropping where they cultivate one or two types of vegetables or fruits in their farms and have to buy other foods from the market. Due to poverty affordability of the sufficient food is a challenge. Not only farmers, but also the majority of people involved in fishing, livestock and poultry raising are facing either moderate or severe food insecurity. Furthermore, the young generation of these farming communities increasingly engage in education, occupation, or other commercial activities. This leads to a serious manpower shortage in agriculture production in near future. The fact mentioned will directly influence the food security in Colombo, since almost the entire food requirement in Colombo is filled by other regions.



The key vulnerabilities faced by Colombo city region food system are:

- Since the population density in Colombo is high, land plot sizes have become smaller and smaller. Since the land sizes are small, it is unable to utilize the technology as in large-scale farms. In addition, people who are interested in farming realise their existing lands face serious manpower shortages. Many agricultural lands used for vegetable farming in Nugegoda, Maharagama, and Homagama area in Colombo district have utilized for housing and other economic activities, due to high demand value for lands.

- The costs of food printing in Sri Lanka are much higher with comparison to a country like India. Food such as rice, vegetable, fruits farming, and fishing involves high production cost. Limited land sizes, expensive seeds, unskilled labor force, labor cost, mono-cropping practices, fuel prices, heavy fertilize, herbicides and pesticides usage are identified as reasons for the high costs. Hence, the farmers have to bare the heavy production costs during the cultivation. Then this cost needed to be transfer to consumers to earn profit after covering the expenses (i.e. the production costs need to be transferred to consumers).

Note: To safeguard the farmers, the government has to force minimum buying prices. Since private businessmen do not buy for such prices, the government also needs to buy rice and other vegetable

(agricultural products) from the farmers. The situation has gone out of control where now the practice has become right of the farmers. Hence farmers are not trying to reduce their productions cost and instead demands for higher minimum buying prices.

- Comparison of producer prices and open market retail prices has revealed that the prices of food products are increased multiple times within the distribution channel. There are many unwanted middlemen along the value chain. Hence, the mainstream supply chain has strong influence in setting prices for final consumers.

- Sixty five percent of the solid waste collected on daily basis in Colombo city is biodegradable organic waste and mainly consists of food wastes. Apart from food wastes coming from food markets, a large volume of food waste is derived from households, restaurants, and hotels. In addition, the major proportion of household waste is food waste. Considering the fact that the presence of many people owe a difficult life to bring hand to mouth, the amount of food waste in Colombo is excessively high.

- The unsustainable farming practices heavily depend on chemicals as fertilizers, herbicides, and pesticides. Farmers overuse chemicals in terms of frequency and dosage. Use of these chemicals can be successful in short term, but the long-term effects can be devastating. First, the use of chemicals raises health concerns for farmers and consumers. Secondly, in the long run chemicals can contaminate soils and water resources.

- Significant climate shifts are predicted to happen in the next decades. As a result, droughts, floods, and other natural disasters will be more frequent in Sri Lanka and might influence the food system. According to the history, majority of natural disasters happen in areas with major food production. Predicted extreme weather patterns also indicate serious risk for the agrarian areas that are the major food suppliers to Colombo city region.

- As discussed before, one key problems faced by the food system is the lack of land and competitive demand for lands. Besides land scarcity, land quality is also degrading. Approximately one third of the land in Sri Lanka experience soil degradation, mostly caused by soil erosion and a decline in soil fertility.

- According to the institutional analysis, many entities facilitate different aspects of the Colombo food system. Many are working on overlapping objectives. However, the entities are not properly coordinated, especially when they are from different ministries. This causes resource and effort redundancies. Furthermore, most entities do not work closely with stakeholders at grass root level. Hence, the interconnection between entities and stakeholders are not fruitful to strengthen the food system.

- The laws and regulations are provided in multiple acts, which affect food systems in Sri Lanka. Hence, they are located in isolation and most of them are not effective. Especially, the stakeholder awareness of these regulations is weak, the existing laws are outdated, and proper enforcement is lacking.

6.8.2. Strengths

Colombo city is the commercial hub of Sri Lanka. It heavily depends on the external food inflow, which includes local and imported food items. This dependency has created positive outcomes:

- As a policy, government of Sri Lanka recognizes the importance of developing food sector (including improving agriculture, fisheries, and livestock) that can bring social and economic benefits to the country. Production increase and introduction of post harvesting industries would increase the food security, inflow, and entrepreneurs in Colombo system.

- High market attractiveness has paved the way for high food supply to Colombo, though agriculture and livestock farming are not the stronghold of Colombo city. Many people are attracted to the city to engage in commercial and service sector activities, which make Colombo city an attractive business center for both agricultural and livestock suppliers, and middlemen. In addition, Colombo city has a highly diversified population living in a relatively small geographical area, which results in an attractive market consisting different types of food items. Further, high-income level among the residents has boosted the food prices to a premium price, as compared to other parts of the country. The recognition Colombo city gained as the best destination to receive high price has attracted food suppliers.

- Colombo city owns the largest international harbor and the airport in Sri Lanka located in vicinity connected by a highway. Road and other transport modes can be found in Annex 6. Hence, Colombo and Pettah markets, which receive almost all imported food items, acts as national distribution centers for imported commodities. Being the major importing destination, Colombo city region have easy access to imported food products, and during food shortages and off-seasons, imported food items fulfill market requirements and Colombo food system can easily maintain the equilibrium between supply and demand.

- Since Colombo is the main commercial center in Sri Lanka, supply chains of majority of other commercial products such as cloths, electronics, fertilizers, and imported food products are supplied from Colombo. Businessmen in other parts of the country have a tendency to buy commercial products from Pettah market, and their lorries travel to Colombo carrying food products from rural areas. This buying and selling business opportunity is the strength that ensures an uninterrupted food supply to the Colombo food system.

- Prepared food market is a well-established industry in Colombo. Due to the busy lifestyle of people and the considerable amount of floating population, a high demand exists in Colombo for prepared food, where food-catering stalls cater to richest to poorest segments of the Colombo city.

- Food security measures a community's ability to withstand hazards and its resilience to hazards. Food security calculated by FAO base on the availability of food, access to food, and utilization of food, based on generally accepted food insecurity models. Occurrence of natural disasters have increased during the recent years in Sri Lanka, which includes long standing droughts, floods, and unpredictable weather patterns. Since Colombo receives food supply from multiple destinations, including imports, this city is not identified as an insecure destination.

- According to the World Food Program (WFP), there is an association between infrastructure facilities available and vulnerability of food security. Colombo district enjoys a high concentration of infrastructure facilities compared to other parts of the country since it is the capital and the commercial center of Sri Lanka.

- There is a tendency among the residents of Colombo to consume organic foods, which generate an increasing demand for organic products. Therefore, organic product prices are relatively high compared to other commercial food products. Hence, peri-urban and urban areas of Colombo city region would be able to cultivate more organic vegetables and fruits to fulfill the increasing demand, while complying with circular economy concept.

7. DISCUSSION, GAPS AND AREAS FOR FUTURE STUDIES

7.1. BRIEF DISCUSSION AND AREAS FOR FUTURE STUDIES

Discussions and attempts in various levels have addressed the food system related issues since long time. Yet, majority of the discussions at top down approach are limited to finding ways to increase food production, increase food security, cost reduction, and to reduce food prices at national level. Institutions and legal and policy framework have been established with top down approaches. These programs have provided some improvements to the local grassroots needs, but the achievements seem limited in the expectations scenario of local community. Using the top down approach seems not feasible to address localized challenges such as urban growth, diversity, and dynamics in view of food systems, food security, and safety.

Before designing a locally sustainable new version of city region food system, CRFS, the concepts such as urban and peri urban agriculture, circular economy, innovative and short supply chains, etc. should be considered in the local context. To achieve a sustainable outcome, an interplay among urban planners, agricultural experts, food suppliers, regulators, and environmental and health departments are needed. Since the political authority links local community to national governance, the local authorities are highly equipped to understand the expectations and needs of the local community. Hence, they could seek national and regional support to provide local level service to obtain valid and practical solutions.

By considering the ability to pay food commodities, initial scoping analysis clearly indicated three layers of people in Colombo city region, namely, high, middle, and grass root level communities. This divergent might have created different food patterns among the marginalized groups and other layers in Colombo city and its regions. However, available secondary statistical sources have not provided GN division level income, expenditure, and food pattern data. Hence, there is a need to carry out primary data collection in Colombo city region to understand the food patterns and food systems catering each layer of the community.

Another general issue stems from the earlier issue; when averaged values represent the district (e. g. average monthly expenditure on food), such values normalise the extreme values. For an example, CMC area consists of GN divisions where an extremely high-income group resides and other GN divisions where hardcore poor groups live. Discussions on Colombo district level statistics do not highlight these poor groups in the story and hence, district level analysis draw a generic picture ignoring the community needs to be focused.

As discussed in this report, there are multiple international, public, and private stakeholders involved in activities related to different sections of the food system. Hence, they have certain levels of data to develop an approximate picture of the Colombo food system, which assisted in producing this report. However, these data and statistics are noisy because individual entities gather those data for their specific purposes

in an unstructured manner. In the first place, it is very difficult to access and conduct a comparative analysis of these data (due to its scattered nature) to provide confident and important conclusions.
Problem of escalating and fluctuating food prices is currently one of the central concerns. The lower income groups are particularly vulnerable, as the prices of many basic food items have ascended to astonishingly high levels. Even though district level analysis indicates Colombo has a relatively high income, in reality, a considerable number of people lives in poverty, as discussed. Especially, people living in shanty areas in Colombo city do not have adequate income to obtain a balanced meal with minimum daily caloric intake. There is a significant difference between producer prices and Colombo food market prices. The actors and processes in between the producer and the consumer increase prices of food items, sometimes beyond the reach of the poor segments in Colombo city. Recently, a case on selling waste vegetables at Manning market for catering food to low income community was reported and another report on people who purchased milk powder at a "Spoon rate" from the retailers. The poorest segment of the city struggle to meet the ends and is forced to consume low quality and less nutritious food.

More importantly, the CRFS concept expects the involvement of local level bodies to assist in enhancing the local food systems. City-region can be defined based on either in political, demographical, legal, and administrative boundaries; however, the definition of city-region is meaningful only when the proposed boundary is based on food flows.

In Sri Lanka, there are two ground level administrative divisions; District Secretariat divisions (DS) and Local governments. Boundaries of local government mostly match with DS divisions, but one local authority to one or few DS divisions. Colombo municipality is the combination of Colombo DS divisions and Thimbirigasyaya DS division. However, data and statistics available in municipal council and the DS division level are limited and most data available are in district level. This may not sufficient to formulate the true picture of the city-region food system, but approximate boundary. This is governed by district boundaries, but it does not provide the exclusive meaning of CRFS in the context of Colombo. Traditionally, Department of Census and Statistics, Central bank, and other statistic providing agencies collect district level data in particular field of interest such as income and expenditure. This data may then get segregated into the field of interest into crosscutting themes like gender, ethnicity, and province. Hence, from available data, researchers were unable to visualize the picture of specific smaller region. According to the Senior Statistician (person in-charge of the household income and expenditure survey 2012/13), data cannot be analyzed in to smaller regions such as DS and GN divisions, since the samples were not selected to represent DS or GN divisions (i.e. using the existing secondary data, it is meaning less to reanalyze the date to the micro level such as DS or GN level). Therefore, a primary level data collection is essential to realize the real situation of the Colombo City region food system.

The impact of establishing the CRFS concept is prominent. An excellent example of how the involvement of LA can improve the food system can be envisaged using the catering food safety scheme by the CMC, where an area CMC is actively involved. CMC has comprehensive plans of annual licensing, and scheduled and random inspection mechanism for food safety of the catering services. This regulatory strategy by the CMC has improved food safety in CMC area in a substantial manner. It has improved to a stage where a food quality complain can be made to the CMC by phone and the action would be taken within one hour

of the complaint. Appropriate actions will include court cases on violations of food safety standards to protect the consumers.
Remainder of this section briefly discuss the gaps identified during initial assessment and propose areas for future studies under few identified areas.

7.2. LEGAL, POLICY, AND STAKEHOLDER ANALYSIS

According to the institutional analysis, it revealed many entities facilitating different aspects of Colombo food system and some of them work on overlapping objectives. However, there is no proper coordination between the entities, especially when they are from different ministries at national level. This make both resource and effort redundancies that might lead to conflict of interests, prolonged delays in actions, and duplication of work. Further, most entities do not work closely with provincial and local level stakeholders. Hence, the interconnection between the entities and stakeholders are not fruitful to strengthen the food system.

The Food act of 1947 is the main law relating to Colombo city region food system. Multiple amendments and regulations attached to this act provide guiding principles and laws for food supply, preparation, and selling. Food act delegate its powers to the local level through a locally appointed food authority, which could be the LA. MOH and department of municipal council are generally responsible in executing the regulations of food act, but in certain aspects, they are being granted a limited power on decision making. For an instance, the LAs have to make legal actions before temporally closing down a food stall on food safety issues. However, many powers vested to LAs seem to be in an inactive state.

Other laws and regulations can be found in multiple acts that influence food systems in Sri Lanka; however, stakeholder awareness of these regulations is rather weak. From food traders' point of view, multiple approvals are needed from different entities, which make the processes cumbersome and complicated. It may be useful to have appointed committees with relevant stakeholders to make quick, collective decisions covering main dimensions of the CRFS. For an example, Sri Lanka Custom and Treasury collectively control the import of food products in order to safeguard both food supply and food prices while protecting the farmers and consumers. However, discussions made with farmers and commission agents revealed that, incidents of importing food products during the season of local harvest enter into market is probably due to lack of coordination between relevant stakeholders. Hence, strengthening the coordination between stakeholders and government is in need.

Involvement of the provincial councils in CRFS is highly limited, though it can play a significant role as per the powers vested by the constitution.

Further studies require:

- To identify all stakeholders (public institutes, private sector, non-government and international players) in each aspect of the food system;

- Identify present interlinks between stakeholders and detect the gaps and the strategies to increase the stakeholder interaction in selected gaps while increasing the possibility in collective decision making in each identified area;
- Recognising the avenues where provincial councils can play a significant role in food systems;
- Find ways of how the CMC can involve in the neglected components of the CRFS up to now;
- Identify how the new CMC bylaws be introduced to improve CMC food system;
- The capacity building needed to the CMC and the provincial council to conduct the additional tasks proposed.

7.3. FOOD AND NUTRIENT SECURITY AND SAFETY

Food safety issues mainly arise with chemical contamination or biological contamination due to various reasons such as agrochemicals, fecal matter, and polluted water. Food contamination can happen throughout the value chain, chemical contamination mostly at farm level, and the biological contamination at the food preparation activities due to unhealthy handling and contaminated water.

A recent study conducted by Hector Kobbekaduwa Agrarian Research and Training Institute (HARTI)[73] revealed that Sri Lankan farmers apply pesticides 7 days before or even closer, to the crop harvest date, whereas it is recommended to stop pesticide application 14 days prior to harvesting. It showed that farmers use an overdose of chemicals than prescribed. During the study, HARTI collected samples of Cabbage, Beans, Potatoes, and Leeks for testing. The results concluded that the harvest was contaminated with harmful residues of chemicals.

It has been recorded few food safety and poisoning incidents in CMC area, even in five-star hotels, due to biological contamination. However, CMC has implemented a comprehensive inspection and certification scheme to confirm food safety for the local community. Still, there are many unauthorized catering food outlets in CMC area, which are not under CMC certificate. It seems food safety regulations by CMC area has been implemented largely, but still there is space to improve.

In fact, the largest number of food insecure people lives in the Western province that consists of Colombo, Gampaha, and Kalutara Districts, and which is the most populated and most urbanized province in Sri Lanka. In Colombo, there are a significant proportion of marginalized people. Over one half of the population in Colombo district is living with less than the prescribed calorie intake per day. An interesting point here is, high food insecurity is found in districts with generally low poverty levels. The reason is that, despite higher expenditures in urban areas that show households to be above the poverty line, less is being spent on food and energy yielding staples, indicating nutritionally unbalanced diets. Another inconvenient truth is that food quality is not always as it should be though food quality is an important part of food security.

[73] **HARTI Research paper 164,** assessment of pesticide usage in up-country vegetable farming in Sri Lanka

In the light of the above context, further studies need to be conducted to following purposes:

- Identify nutrient and food security of the most vulnerable people in CMC area and strategies to address them;
- Identify the food habits and necessary changes to the food plate, in order to increase the nutrient and food security;
- Capacity building requirements for catering workers in food preparation;
- Capacity building needed for farmers in agrochemical use.

7.4. FOOD SUPPLY CHAINS AND CRFS

In Sri Lanka, during the off-season, imported commodities fulfill the market requirements at a lower price. During this season, the government enforces taxes to reduce food commodity imports to ensure reasonable prices for local farmers. Hence, imported products play a seasonally significant role in many food items and Colombo food system to maintain equilibrium between supply and demand. As a result, most commodities have two main supply sources during the season and out of the season.

CMC has the main international harbour of the country within its limits and the main airport is also located in close proximity. Hence, all imported dry food items such as onions, canned fish, and grains flow through CMC wholesale market while CMC acts as the national distribution hub for imported food items. As a result of the airport and the commercial harbour, apart from food products, supply chains of majority of other imported commercial products such as cloths and garments, electronics, fertilizers, imported equipment, and other essentials start from Colombo city region. Businessmen in other parts of the country have a tendency to buy their local needs from CMC and transport them using the same vehicles arrives Colombo with food (especially vegetable and fruit) products. This scenario has being the strength of the Colombo food system to ensure an uninterrupted food supply from almost all parts of the country.

The supply chain in Sri Lanka is significantly influenced by the agricultural practice of farmers. The food supply chain in Sri Lanka mostly follows the “Supply Push Strategy,” where supply is not considering the potential demand at a given time. Because of the mono cropping and monoculture, in many occasions the farmers fail to satisfy consumer requirements at the right time. However, it is the time for farmers to think about “Demand Pull Strategy” adaptation in production and supply in a rational way to satisfy consumers and their demand changes. This major problem remains unanswered. Sustainable short-term and long-term socio-technological initiatives at a national level would bring the required changes to the back-end problems and issues in food supply chain in Sri Lanka. If the vegetable and fruit supply chain is considered, the need of an intervention is highly evident.

Serious price fluctuations, perish of vegetables and fruit, and farmers’ grievances are famous discussions on the vegetable and fruit supply chain in Sri Lanka. However, so far the discussions have pointed the finger towards the middle members of supply chain. Especially the commission agents at Colombo Manning market are accused of the “mafia” to change prices to get unethical financial gains. However, analysis are

not deep enough to prove the allegations on the middlemen/commission agents. During the study, two major downsides in the food supply chain in Sri Lanka are (a) high cost of production and (b) excess supply. The root cause diagnosis identified the two major reasons as mono cropping and monoculture practices.

CRFS for each commodity is produced using a random sample interview in a smaller period of time. Due to the smaller sample size and the randomized sample selection, the confidence on data is low. The CRFS can change with seasonal supplies. Proper primary data collection is required to produce CRFS maps with more validity.

Box 7.1

Mono Cropping has been the most popular farming practice among Sri Lankan farmers, is the high-yield agricultural practice of growing a single crop year after year on the same land, in the absence of crop rotation. As a result, farmers become specialists in a specific crop. Even though this practice is very popular among Sri Lankan farmers, it is counterproductive in various ways and ultimately cause negative effects to the cost of production. Mono cropping severely depletes the soil, as the plant will strip the soil of the nutrients it needs. This forces farmers to use high amount of fertilizer, which can disturb the natural balance of the soil and could contribute to a host of environmental problems from pollution to desertification. This practice can contribute to the proliferation of crop pests and diseases, as land is planted exclusively with one crop. This practice continuously makes the farmers dependent on fertilizer and they keep using more and more fertilizer to get the expected level of harvest. When the harvest heavily depends on the amount of fertilizer and pesticides used beyond the recommendations, the cost of production tends to rise to an unreasonable level, while jeopardizing food safety.

The responsible authorities fail to take sufficient efforts to educate farmers to avoid large-scale mono cropping and monoculture farming[74]. All farmers begin cultivating their farms in same time of the year, with similar crops, and finally reap a harvest at approximately in a similar period of the year. Therefore, many farmers bring their harvest (of the same product) to the market during the specific time. Since many farmers bring their harvest within a short-time span, some commodities are over supplied to the market. Considering the vegetables, as far as the unique demand for certain vegetables like Carrots, Beans, Leeks, and Potato exist and they get lower but reasonable prices even at the harvesting season. However, during the harvesting season, mainly due to oversupply the vegetables like Kakiri, Cucumber, Pumpkin, and even Tomato, which are cultivated in the dry zone, do not receive reasonable prices, which are sometimes even lower than the production cost.

Further study should be conducted:

- To identify the price increase along the value chain and the role of middlemen and other actors;
- To identify the innovative value chains that can be introduced to sustain food system and reduce price;
- Possibility of shortening value chains while reducing the involvement of middle men;

[74] There are no evidences on TV commercials, Radio programs, or other serious campaigns to cultivate multi culture farming in Sri Lanka. There are certain specific level training programs, but they are not effective as per the farmers met at Dambulla Economic centre

- Quantity of commodities flowing through each different supply chains;
- Identifying interventions that can be introduced to sustain the supply at lower cost;
- Draw the CRFS for each commodity by using comprehensive primary data collection and produce the changes to CRFS with seasonality;
- Capacity building of farmers to use agro chemicals properly and move away from monocrop practices.

7.5. FOOD WASTE

According to wholesale traders, throwing away the harvest at Colombo Manning market happens rarely and if in case it happens, it is mostly for highly perishable vegetables like Kakiri, Cucumber, or sometimes Tomato. However, the excessive stock of certain vegetables and fruits at Colombo Manning market causes massive price reductions of vegetables and fruits. It could be suggested that complementary industries such as sauce, chutney, pickle, cordial, jam, etc. could be established around Colombo Manning market since it could be more advantageous for perishable goods. This complementary industries will limit price reductions and help sustainable market prices, reduces the wastage and unproductive throw ways. In order to motivate those industries, relevant infrastructure should be established around Colombo Manning market and the public private partnership could be an ideal mechanism.

Currently, food market is competitive, and as a result, many unhealthy chemicals are used in different stages of the food supply chain. Hence, there is a tendency among the residents of Colombo to consume organic foods. There is an excess demand for organic products in Colombo and therefore prices of organic products are relatively high compared to commercial food products. The peri urban and rural areas of Colombo city region would be able to cultivate more organic vegetables and fruits to fulfill the increasing demand using the circular economy concept or using recycled food waste.

There are many informal reuse practices for catering food waste as animal feed can be observed in CMC area. Source segregated catering waste at nighttime only exceed 100 t/day. If the catering food waste in CMC is collected in a systematic way, it may be possible to find business opportunities in food waste as an animal feed.

So far, small-scale studies have been conducted on wastage of vegetables and fruits during the supply chain activities in Sri Lanka. The studies on post-harvest losses on other food commodities (apart from fruits and vegetables) are hard to find, but for fruits and vegetables, the waste along the supply chain is estimated as 30-40%. Further, it is claimed that nearly 75% of the total loss occurs during transportation and mainly due to use of improper packages.

Further study should be conducted:

- To quantitative and qualitative food waste production and their flows in CMC area;
- Quantify the waste along the value chain for major food commodities;

- Estimate the food waste to urban and peri urban agriculture possibilities;
- Potential of the food waste as an animal feed and the quantities from CMC.
- Capacity building of each actor along the value chain.

7.6. NATURAL RESOURCE MANAGEMENT

Among the 65,610 km^2 land area in Sri Lanka, the highest percentage is utilized for agriculture, which is 43.7% during 2010-2015 period. The organic matter content in a typical agricultural topsoil is expected to be around 5% (DOA, 2014), but the reddish-brown earth, which is the predominant soil type found in dry zone, is low in Phosphorus and organic matter (1-2%) contents. As per Wijewardena (1994), Phosphorus is the most limiting plant nutrient in Sri Lankan soils. Soil nutrient inputs for agricultural lands in Sri Lanka limits to application of synthetic fertilizers in almost all cases. Synthetic fertilizers can supply major nutrients, but does not help increasing micronutrients or organic content in soils.
Water, in terms of quality and quantity, has a great impact on agricultural production. Water scarcity is not a concern except in few parts of the country though polluted water in agriculture is a growing concern. The total volume of surface water is assessed as 43,000 - 45,000 MCM annually and groundwater resources are considered lesser with an estimated potential of 7,800 MCM per annum. Approximately, agricultural purposes consume 87% of freshwater withdrawals.

Future work:

- Identifying the agricultural practices to help soil deficiencies;
- Identify the impact from the present agriculture practices on natural resources and ecosystem;
- Identify the climate change and its future impact on natural resources and food production;
- Capacity building on adaptation of farmers.

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ANNEXURES

Annex 1: Seasonal Variation in Food Production in Sri Lanka

a. Paddy- Maha Season- 2013/2014

DEPARTMENT OF CENSUS AND STATISTICS

PADDY STATISTICS - EXTENT, SOWN, HARVESTED(GROSS & NETT), AVERAGE YIELD AND PRODUCTION BY DISTRICT - 2013/14 MAHA SEASON

Final Estimate

DISTRICT	GROSS EXTENT SOWN (ACRES)				GROSS EXTENT HARVESTED (ACRES)				AVERAGE YIELD (BUSHELS PER NETT ACRE)				NETT EXTENT HARVESTED (ACRES)	TOTAL PRODUCTION (000 BUSHELS)
	MAJOR SCHEMES	MINOR SCHEMES	RAINFED	ALL SCHEMES	MAJOR SCHEMES	MINOR SCHEMES	RAINFED	ALL SCHEMES	MAJOR SCHEMES	MINOR SCHEMES	RAINFED	AVERAGE YIELD		
01. COLOMBO	162	2,221	6,919	9,302	160	2,214	6,832	9,206	51.22	75.13	67.27	68.88	7,825	539
02. GAMPAHA	4,114	8,650	13,542	26,306	4,114	8,648	13,518	26,280	53.39	59.63	65.79	61.82	22,338	1,381
03. KALUTARA	237	5,342	25,911	31,490	237	5,333	25,790	31,360	54.46	51.12	57.67	56.53	28,930	1,635
04. GALLE	243	1,620	29,527	31,390	243	1,620	29,297	31,160	74.44	69.36	70.91	70.86	24,386	1,728
05. MATARA	8,850	7,993	17,480	34,323	8,821	7,961	17,433	34,215	76.92	78.43	73.03	75.29	27,013	2,034
06. RATNAPURA	5,144	16,696	7,572	29,412	5,144	16,660	7,539	29,343	85.27	83.75	62.66	78.60	24,942	1,960
07. KEGALLE	-	5,187	9,858	15,045	-	5,104	9,588	14,692	-	69.21	62.55	64.86	13,763	893
08. KURUNEGALA	29,587	60,845	60,644	151,076	29,284	56,155	51,655	137,094	87.63	81.22	71.09	78.77	137,094	10,799
09. PUTTALAM	11,548	19,625	3,283	34,456	11,346	17,478	2,282	31,106	83.36	76.74	74.33	78.98	26,440	2,088
10. KANDY	10,158	13,326	6,233	29,717	10,148	12,959	6,108	29,215	98.07	72.38	71.94	81.21	23,103	1,876
11. MATALE	16,732	19,187	9,988	45,907	16,155	17,728	8,344	42,227	77.63	82.78	62.09	76.72	37,975	2,913
12. NUWARAELIYA	2,259	10,110	64	12,433	2,259	10,095	64	12,418	82.00	86.20	79.20	85.40	6,998	598
13. BADULLA	27,475	27,020	13,797	68,292	27,471	26,412	7,256	61,139	112.80	79.64	79.20	94.49	51,968	4,910
14. MONARAGALA	18,760	24,837	42,431	86,028	18,616	22,095	17,696	58,407	98.49	79.17	51.60	76.97	57,239	4,406
15. JAFFNA	-	-	25,155	25,155	-	-	6,485	6,485	-	-	30.00	30.00	5,755	173
16. KILLINOCHCHI	26,509	1,187	28,885	56,581	24,188	401	8,518	33,107	82.86	59.43	79.87	81.81	29,379	2,403
17. VAVUNIYA	3,462	14,740	2,497	20,699	2,350	10,354	817	13,521	76.49	64.94	50.93	66.10	12,757	843
18. MULLAITIVU*	13,208	8,120	10,294	31,622	10,080	4,176	1,525	15,781	52.83	47.21	35.93	49.71	14,889	740
19. MANNAR	9,574	3,489	66	13,129	9,074	3,198	56	12,328	101.00	105.30	54.49	101.90	11,771	1,200
20. ANURADHAPURA	54,881	49,396	26,166	130,443	52,807	33,668	11,497	97,972	81.91	75.12	48.05	75.60	78,779	5,956
21. POLONNARUWA	135,472	14,747	3,479	153,698	135,427	13,725	2,438	151,590	93.00	101.40	74.88	93.47	134,097	12,534
22. TRINCOMALEE	33,566	12,716	18,292	64,574	32,884	8,975	11,903	53,762	94.75	89.36	93.99	93.68	49,945	4,679
23. BATTICALOA	51,671	7,727	94,311	153,709	51,671	7,727	94,311	153,709	69.45	39.20	54.32	58.65	135,664	7,956
24. AMPARA	154,848	9,590	38,039	202,477	154,279	8,838	32,047	195,164	102.41	78.45	62.36	94.75	186,518	17,672
25. HAMBANTOTA	49,474	13,401	3,553	66,428	49,456	13,003	3,467	65,926	112.60	98.00	88.65	108.46	57,600	6,247
26. UDA WALAWE	29,725			29,725	29,725			29,725	112.70			112.70	29,131	3,283
27. MAHAWELI 'H'	55,946	-	-	55,946	55,918	-	-	55,918	113.80	-	-	113.80	50,147	5,707
SRILANKA	753,605	357,772	497,986	1,609,363	741,857	314,527	376,466	1,432,850	95.16	78.51	63.24	83.30	1,286,446	107,155

* Excluding Welioya DS Division

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DEPARTMENT OF CENSUS AND STATISTICS

PADDY STATISTICS - EXTENT, SOWN, HARVESTED (GROSS & NETT), AVERAGE YIELD AND PRODUCTION BY DISTRICT - 2013 YALA SEASON

DISTRICT	GROSS EXTENT SOWN (ACRES)				GROSS EXTENT HARVESTED (ACRES)				AVERAGE YIELD (BUSHELS PER NETT ACRE)				NETT EXTENT HARVESTED (ACRES)	TOTAL PRODUCTION ('000 Bushels)
	MAJOR SCHEMES	MINOR SCHEMES	RAIN FED	ALL SCHEMES	MAJOR SCHEMES	MINOR SCHEMES	RAIN FED	ALL SCHEMES	MAJOR SCHEMES	MINOR SCHEMES	RAIN FED	AVERAGE YIELD		
01' COLOMBO	91	730	2,284	3,105	91	730	2,260	3,081	61.00	53.43	46.97	48.91	2,619	128
02' GAMPAHA	3,548	3,623	4,721	11,892	3,433	3,508	4,704	11,645	70.11	53.06	50.14	56.91	9,898	563
03' KALUTARA	159	3,071	13,836	17,066	159	3,071	13,834	17,064	48.01	51.18	48.83	49.25	15,742	775
04' GALLE	60	501	9,464	10,025	60	501	9,446	10,007	76.00	51.53	51.64	51.78	7,831	406
05' MATARA	7,596	6,459	13,944	27,999	7,595	6,449	13,863	27,907	80.87	62.87	62.13	67.40	22,033	1,485
06' RATNAPURA	5,402	12,000	3,515	20,917	5,400	11,991	3,506	20,897	108.00	68.31	55.61	76.44	17,762	1,358
07' KEGALLE		3,861	7,814	11,675		3,814	7,704	11,518		56.75	52.59	53.97	10,790	582
08' KURUNEGALA	28,813	57,093	43,728	129,634	28,806	56,808	43,621	129,235	83.01	71.36	60.21	70.19	129,235	9,071
09' PUTTALAM	14,791	12,408	1,299	28,498	14,323	11,987	1,251	27,561	82.74	67.26	55.88	74.79	23,427	1,752
10' KANDY	9,265	7,052	4,586	20,903	9,265	7,025	4,562	20,852	95.47	54.57	49.32	71.59	16,490	1,181
11' MATALE	12,356	9,376	1,294	23,026	12,352	9,340	1,269	22,961	100.80	79.37	54.85	89.54	20,649	1,849
12' NUWARAELIYA	952	3,557	19	4,528	952	3,557	19	4,528	77.05	58.00	52.00	61.98	2,552	158
13' BADULLA	21,556	11,674	91	33,321	21,556	11,674	91	33,321	98.22	64.05	68.08	86.17	28,323	2,440
14' MONARAGALA	20,320	14,918	2,682	37,920	20,320	14,859	2,675	37,854	80.42	63.13	52.74	71.68	37,097	2,659
15' JAFFNA	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16' KILLINOCHCHI	14,320	73		14,393	14,320	73		14,393	109.40	70.00		109.20	12,772	1,395
17' VAVUNIYA	5,425	7,579	18	13,022	5,425	7,579	18	13,022	96.23	91.38	50.00	93.34	12,286	1,147
18' MULATIVU	7,280	2,347		9,627	7,280	2,347		9,627	102.60	97.62		101.39	9,083	921
19' MANNAR	2,127	3,429		5,556	2,127	3,429		5,556	103.90	114.50		110.44	5,305	586
20' ANURADHAPURA	58,519	57,088	256	115,863	58,499	57,014	256	115,769	89.36	76.82	50.00	83.10	93,090	7,736
21' POLONNARUWA	136,639	17,809		154,448	136,639	17,809		154,448	92.86	82.34		91.65	136,625	12,521
22' TRINCOMALEE	44,581	12,011	273	56,865	44,581	12,011	273	56,865	92.59	92.09	50.00	92.28	52,828	4,875
23' BATTICALOA	54,061	9,189	4,843	68,093	54,061	9,189	4,843	68,093	88.63	88.51	97.84	89.27	60,099	5,365
24' AMPARA	152,454	6,250	440	159,144	152,358	6,220	440	159,018	93.91	91.07	70.00	93.73	151,974	14,245
25' HAMBANTOTA	49,688	11,942	2,361	63,991	49,573	11,942	2,361	63,876	100.20	88.24	66.43	96.72	55,808	5,398
26' UDA WALAWE	29,637			29,637	29,637			29,637	120.20			120.20	29,044	3,491
27' MAHAWELI 'H'	34,927			34,927	34,927			34,927	94.36			94.36	31,323	2,956
SRI LANKA	714,567	274,040	117,468	1,106,075	713,739	272,927	116,996	1,103,662	93.89	74.86	58.08	85.50	994,683	85,042

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c. Field crops – Maha Season – 2013/2014 (Source: Ministry of Agriculture)

Extent and Production of Other Field Crops - Maha 2013/14

Extent in Hectares, Production in Metric Tons

District	Chilies			Red Onion		Big Onion		Cowpea		Grean Gram		Black Gram	
	Extent	Pro.(green	Pro.(dry)	Extent	Pro.	Extent	Pro.	Extent	Pro.	Extent	Pro.	Extent	Pro.
Colombo	40	240											
Gampaha	80	480											
Kalutara	90	540											
Western	**210**	**1,260**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Galle	100	600											
Matara	70	420								50	50		
Hambantota	810	1,555	826	60	840	550	6,600	500	650	4,350	4,410		
Southern	**980**	**2,575**	**826**	**60**	**840**	**550**	**6,600**	**500**	**650**	**4,400**	**4,460**	**0**	**0**
Badulla	425	815	435	75	1,050	50	700	225	295	150	150	20	20
Monaragala	1,200	2,160	1,260	75	1,050	200	2,400	1,800	2,340	1,825	1,850	400	440
Uva	**1,625**	**2,975**	**1,695**	**150**	**2,100**	**250**	**3,100**	**2,025**	**2,635**	**1,975**	**2,000**	**420**	**460**
Rathnapura	250	480	255	70	980			250	325	350	355		
Kegalle	45	270								10	10		
Sabaragamuva	**295**	**750**	**255**	**70**	**980**	**0**	**0**	**250**	**325**	**360**	**365**	**0**	**0**
Kurunegala	700	1,345	715	45	630	10	140	785	1,020	970	985	325	360
Puttalam	1,000	2,240	1,190	1,100	15,400			475	620	450	455	150	165
North Western	**1,700**	**3,585**	**1,905**	**1,145**	**16,030**	**10**	**140**	**1,260**	**1,640**	**1,420**	**1,440**	**475**	**525**
Kandy	160	310	165	20	280			10	15	20	20		
Matale	500	960	510	5	70	20	300	45	60	75	75	10	10
Nuwara-Eliya	160	305	165	120	1,680			25	35	5	5		
Central	**820**		**840**	**145**	**2,030**	**20**	**300**	**80**	**110**	**100**	**100**	**10**	**10**
Anuradhapura	4,500	8,100	4,725	75	1,050	10	140	1,500	1,950	800	810	6,000	6,600
Polonnaruwa	200	480	180	40	560			200	260	160	160	50	55
North Central	**4,700**	**8,580**	**4,905**	**115**	**1,610**	**10**	**140**	**1,700**	**2,210**	**960**	**970**	**6,050**	**6,655**
Jaffna	650	1,170	685	2,100	29,400	10	120	190	250	185	190	300	330
Kilinochchi	300	575	305	700	9,800	10	110	300	390	410	415	400	440
Manar	230	440	235	55	770			175	230	220	225	400	440
Vavuniya	250	480	255	70	980			700	910	620	630	6,500	7,150
Mullaitivu	300	575	305	60	840	10	120	375	490	350	355	1,500	1,650
Northern	**1,730**	**3,240**	**1,785**	**2,985**	**41,790**	**30**	**350**	**1,740**	**2,270**	**1,785**	**1,815**	**9,100**	**10,010**
Trincomalee	250	600	225	670	9,380	10	110	200	260	190	195	250	275
Batticoloa	250	480	255	100	1,400	10	100	300	390	200	205	200	220
Ampara	1,000	1,920	1,020	20	280	5	60	3,800	4,940	350	355	120	130
Eastern	**1,500**	**3,000**	**1,500**	**790**	**11,060**	**25**	**270**	**4,300**	**5,590**	**740**	**755**	**570**	**625**
Walawe	75	145	80	10	140			100	130	200	205		
Kalawewa	200	360	210	10	140	50	600	150	195	865	875	30	35
System B	150	290	155	5	70			80	105	360	365	20	20
System C	50	95	50	5	70			75	100	250	255	10	10
System G	20	40	20	5	70			40	50	20	20	10	10
System L	25	50	25	5	70			5	10	25	25		
Mahaweli Area	**520**	**980**	**540**	**40**	**560**	**50**	**600**	**450**	**590**	**1,720**	**1,745**	**70**	**75**
Sri Lanka	**14,080**	**26,945**	**14,251**	**5,500**	**77,000**	**945**	**11,500**	**12,305**	**16,020**	**13,460**	#####	**16,695**	**18,360**

Extent and Production of Other Field Crops - Maha 2013/14

Extent in Hectares, Production in Metric Tons

District	Soya Bean		Ground Nut		Maize		Kurakkan		Gingelly		Potato	
	Extent	Pro.	Extent	Pro.	Extent	Pro.	Extent	Pro.	Extent	Pro.	Extent	Pro.
Colombo												
Gampaha												
Kalutara												
Western	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Galle												
Matara					10	45	40	45	10	10		
Hambantota			500	1,000	600	2,390	750	825	900	765		
Southern	**0**	**0**	**500**	**1,000**	**610**	**2,435**	**790**	**870**	**910**	**775**	**0**	**0**
Badulla			130	260	5,555	22,110	210	230	500	425	1,945	29,150
Monaragala			2,915	5,830	22,785	90,690	850	935	550	470		
Uva	**0**	**0**	**3,045**	**6,090**	**28,340**	**112,800**	**1,060**	**1,165**	**1,050**	**895**	**1,945**	**29,150**
Rathnapura			385	770	270	1,075	230	255	5	5		
Kegalle					45	180			15	10		
Sabaragamuva	**0**	**0**	**385**	**770**	**315**	**1,255**	**230**	**255**	**20**	**15**	**0**	**0**
Kurunegala			1,640	3,280	1,410	5,615	350	385	200	170		
Puttalam			1,000	2,000	850	3,385	110	120	250	215		
North Western	**0**	**0**	**2,640**	**5,280**	**2,260**	**9,000**	**460**	**505**	**450**	**385**	**0**	**0**
Kandy			10	20	240	960	115	130	50	45	320	3,850
Matale	15	25	115	225	720	2,865	170	190	50	45		
Nuwara-Eliya	35	60			245	980	150	165	5	5	1,720	34,400
Central	**50**	**85**	**125**	**245**	**1,205**	**4,805**	**435**	**485**	**105**	**95**	**2,040**	**38,250**
Anuradhapura	500	750	600	1,200	32,000	127,360	2,300	2,530	100	85		
Polonnaruwa			350	700	785	3,125	85	90	20	15		
North Central	**500**	**750**	**950**	**1,900**	**32,785**	**130,485**	**2,385**	**2,620**	**120**	**100**	**0**	**0**
Jaffna			95	190	30	120	50	55	900	765	120	465
Kilinochchi			415	830	150	600	70	70	110	95	1	5
Manar			245	490	175	695	10	10	55	50		
Vavuniya			1,060	2,120	415	1,655	30	35	280	240		
Mullaitivu			2,330	4,665	150	600	25	30	320	270		
Northern	**0**	**0**	**4,145**	**8,295**	**920**	**3,670**	**185**	**200**	**1,665**	**1,420**	**121**	**470**
Trincomalee			800	1,600	1,385	5,500	45	45	70	60		
Batticoloa			500	1,000	2,150	8,560	50	55	50	45		
Ampara			220	440	7,725	30,740	130	140	300	255		
Eastern	**0**	**0**	**1,520**	**3,040**	**11,260**	**44,800**	**225**	**240**	**420**	**360**	**0**	**0**
Walawe			560	1,120	440	1,760	50	55	95	80		
Kalawewa	1,000	1,500	195	390	3,485	13,865	90	100	105	90		
System B	5	10	310	620	1,000	3,980	15	20	15	10		
System C			250	500	2,300	9,155	85	95	45	40		
System G	20	30	250	500	470	1,870	5	5	5	5		
System L			20	40	25	100	5	5	5	5		
Mahaweli Area	**1,025**	**1,540**	**1,585**	**3,170**	**7,720**	**30,730**	**250**	**280**	**270**	**230**	**0**	**0**
Sri Lanka	**1,575**	**2,375**	**14,895**	**29,790**	**85,415**	**339,980**	**6,020**	**6,620**	**5,010**	**4,275**	**4,106**	**67,870**

d. Field crops – Yala Season- 2013/2014 (Source: Ministry of Agriculture)

Extent and Production of Other Field Crops - Yala 2014

(Extent in Hectares, Production in Metric Tons)

District	Chilies			Red Onion		Big Onion		Cowpea		Grean Gram		Black Gram	
	Extent	Pro.(green)	Pro.(dry)	Extent	Pro.	Extent	Pro.	Extent	Pro.	Extent	Pro.	Extent	Pro.
Colombo	40	280											
Gampaha	60	420											
Kalutara	90	630											
Western	**190**	**1,330**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Galle	70	490											
Matara	70	490								60	60		
Hambantota	700	1,325	770	50	700	430	5,590	100	130	3,700	3,750		
Southern	**840**	**2,305**	**770**	**50**	**700**	**430**	**5,590**	**100**	**130**	**3,760**	**3,810**	**0**	**0**
Badulla	270	290	170	60	840	10	140	125	165	150	155		
Monaragala	500	945	550	180	2,520			600	780	450	455	30	35
Uva	**770**	**1,235**	**720**	**240**	**3,360**	**10**	**140**	**725**	**945**	**600**	**610**	**30**	**35**
Rathnapura	300	570	330	50	700	5	70	150	195	175	175		
Kegalle	125	500								20	20		
Sabaragamuva	**425**	**1,070**	**330**	**50**	**700**	**5**	**70**	**150**	**195**	**195**	**195**	**0**	**0**
Kurunegala	600	1,135	660	100	1,400	150	1,800	500	650	900	915	450	495
Puttalam	850	1,605	940	1,100	15,400	10	140	100	130	100	100	40	45
North Western	**1,450**	**2,740**	**1,600**	**1,200**	**16,800**	**160**	**1,940**	**600**	**780**	**1,000**	**1,015**	**490**	**540**
Kandy	300	1,680	105	10	140	5	70	10	15	20	20		
Matale	400	2,240	140	20	280	4,000	72,000	80	105	550	560	30	35
Nuwara-Eliya	150	720	45	100	1,400	10	120	20	25	5	5		
Central	**850**	**4,640**	**290**	**130**	**1,820**	**4,015**	**72,190**	**110**	**145**	**575**	**585**	**30**	**35**
Anuradhapura	2,000	2,800	2,800	80	1,120	1,500	21,000	150	195	200	205	200	220
Polonnaruwa	100	190	110	10	140	150	1,950	60	80	225	230	30	35
North Central	**2,100**	**2,990**	**2,910**	**90**	**1,260**	**1,650**	**22,950**	**210**	**275**	**425**	**435**	**230**	**255**
Jaffna	115	220	130	1,500	21,000	60	720	35	45	100	100	15	15
Kilinochchi	85	160	95	500	7,000	10	120	75	100	15	15	10	10
Mannar	120	230	130	70	980	15	180	50	65	85	85	5	5
Vavuniya	250	470	275	800	11,200	60	780	60	80	55	55	25	30
Mullaitivu	175	330	190	500	7,000	50	700	150	195	100	100	10	10
Northern	**745**	**1,410**	**820**	**3,370**	**47,180**	**195**	**2,500**	**370**	**485**	**355**	**355**	**65**	**70**
Trincomalee	160	300	175	200	2,800	50	600	100	130	135	140	170	185
Batticoloa	150	285	165	50	700	5	55	75	100	50	50	60	65
Ampara	500	945	550	10	140	5	60	4,000	5,200	250	255	30	35
Eastern	**810**	**1,530**	**890**	**260**	**3,640**	**60**	**715**	**4,175**	**5,430**	**435**	**445**	**260**	**285**
Walawe	200	380	220	10	140	5	50	50	65	80	80	30	35
Kalawewa	445	840	490	10	140	500	6,000	300	390	70	70	90	100
System B	50	95	55	5	70	70	980	25	35	25	25	20	20
System C	25	50	30	5	70	10	140	50	65	40	40	5	5
System G	30	60	35	5	70	125	1,750	10	15	10	10		
System L	10	20	10	5	70			10	15				
Mahaweli Area	**760**	**1,445**	**840**	**40**	**560**	**710**	**8,920**	**445**	**585**	**225**	**225**	**145**	**160**
Sri Lanka	**8,940**	**20,695**	**9,170**	**5,430**	**76,020**	**7,235**	**115,015**	**6,885**	**8,970**	**7,570**	**7,675**	**1,250**	**1,380**

e. Vegetable – Maha season - 2014/2015 (Source: Ministry of Agriculture)

Targeted Extent & Production -Maha 2014/2015

Vegetables

District	Potato		Beans		Capsicum		Tomato		Cabbage		Carrot		Beet Root		Raddish	
	Ext.(ha)	Pro.(mt)	Ext.(ha)	Pro.(mt)	Ext.(ha)	Pro.(mt)	Ext.(ha)	Pro.(mt)	Ext.(ha)	Pro.(mt)	Ext.(ha)	Pro.(mt)	Ext.(ha)	Pro.(mt)	Ext.(ha)	Pro.(mt)
Colombo	0	0	0	0	45	260	15	308	16	280	0	0	0	0	20	200
Gampaha	0	0	2	8	50	288	20	410	1	25	0	0	0	0	50	500
Kalutara	0	0	0	0	40	231	40	820	0	0	0	0	0	0	60	600
Western	**0**	**0**	**2**	**8**	**135**	**779**	**75**	**1,538**	**17**	**306**	**0**	**0**	**0**	**0**	**130**	**1,300**
Kandy	2	47	700	10,500	150	1,051	650	9,750	500	6,000	140	1,421	125	625	130	2,600
Matale	0	0	900	3,075	230	1,611	400	6,000	300	3,600	4	37	200	1,000	100	2,000
Nuwara Eliya	1,400	28,000	1,200	6,177	450	3,152	700	10,500	900	10,800	1,200	12,180	650	3,250	550	11,000
Central	**1,402**	**28,047**	**2,800**	**19,752**	**830**	**5,814**	**1,750**	**26,250**	**1,700**	**20,400**	**1,344**	**13,639**	**975**	**4,875**	**780**	**15,600**
Galle	0	0	0	0	30	187	20	175	0	0	0	0	0	0	85	1,200
Matara	0	0	6	55	50	312	45	393	0	0	5	75	0	0	125	2,000
Hambantota	0	0	0	0	180	1,123	350	3,057	10	0	5	70	0	0	10	160
Southern	**0**	**0**	**6**	**55**	**260**	**1,622**	**415**	**3,624**	**10**	**0**	**10**	**145**	**0**	**0**	**220**	**3,360**
Jaffna	50	463	50	366	40	373	120	1,947	60	1,554	75	1,615	110	227	5	85
Kilinochchi **	0	0	0	0	35	327	80	1,298	20	0	15	323	10	21	0	0
Mannar	12	180	1	7	50	467	50	811	30	102	20	431	10	21	0	0
Vavunia	0	0	40	280	80	747	80	1,298	65	688	10	215	40	83	5	90
Mullaitivu **	0	0	0	0	45	420	50	811	25	0	20	431	20	41	0	0
Northern	**62**	**643**	**91**	**653**	**250**	**2,333**	**380**	**6,165**	**200**	**2,344**	**140**	**3,014**	**190**	**392**	**10**	**175**
Batticaloa	0	0	0	0	20	240	45	900	5	0	5	50	5	75	0	0
Ampara	0	0	140	700	400	4,800	200	4,000	0	0	0	0	5	75	20	334
Trincomalee	0	0	15	105	45	540	75	1,500	0	0	25	250	15	300		
Eastern	**0**	**0**	**155**	**805**	**465**	**5,580**	**320**	**6,400**	**5**	**0**	**30**	**300**	**25**	**450**	**20**	**334**
Kurunegala	0	0	40	400	230	2,995	100	2,425	15	675	0	0	250	6,335	200	5,189
Puttalam	0	0	0	0	280	3,647	100	2,425	200	9,000	0	0	200	5,068	245	6,356
North Western	**0**	**0**	**40**	**400**	**510**	**6,642**	**200**	**4,850**	**215**	**9,675**	**0**	**0**	**450**	**11,403**	**445**	**11,545**
Anuradhapura	0	0	110	541	140	700	200	3,000	34	687	0	0	70	1,050	20	280
Polonnaruwa	0	0	10	243	20	100	20	300	6	114	1	15	5	75	20	280
North Central	**0**	**0**	**120**	**784**	**160**	**800**	**220**	**3,300**	**40**	**801**	**1**	**15**	**75**	**1,125**	**40**	**560**
Badulla	3,000	42,000	2,063	14,443	310	2,170	800	12,000	700	14,700	400	4,800	210	147	350	4,200
Monaragala	0	0	50	350	75	525	300	4,500	5	105	5	60	1	12	60	720
Uva	**3,000**	**42,000**	**2,113**	**14,793**	**385**	**2,695**	**1,100**	**16,500**	**705**	**14,805**	**405**	**4,860**	**211**	**159**	**410**	**4,920**
Ratnapura	2	30	380	4,560	50	400	200	4,000	20	400	10	150	15	180	90	1,800
Kegalle	0	0	45	540	30	240	30	600	0		0	0	0	0	60	1,200
Sabaragamuwa	**2**	**30**	**425**	**5,100**	**80**	**640**	**230**	**4,600**	**20**	**400**	**10**	**150**	**15**	**180**	**150**	**3,000**
Mahaweli "H"	0	0	100	1,350	75	676	200	5,471	50	750	0	0	20	277	10	269
Uda Walawe			0		7	63	90	2,462	5	75			5	69	35	941
System H			100	1,368	70	631	145	3,966	45	675			15	208	10	269
System B			15	205	20	180	30	821	15	225			7	97	50	1,344
System C			25	342	30	270	15	410	10	150			7	97	30	806
System G			15	205	10	90	7	191	5	75			0	0	5	134
System L			5	68	8	72	10	274	0	0			5	69	7	188
Mahaweli Area	**0**	**0**	**260**	**3,539**	**220**	**1,984**	**497**	**13,594**	**130**	**1,950**	**0**	**0**	**59**	**817**	**147**	**3,951**
Sri Lanka	**4,466**	**70,720**	**6,013**	**45,889**	**3,295**	**28,889**	**5,187**	**86,821**	**3,042**	**50,681**	**1,940**	**22,123**	**2,000**	**19,402**	**2,352**	**44,745**

f. Vegetables- Maha Season- 2012/2013 (Source: Ministry of Agriculture)

Targeted Extent & Production -Maha 2012/2013

District	Knokhol		Leeks		Long Beans		Bushitovo		Okra		Lufa		Snake Gourd		Bitter Gourd	
	Ext.(ha)	Pro.(mt)	Ext.(ha)	Pro.(mt)	Ext.(ha)	Pro.(mt)	Ext.(ha)	Pro.(mt)	Ext.(ha)	Pro.(mt)	Ext.(ha)	Pro.(mt)	Ext.(ha)	Pro.(mt)	Ext.(ha)	Pro.(mt)
Colombo	0	0	0	0	60	240	30	150	75	746	55	60	60	903	30	295
Gampaha	0	0	0	0	100	400	45	225	120	1,193	85	93	80	1,204	75	737
Kalutara	0	0	0	0	130	520	60	300	150	1,492	100	109	100	1,505	100	982
Weste	**0**	**0**	**0**	**0**	**290**	**1,160**	**135**	**675**	**345**	**3,431**	**240**	**262**	**240**	**3,612**	**205**	**2,013**
Kandy	150	1,500	20	200	100	300	20	60	140	560	110	1,174	100	300	170	510
Matale	120	1,200	15	150	225	675	75	225	350	1,400	210	2,241	180	540	215	645
Nuwara Eliy	300	3,000	1,000	11,090	50	150	20	60	40	160	50	533	40	120	60	180
Centr	**570**	**5,700**	**1,035**	**11,440**	**375**	**1,125**	**115**	**345**	**530**	**2,120**	**370**	**3,948**	**320**	**960**	**445**	**1,335**
Galle	0	0	0	0	110	1,375	10	125	120	1,500	100	1,867	80	219	60	1,128
Matara	0	0	0	0	80	1,000	25	312	130	1,625	60	1,120	60	164	570	10,716
Hambantota	100	1,000	0	0	600	7,500	50	623	530	6,625	400	7,467	370	1,011	500	9,400
Southe	**100**	**1,000**	**0**	**0**	**790**	**9,875**	**85**	**1,060**	**780**	**9,750**	**560**	**10,453**	**510**	**1,394**	**1,130**	**21,244**
Jaffna	0	0	30	531	200	0	10	100	180	2,212	4	39	90	1,259	90	1,013
Kilinochchi **	0	0	5	0	170	0	25	250	140	1,720	10	100	60	839	70	788
Mannar	0	0	0	0	50	0	25	250	50	614	5	50	30	420	30	338
Vavunia	0	0	0	0	120	0	50	500	110	1,352	20	200	60	839	70	788
Mullaitivu **	0	0	0	0	90	0	40	400	100	0	0	0	50	699	50	563
Northe	**0**	**0**	**35**	**531**	**630**	**0**	**150**	**1,500**	**580**	**5,898**	**39**	**389**	**290**	**4,057**	**310**	**3,489**
Batticaloa	0	0	0	0	100	1,200	130	1,820	170	2,720	60	1,620	90	2,450	90	2,250
Ampara	1	12	0	0	200	2,400	60	840	210	3,360	60	1,620	130	3,539	100	1,250
Trincomalee	1	12	0	0	110	1,320	125	1,750	180	2,880	60	1,620	80	2,178	90	1,125
Easte	**2**	**23**	**0**	**0**	**410**	**4,920**	**315**	**4,410**	**560**	**8,960**	**180**	**4,860**	**300**	**8,166**	**280**	**4,625**
Kurunegala	125	1,398	0	0	500	5,000	80	805	300	5,036	175	6,377	170	4,255	260	5,200
Puttalam	10	69	0	0	400	4,000	160	1,611	230	3,861	120	4,373	100	2,503	100	2,000
North Wes	**135**	**1,468**	**0**	**0**	**900**	**9,000**	**240**	**2,416**	**530**	**8,896**	**295**	**10,750**	**270**	**6,758**	**360**	**7,200**
Anuradhapu	20	240	0	0	400	4,000	250	2,500	675	6,750	300	4,500	185	3,325	410	6,150
Polonnaruwa	5	58	0	0	45	450	5	50	40	400	25	375	30	540	40	600
North Cen	**25**	**298**	**0**	**0**	**445**	**4,450**	**255**	**2,550**	**715**	**7,150**	**325**	**4,875**	**215**	**3,865**	**450**	**6,750**
Badulla	225	2,700	150	1,800	160	960	150	900	180	900	160	1,120	100	900	150	900
Monaragala	5	60	5	60	400	2,400	100	600	440	2,200	225	1,575	150	1,350	220	1,320
U	**230**	**2,760**	**155**	**1,860**	**560**	**3,360**	**250**	**1,500**	**620**	**3,100**	**385**	**2,695**	**250**	**2,250**	**370**	**2,220**
Ratnapura	15	195	0	0	300	4,200	0	0	300	3,600	150	2,250	120	2,169	200	3,394
Kegalle	20	260	0	0	120	1,680	40	600	100	1,200	75	1,125	75	1,356	90	1,527
Sabaragam	**35**	**455**	**0**	**0**	**420**	**5,880**	**40**	**600**	**400**	**4,800**	**225**	**3,375**	**195**	**3,525**	**290**	**4,921**
Mahaweli "H	30	780	0	0	200	2,703	30	258	200	2,773	200	3,275	150	2,920	75	1,477
Uda Walawe	5	130			10	135	30	258	160	2,218	110	1,801	150	2,920	130	2,560
System H	30	780			155	2,095	35	301	170	2,357	130	2,129	118	2,297	65	1,280
System B	10	260			20	270	20	172	30	416	30	491	10	195	20	394
System C	0	0			0	0	30	258	55	762	45	737	30	584	25	492
System G	5	130			0	0	5	43	20	277	122	1,998	0	0	15	295
System L	0	0			12	162	5	43	15	208	15	246	10	195	12	236
Mahaweli A	**80**	**2,080**	**0**	**0**	**397**	**5,366**	**155**	**1,332**	**650**	**9,011**	**652**	**10,678**	**468**	**9,109**	**342**	**6,736**
Sri Lanka	**1,177**	**13,784**	**1,225**	**13,831**	**5,217**	**45,136**	**1,740**	**16,388**	**5,710**	**63,116**	**3,271**	**52,285**	**3,058**	**43,697**	**4,182**	**60,534**

Targeted Extent & Production -Maha 2012/2013

District	Cucumber		Pumkin		Brinjal		Winged Beans		Ash Plantain		Leafy Vegetable		Murunga	
	Ext.(ha)	Pro.(mt)	Ext.(ha)	Pro.(mt)	Ext.(ha)	Pro.(mt)	Ext.(ha)	Pro.(mt)	Ext.(ha)	Pro.(mt)	Ext.(ha)	Pro.(mt)	Ext.(ha)	Pro.(mt)
Colombo	40	478	0		70	491	30	300	35	468	60	1,140	0	0
Gampaha	20	239	0		115	807	25	250	140	1,872	80	1,520	0	0
Kalutara	50	597	0		130	912	40	400	75	1,003	220	4,180	0	0
Weste	**110**	**1,313**	**0**	**0**	**315**	**2,210**	**95**	**950**	**250**	**3,343**	**360**	**6,840**	**0**	**0**
Kandy	90	900	90	1,350	180	2,135	50	500	140	1,763	70	280	0	0
Matale	290	2,900	310	4,650	320	3,795	400	4,000	100	1,259	80	320	65	650
Nuwara Eliy	40	400	55	825	130	1,542	25	250	45	567	35	140	0	0
Centr	**420**	**4,200**	**455**	**6,825**	**630**	**7,471**	**475**	**4,750**	**285**	**3,588**	**185**	**740**	**65**	**650**
Galle	10	158	4	47	110	1,788	45	731	230	2,011	250	2,190	0	0
Matara	15	238	15	170	100	1,625	40	650	230	2,011	120	1,051	5	50
Hambantota	500	7,923	580	6,556	525	8,531	100	1,625	425	3,717	190	1,664	50	500
Southe	**525**	**8,319**	**599**	**6,773**	**735**	**11,944**	**185**	**3,006**	**885**	**7,740**	**560**	**4,906**	**55**	**550**
Jaffna	13	189	100	1,722	175	3,081	5	50	170	1,360	225	2,703	0	0
Kilinochchi **	0	0	70	1,205	200	3,521	0	0	50	400	50	601	20	160
Mannar	3	38	40	689	70	1,232	0	0	45	360	70	841	40	375
Vavunia	10	150	90	1,550	160	2,817	0	0	65	520	60	721	35	350
Mullaitivu **	0	0	55	947	160	2,817	0	0	200	1,600	40	481	0	0
Northe	**25**	**377**	**355**	**6,112**	**765**	**13,469**	**5**	**50**	**530**	**4,240**	**445**	**5,346**	**95**	**885**
Batticaloa	35	117	30	540	210	4,200	5	50	50	1,250	90	1,172	70	720
Ampara	60	742	45	810	235	4,700	0	0	210	5,250	0	0	0	0
Trincomalee	40	247	90	1,620	235	4,700	15	75	70	1,750	90	1,172	100	960
Easte	**135**	**1,107**	**165**	**2,970**	**680**	**13,600**	**20**	**125**	**330**	**8,250**	**180**	**2,344**	**170**	**1,680**
Kurunegala	250	8,883	300	6,058	230	5,003	0	0	150	3,750	80	787	0	0
Puttalam	70	2,487	140	2,827	200	4,350	43	541	70	1,750	20	197	20	190
North Wes	**320**	**11,370**	**440**	**8,885**	**430**	**9,353**	**43**	**541**	**220**	**5,500**	**100**	**984**	**20**	**190**
Anuradhapu	200	4,000	2,100	30,318	1,000	18,000	100	9,850	200	1,600	216	3,240	0	0
Polonnaruwa	20	400	30	2,522	30	540	20	201	10	80	5	75	20	200
North Cen	**220**	**4,400**	**2,130**	**32,840**	**1,030**	**18,540**	**120**	**10,051**	**210**	**1,680**	**221**	**3,315**	**20**	**200**
Badulla	160	1,600	300	1,800	610	7,930	70	420	250	1,500	200	1,200	130	1,260
Monaragala	260	2,600	2,800	16,800	720	9,360	60	360	650	3,900	90	540	200	1,980
U	**420**	**4,200**	**3,100**	**18,600**	**1,330**	**17,290**	**130**	**780**	**900**	**5,400**	**290**	**1,740**	**330**	**3,240**
Ratnapura	110	11,000	200	3,200	300	4,500	120	1,800	30	300	120	1,800	0	0
Kegalle	30	3,000	5	80	70	1,050	30	450	65	650	85	1,275	0	0
Sabaragam	**140**	**14,000**	**205**	**3,280**	**370**	**5,550**	**150**	**2,250**	**95**	**950**	**205**	**3,075**	**0**	**0**
Mahaweli "H	60	1,183	250	4,889	170	2,978	30	401	120	2,040	0	0	0	0
Uda Walawe	120	2,367	110	2,151	185	3,236	45	601	35	595	50	434		
System H	65	1,282	145	2,836	175	3,061	30	401	115	1,955	45	391		
System B	30	592	50	978	50	875	10	134	15	255	10	87		
System C	38	750	70	1,369	80	1,399	20	267	20	340	40	347		
System G	15	296	30	587	20	350	5	67	5	85	5	43		
System L	15	296	15	293	20	350	8	107	10	170	10	87		
Mahaweli Au	**343**	**6,765**	**670**	**13,102**	**700**	**12,248**	**148**	**1,978**	**320**	**5,440**	**160**	**1,389**	**0**	**0**
Sri Lanka	**2,658**	**56,052**	**8,119**	**99,386**	**6,985**	**111,674**	**1,371**	**24,481**	**4,025**	**46,131**	**2,706**	**30,679**	**755**	**7,395**

g. Vegetables- Yala Season- 2014 (Source: Ministry of Agriculture)

Targeted Extent & Production -Yala 2014

Vegetables

District	Potato		Beans		Capsicum		Tomato		Cabbage		Carrot		Beet Root		Raddish	
	Ext.(ha)	Pro.(mt)	Ext.(ha)	Pro.(mt)	Ext.(ha)	Pro.(mt)	Ext.(ha)	Pro.(mt)	Ext.(ha)	Pro.(mt)	Ext.(ha)	Pro.(mt)	Ext.(ha)	Pro.(mt)	Ext.(ha)	Pro.(mt)
Colombo	0	0	0	0	20	25	0	0	0	0	0	0	0	0	15	153
Gampaha	0	0	0	0	30	180	10	80	0	0	0	0	0	0	35	356
Kalutara	0	0	5	0	35	136	5	50	0	0	0	0	0	0	55	560
Western	**0**	**0**	**5**	**0**	**85**	**340**	**15**	**130**	**0**	**0**	**0**	**0**	**0**	**0**	**105**	**1,069**
Kandy	10	120	588	5,294	170	266	560	5,660	430	3,440	120	1,800	90	2,248	120	2,400
Matale	5	60	300	2,700	214	879	510	5,100	160	1,280	2	36	1,280	31,969	330	6,600
Nuwara Eliya	830	16,600	240	2,160	247	1,015	975	9,750	900	7,200	900	13,500	500	12,488	475	9,500
Central	**845**	**16,780**	**1,128**	**10,154**	**631**	**2,160**	**2,045**	**20,510**	**1,490**	**11,920**	**1,022**	**15,336**	**1,870**	**46,704**	**925**	**18,500**
Galle	0	0	0	0	30	291	10	100	2	16	0	0	0	0	60	974
Matara	0	0	4	18	45	142	9	90	5	40	1	15	0	0	120	1,950
Hambantota	0	0	1	6	75	74	207	2,070	10	80	5	75	5	0	150	2,436
Southern	**0**	**0**	**5**	**25**	**150**	**508**	**226**	**2,260**	**17**	**136**	**6**	**90**	**5**	**0**	**330**	**5,361**
Jaffna	0	0	1	6	25	192	75	836	35	743	70	1,542	115	2,086	5	50
Kilinochchi **	0	0	1	6	15	115	30	335	20	425	20	441	15	272	0	0
Mannar	0	0	2	12	30	230	35	390	20	425	1	26	5	91	0	0
Vavunia	0	0	0	0	50	383	55	613	30	637	5	110	30	544	0	0
Mullaitivu **	0	0	0	0	60	460	70	781	40	849	25	551	30	544	0	0
Northern	**0**	**0**	**5**	**25**	**180**	**1,380**	**265**	**2,955**	**145**	**3,079**	**121**	**2,670**	**195**	**3,538**	**5**	**50**
Batticaloa	0	0	5	0	10	77	10	180	0	0	0	0	0	0	0	0
Ampara	0	0	10	0	40	307	0	0	0	0	0	0	0	0	3	40
Trincomalee	0	0	10	0	30	230	40	600	5	60	60	840	15	135	15	165
Eastern	**0**	**0**	**25**	**0**	**80**	**613**	**50**	**780**	**5**	**60**	**60**	**840**	**15**	**135**	**18**	**205**
Kurunegala	0	0	45	116	250	2,530	150	3,398	30	1,158	0	0	240	6,239	215	5,504
Puttalam	0	0	0	0	130	1,315	45	1,019	50	1,930	0	0	120	3,119	250	6,400
North Western	**0**	**0**	**45**	**116**	**380**	**3,845**	**195**	**4,418**	**80**	**3,088**	**0**	**0**	**360**	**9,358**	**465**	**11,904**
Anuradhapura	0	0	15	12	110	440	85	1,275	30	600	0	0	110	1,650	60	900
Polonnaruwa	0	0	5	31	20	80	15	225	5	100	0	0	0	0	10	120
North Central	**0**	**0**	**20**	**43**	**130**	**520**	**100**	**1,500**	**35**	**700**	**0**	**0**	**110**	**1,650**	**70**	**1,020**
Badulla	2,741	38,377	1,667	8,619	250	1,750	634	9,510	575	12,075	300	3,600	100	1,200	300	3,600
Monaragala	0	0	8	43	230	1,610	160	2,400	5	105	10	120	10	120	40	480
Uva	**2,741**	**38,377**	**1,676**	**8,661**	**480**	**3,360**	**794**	**11,910**	**580**	**12,180**	**310**	**3,720**	**110**	**1,320**	**340**	**4,080**
Ratnapura	0	0	394	2,035	45	540	200	4,000	20	400	10	100	10	120	90	1,800
Kegalle	0	0	36	184	30	360	25	500	0	0	4	60	0	0	60	1,200
Sabaragamuwa	**0**	**0**	**429**	**2,219**	**75**	**900**	**225**	**4,500**	**20**	**400**	**14**	**160**	**10**	**120**	**150**	**3,000**
Uda Walawe	0	0	0	0	0	0	100	2,850	5	75	0	0	91	1,364	40	571
System H					150	1,500	210	5,985	130	1,950			15	225	15	214
System B					10	100	0	0	0	0			5	75	25	357
System C					10	100	5	143	5	75			5	75	10	143
System G					5	50	5	143	0	0			0	0	5	71
System L					5	50	0	0	0	0			0	0	0	0
Mahaweli Area	**0**	**0**	**0**	**0**	**180**	**1,800**	**320**	**9,120**	**140**	**2,100**	**0**	**0**	**116**	**1,739**	**95**	**1,357**
Sri Lanka	**3,586**	**55,157**	**3,338**	**21,243**	**2,371**	**15,427**	**4,235**	**58,083**	**2,512**	**33,663**	**1,533**	**22,816**	**2,791**	**64,565**	**2,504**	**46,546**

Targeted Extent & Production -Yala 2015

District	Knokhol		Leeks		Long Beans		Bushitovo		Okra		Lufa		Snake Gourd		Bitter Gourd	
	Ext.(ha)	Pro.(mt)	Ext.(ha)	Pro.(mt)	Ext.(ha)	Pro.(mt)	Ext.(ha)	Pro.(mt)	Ext.(ha)	Pro.(mt)	Ext.(ha)	Pro.(mt)	Ext.(ha)	Pro.(mt)	Ext.(ha)	Pro.(mt)
Colombo	0	0	0	0	40	163	20	78	55	549	45	536	45	675	35	350
Gampaha	0	0	0	0	60	244	30	117	75	749	55	655	50	750	50	500
Kalutara	0	0	0	0	110	447	55	214	150	1,497	100	1,190	80	1,200	51	510
Western	**0**	**0**	**0**	**0**	**210**	**853**	**105**	**408**	**280**	**2,794**	**200**	**2,380**	**175**	**2,625**	**136**	**1,360**
Kandy	140	1,680	30	360	100	1,500	20	300	150	675	140	1,578	90	1,800	140	2,800
Matale	200	2,400	5	60	245	3,675	90	1,350	360	1,620	275	3,099	270	5,400	315	6,300
Nuwara Eliya	310	3,720	875	10,500	40	600	20	300	40	180	35	394	30	600	35	700
Central	**650**	**7,800**	**910**	**10,920**	**385**	**5,775**	**130**	**1,950**	**550**	**2,475**	**450**	**5,071**	**390**	**7,800**	**490**	**9,800**
Galle	0	0	0	0	72	90	25	306	90	1,125	75	1,404	80	2,200	80	1,497
Matara	1	8	0	0	75	93	20	250	130	1,625	55	1,029	55	1,513	50	936
Hambantota	10	78	0	0	430	534	40	500	330	4,125	320	5,989	270	7,425	300	5,614
Southern	**11**	**86**	**0**	**0**	**577**	**717**	**85**	**1,056**	**550**	**6,875**	**450**	**8,421**	**405**	**11,138**	**430**	**8,047**
Jaffna	0	0	15	244	120	1,382	5	50	119	1,442	0	0	60	877	70	858
Kilinochchi **	0	0	0	0	50	576	25	250	65	791	0	0	35	512	40	490
Mannar	0	0	0	0	0	0	10	100	40	487	4	60	35	512	30	368
Vavunia	0	0	0	0	60	691	35	350	70	852	10	150	45	658	70	858
Mullaitivu **	0	0	0	0	75	863	50	500	85	1,034	0	0	70	1,024	60	735
Northern	**0**	**0**	**15**	**244**	**305**	**3,511**	**125**	**1,250**	**379**	**4,606**	**14**	**210**	**245**	**3,583**	**270**	**3,309**
Batticaloa	0	0	0	0	50	600	80	1,120	110	1,760	25	675	60	1,560	60	1,500
Ampara	0	0	0	0	175	2,102	49	686	50	800	56	1,499	50	1,300	40	1,000
Trincomalee	5	0	0	0	60	720	80	1,120	95	1,520	35	945	29	765	45	1,125
Eastern	**5**	**0**	**0**	**0**	**285**	**3,422**	**209**	**2,926**	**255**	**4,080**	**116**	**3,119**	**139**	**3,625**	**145**	**3,625**
Kurunegala	100	1,000	0	0	450	4,914	90	974	300	5,036	145	4,980	180	4,500	180	3,759
Puttalam	0	0	1	13	556	6,073	110	1,191	140	2,350	85	2,919	75	1,875	90	1,879
North Western	**100**	**1,000**	**1**	**13**	**1,006**	**10,987**	**200**	**2,165**	**440**	**7,386**	**230**	**7,899**	**255**	**6,375**	**270**	**5,638**
Anuradhapura	5	46	0	0	230	2,300	120	1,200	340	3,610	140	2,100	130	2,340	140	2,100
Polonnaruwa	1	8	0	0	35	350	25	250	25	255	20	300	30	540	30	450
North Central	**6**	**54**	**0**	**0**	**265**	**2,650**	**145**	**1,450**	**365**	**3,865**	**160**	**2,400**	**160**	**2,880**	**170**	**2,550**
Badulla	210	2,520	150	1,800	60	360	60	360	100	500	60	420	50	450	100	600
Monaragala	10	120	5	60	210	1,260	50	300	300	1,500	145	1,015	115	1,035	125	750
Uva	**220**	**2,640**	**155**	**1,860**	**270**	**1,620**	**110**	**660**	**400**	**2,000**	**205**	**1,435**	**165**	**1,485**	**225**	**1,350**
Ratnapura	20	200	5	41	240	3,360	0	0	195	2,340	120	1,800	100	1,800	140	2,380
Kegalle	3	30	0	0	130	1,820	40	600	90	1,080	80	1,200	90	1,620	80	1,360
Sabaragamuwa	**23**	**230**	**5**	**41**	**370**	**5,180**	**40**	**600**	**285**	**3,420**	**200**	**3,000**	**190**	**3,420**	**220**	**3,740**
Uda Walawe	5	35	0	0	6	56	25	146	155	1,850	120	1,430	160	2,374	130	1,924
System H	20	140			430	4,013	0	0	100	1,194	280	3,336	265	3,932	350	5,180
System B	5	35			10	93	0	0	10	119	5	60	5	74	5	74
System C	0	0			0	0	10	59	10	119	10	119	5	74	0	0
System G	0	0			0	0	5	29	15	179	10	119	10	148	20	296
System L	0	0			5	47	0	0	5	60	25	298	5	74	5	74
Mahaweli Area	**30**	**210**	**0**	**0**	**451**	**4,209**	**40**	**234**	**295**	**3,521**	**450**	**5,361**	**450**	**6,677**	**510**	**7,548**
Sri Lanka	**1,045**	**12,020**	**1,086**	**13,078**	**4,125**	**38,925**	**1,189**	**12,700**	**3,799**	**41,023**	**2,474**	**39,297**	**2,574**	**49,607**	**2,866**	**46,967**

Targeted Extent & Production -Yala 2014

District	Cucumber		Pumkin		Brinjal		Winged Beans		Ash Plantain		Leafy Vegetable		Murunga	
	Ext.(ha)	Pro.(mt)	Ext.(ha)	Pro.(mt)	Ext.(ha)	Pro.(mt)	Ext.(ha)	Pro.(mt)	Ext.(ha)	Pro.(mt)	Ext.(ha)	Pro.(mt)	Ext.(ha)	Pro.(mt)
Colombo	20	242	5	74	50	350	5	50	30	404	50	934	0	0
Gampaha	15	182	10	111	60	420	15	150	130	1,750	60	1,120	0	0
Kalutara	45	549	0	0	120	840	40	400	100	1,346	190	3,548	0	0
Western	**80**	**973**	**15**	**185**	**230**	**1,610**	**60**	**600**	**260**	**3,500**	**300**	**5,602**	**0**	**0**
Kandy	135	1,620	55	825	190	2,762	60	600	40	280	60	312	0	0
Matale	326	3,912	470	7,050	240	3,489	140	1,400	100	700	35	182	60	270
Nuwara Eliya	30	360	45	675	130	1,890	50	500	70	490	19	97	0	0
Central	**491**	**5,892**	**570**	**8,550**	**560**	**8,141**	**250**	**2,500**	**210**	**1,470**	**114**	**591**	**60**	**270**
Galle	32	451	5	57	90	1,463	30	488	190	1,340	160	1,429	0	0
Matara	15	209	20	247	100	1,625	70	1,139	185	1,305	120	1,072	5	50
Hambantota	300	4,175	540	6,669	420	6,825	80	1,301	330	2,328	180	1,608	20	200
Southern	**347**	**4,835**	**565**	**6,973**	**610**	**9,913**	**180**	**2,928**	**705**	**4,974**	**460**	**4,109**	**25**	**250**
Jaffna	0	0	90	1,557	100	1,635	0	0	90	850	185	2,277	25	256
Kilinochchi **	0	0	65	1,125	130	2,126	0	0	15	142	45	554	0	0
Mannar	0	0	30	519	50	818	0	0	25	236	35	431	20	200
Vavunia	10	15	50	865	110	1,799	0	0	70	661	40	492	0	0
Mullaitivu **	0	0	30	519	170	2,780	0	0	15	142	35	431	15	150
Northern	**10**	**15**	**265**	**4,585**	**560**	**9,157**	**0**	**0**	**215**	**2,032**	**340**	**4,185**	**60**	**606**
Batticaloa	60	990	20	360	200	4,000	10	98	75	1,875	80	1,600	60	1,320
Ampara	50	825	50	900	50	1,000	0	0	575	14,375	93	1,864	0	0
Trincomalee	40	660	20	360	130	2,600	0	0	31	785	65	1,300	60	1,320
Eastern	**150**	**2,475**	**90**	**1,620**	**380**	**7,600**	**10**	**98**	**681**	**17,035**	**238**	**4,764**	**120**	**2,640**
Kurunegala	260	9,412	330	6,803	260	5,564	50	500	150	4,232	115	1,123	0	0
Puttalam	50	1,810	126	2,602	140	2,996	20	200	66	1,859	395	3,853	0	0
North Wes	**310**	**11,222**	**456**	**9,405**	**400**	**8,560**	**70**	**700**	**216**	**6,091**	**510**	**4,976**	**0**	**0**
Anuradhapu	100	2,000	640	12,800	400	7,200	48	610	30	240	30	450	0	0
Polonnaruwa	20	400	30	600	40	720	10	87	10	80	10	150	5	55
North Centr	**120**	**2,400**	**670**	**13,400**	**440**	**7,920**	**58**	**697**	**40**	**320**	**40**	**600**	**5**	**55**
Badulla	80	800	195	1,170	500	6,500	30	180	50	300	60	360	50	500
Monaragala	180	1,800	3,100	18,600	500	6,500	20	120	420	2,520	55	330	140	1,400
Uva	**260**	**2,600**	**3,295**	**19,770**	**1,000**	**13,000**	**50**	**300**	**470**	**2,820**	**115**	**690**	**190**	**1,900**
Ratnapura	90	1,800	100	1,600	190	2,850	70	1,050	30	300	110	1,650	0	0
Kegalle	30	600	5	80	75	1,125	30	450	90	900	90	1,350	0	0
Sabaragam	**120**	**2,400**	**105**	**1,680**	**265**	**3,975**	**100**	**1,500**	**120**	**1,200**	**200**	**3,000**	**0**	**0**
Uda Walawe	110	2,119	100	1,938	170	1,990	35	339	40	467	25	250	0	0
System H	310	5,970	560	10,850	500	5,852	65	630	50	583	30	300	0	0
System B	15	289	30	581	25	293	0	0	0	0	5	50	0	0
System C	5	96	20	388	15	176	5	48	5	58	10	100	0	0
System G	15	289	20	388	10	117	0	0	0	0	2	20	0	0
System L	5	96	5	97	5	59	0	0	5	58	0	0	0	0
Mahaweli Au	**460**	**8,859**	**735**	**14,241**	**725**	**8,485**	**105**	**1,017**	**100**	**1,167**	**72**	**720**	**0**	**0**
Sri Lanka	**2,349**	**41,670**	**6,766**	**80,408**	**5,170**	**78,361**	**883**	**10,340**	**3,017**	**40,608**	**2,389**	**29,237**	**460**	**5,721**

Annex 2: Food printing in Colombo city region food system

This appendix provides latest available statistical evidences relating to input and output in food system in Colombo district.

a. Land Use Pattern of Colombo District- Latest Available

දිස්ත්‍රික්කයේ ඉඩම් පරිහරණ රටාව - 2012

Land used pattern in District - 2012

වගුව, Table : 3.1

ඉඩම් ස්වභාවය Nature of land	භූමි ප්‍රමාණය (හෙක්ටයාර) Area (Hec)	ප්‍රතිශතය Percentage (%)
01.අස්වද්දන ලද කුඹුරු` - Asweddumized paddy land		
1. වාරිමාර්ග - Irrigated	1971.3	2.8
11.අහස්දියෙන් - Rainfed	5737.5	8.2
02.තේ - Tea	67.2	0.1
03. රබර් - Rubber	16558.0	23.7
04. පොල් - Coconut	2928.6	4.2
05. කුරුදු- Cinnamon	152.8	0.2
06. වෙනත් වගාවන් - Other crops	418.4	0.6
07.වනාන්තර- Forests		
1. ඝන වනාන්තර - Dense forests	1237.4	1.8
11. විවෘත වනාන්තර - Open forests	8.0	0.0
111. වගා කරන ලද වනාන්තර - Planted forests	618.3	0.9
08.ලදු කැළෑ හා හේන - Grass lands/Chena	584.1	0.8
09. වගුරු හා කඩොලාන කැළෑ - Marshes and Mangroves	2226.2	3.2
10.ගෙවතු - Home gardens	19154.4	27.4
11.ජලාශ - Reservoirs	1705.9	2.4
12.ගොඩනැගිලි- Building	10957.1	15.7
13වැලි හා ගල් පර - Sand and Mountain	58.8	0.1
14. මුඩු බිම් හා අත්හරින ලද ඉඩම් - Abandoned land	598.4	0.9
15.වෙනත් (පූජා භූමි, මාර්ග,සුසාන භූමි ආදිය)	4917.8	7.0
Other (sacred places, roads,cemetery etc)		
එකතුව - Total	69900.0	100.0

මූලාශ්‍රය - දිස්ත්‍රික් ඉඩම් පරිහරන සැලසුම් කාර්යාලය

Source - District Land use Planning Office

ප්‍රාදේශීය ලේකම් කොට්ඨාශ මට්ටමින් අස්වද්දන ලද බිම් ප්‍රමාණය- 2012

Asweddumized extent of paddy by Divisional level - 2012

වගුව Table : 4.1

ප්‍රා.ලේ කොට්ඨාශය	අස්වද්දන ලද බිම් ප්‍රමාණය(හෙක්ටයාර) - Asweddumized extent (Hect.)			
D.S. Division	වාරිමාර්ග යටතේ- By Irrigation		වර්ෂා- Rainfed	එකතුව - Total
	විශාල - Major	සුළු - Minor		
කොලොන්නාව Kolonnawa	-	-	102	102
කඩුවෙල Kaduwela	258	206	1867	2331
හෝමාගම Homagama	-	1634	5629	7263
සීතාවක Seethawaka	-	1004	812	1816
පාදුක්ක Padukka	-	1440	3201	4641
මහරගම Maharagama	-	236	912	1148
කැස්බෑව Kesbewa	-	1440	3201	4641
එකතුව - Total	258	5960	15724	21942

(1 Hec = 2.471 Ac)

මූලාශ්‍රය -දිස්ත්‍රික් සංඛ්‍යාලේඛන අංශය,
Source - District Statistical Branch,

b. Crop Statistics in Colombo by DS divisions- Latest Available

ප්‍රාදේශීය ලේකම් කොට්ඨාශ මට්ටමින් කාෂිකාර්මික
බෝග වගාව - 2012 (හෙක්ටයාර වලින්)

Highland crop Statistics by Divisional Level - 2012(Extent in Hec.)

වගුව, Table : 4. 6

ප්‍රා.ලේ කොට්ඨාශය D.S. Division	තේ - Tea*	රබර් - Rubber*	පොල් - Coconut*	කුරුඳු - Cinnamon	කෝපි - Coffee	ගම්මිරිස් - Pepper	කජු - Cashew	කරාබු - Cloves	බුලත් - Bettle
කොළඹ Colombo	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00
කොලොන්නාව Kolonnawa	-	5.10	274.50	0.00	0.36	0.57	0.00	0.00	1.66
කඩුවෙල Kaduwela	-	122.50	895.00	0.73	1.05	8.30	0.08	0.00	2.55
හෝමාගම Homagama	12.50	712.50	2115.00	26.63	12.22	29.14	4.86	0.00	8.09
සීතාවක Seethawaka	82.50	3685.00	1185.00	5.79	5.63	41.48	3.48	0.00	6.15
පාදුක්ක Padukka	72.90	2655.00	972.00	11.74	10.93	21.97	5.54	0.53	11.98
මහරගම Maharagama	-	26.50	612.00	0.00	0.00	0.00	0.00	0.00	0.00
ශ්‍රී ජයවර්ධනපුර කොට්ටේ Sri jayawardanapura kotte	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00
තිඹිරිගස්යාය Thimbirigasyaya	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00
දෙහිවල Dehiwala	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00
රත්මලාන Rathmalana	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00
මොරටුව Moratuwa	-	-	148.00	0.00	0.00	0.00	0.00	0.00	0.00
කැස්බෑව Kesbewa	-	55.80	915.00	5.91	1.46	5.67	0.49	0.00	2.27
එකතුව - Total	167.90	7262.40	7116.50	50.79	31.65	107.12	14.45	0.53	32.70

සම්බන්ධයි- Connected).

ප්‍රා.ලේ කොට්ඨාශය D.S. Division	පුවක් - Arecant	අඹ - Mango	දොඩම් - Orange	දෙහි - Lime	කොස් - Jack	කෙසෙල් - Plantain	පැපොල් - Papaw	අන්නාසි Pineapple	වෙනත් - Other
කොළඹ Colombo	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
කොලොන්නාව Kolonnawa	3.64	3.32	0.20	0.20	1.98	9.92	0.00	0.53	19.79
කඩුවෙල Kaduwela	2.95	9.02	2.10	2.71	11.53	24.56	3.16	2.87	58.92
හෝමාගම Homagama	19.02	27.92	3.93	6.11	22.66	54.43	13.15	4.45	151.68
සීතාවක Seethawaka	14.65	74.87	1.58	5.22	120.80	40.75	11.70	20.76	290.33
පාදුක්ක Padukka	41.28	26.99	1.82	3.93	57.14	59.98	11.33	11.41	213.88
මහරගම Maharagama	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ශ්‍රී ජයවර්ධනපුර කොට්ටේ Sri jayawardanapura kotte	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
තිඹිරිගස්යාය Thimbirigasyaya	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
දෙහිවල Dehiwala	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
රත්මලාන Rathmalana	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
මොරටුව Moratuwa	0.53	2.02	0.02	1.21	0.00	0.00	0.00	0.00	3.79
කැස්බෑව Kesbewa	5.67	20.64	0.00	1.38	20.48	23.15	7.24	1.30	79.85
එකතුව - Total	87.74	164.79	9.66	20.76	234.60	212.79	46.58	41.32	818.24

මූලාශ්‍රය -දිස්ත්‍රික් සංඛ්‍යාලේඛන අංශය,
Source - District Statistical Branch,

c. Extent and Yield of permanent and semi-permanent crops in Colombo- Latest Available

දිස්ත්‍රික්කයේ ස්ථිර හා අර්ධ ස්ථිර බෝග වගා කළ
බිම් ප්‍රමාණය හා අස්වැන්න - 2012

Permanent crops and semi permanent crops cultivated extent and yield in District 2012

වගුව, Table : 4.7

බෝගය Crop	වගා කළ බිම් ප්‍රමාණය(හෙක්ටයාර්) Cultivated extent (Hectares)		අස්වැන්න Yield	
	ඵලදරන In production	ඵලනොදරන Not in production	ඒකකය Unit	ප්‍රමාණය Quantity
කුරුඳු - Cinnamon	104.7	20	කි./ග්‍රෑම්- Kg.	51990
කෝපි - Coffee	58.1	20.1	කි./ග්‍රෑම්- Kg.	48460
කොකෝවා - Cocoa	0.4		කි./ග්‍රෑම්- Kg.	-
ගම්මිරිස් - Papper	206.9	57.8	කි./ග්‍රෑම්- Kg.	54830
කරදමුංගු - Cardamom	-	-	කි./ග්‍රෑම්- Kg.	-
කරාබු - Cloves	1.3	-	කි./ග්‍රෑම්- Kg.	-
පුවක් - Arecant	162	54.8	කි./ග්‍රෑම්- Kg.	133450
කජු - Cashew	28.1	7.8	දහස්ගණන්-In 1000s	56750
දොඩම් - Orange	20.34	3.52	ගණන - In Nos.	120880
දෙහි - Lime	42.6	8.7	ගණන - In Nos.	243650
අඹ - Mango	312.4	94.8	ගණන - In Nos.	2063900
කොස් - Jack	441.5	138.2	ගණන - In Nos.	1623550
දෙල් - Jackfruit	58.1	15.4	ගණන - In Nos.	806275
උක් - Cane sugar	3.04	0.1	ගණන - In Nos.	-
කෙසෙල් - plantain	391.4	134.4	දහස්ගණන්-In 1000s	907150
පැපොල්- Papaw	90	25.1	ගණන - In Nos.	795125
අන්නාසි - Pineapple	89.8	12.3	ගණන - In Nos.	975200
පැෂන් ෆෘට් - Pasion fruit	4	0.8	ගණන - In Nos.	143760
බුලත්- Bettle	67.8	13	දහස්ගණන්-In 1000s	84525

මූලාශ්‍රය -දිස්ත්‍රික් සංඛ්‍යාලේඛන අංශය,
Source - District Statistical Branch

d. Live Stock Statistics in Colombo by DS divisions - Latest Available

ප්‍රාදේශීය ලේකම් කොට්ඨාශ මට්ටමින් සත්ව සංඛ්‍යාලේඛන- 2012

Livestock Statistics by Divisional Level - 2012

වගුව, Table : 4.9

ප්‍රා.ලේ කොට්ඨාශය D.S. Division	එළ හරන් ගණන Cattle *	මී හරක් ගණන * Buffaloes *	එළුවන් ගණන Goats	ඌරන් ගණන Pigs	කුකුළන්, කිකිළින් ගණන Cock / Hens	තාරාවන් ගණන Duck	කළුකුන් ගණන Turkey
කොළඹ Colombo	106	37	50	72	2710	0	0
කොලොන්නාව Kolonnawa	1141	739	586	325	2370	135	18
කඩුවෙල Kaduwela	2486	1977	448	804	58040	65	62
හෝමාගම Homagama	3603	3517	675	110	123675	850	175
සීතාවක Seethawaka	2727	1242	623	7460	461390	45	95
පාදුක්ක Padukka	2477	1922	355	94	326250	140	18
මහරගම Maharagama	1050	668	89	22	1580	35	22
ශ්‍රී ජයවර්ධනපුර කොට්ටේ Sri jayawardanapura kotte	414	70	104	0	675	65	0
තිඹිරිගස්යාය Thimbirigasyaya	0	0	0	0	0	0	0
දෙහිවල Dehiwala	136	83	11	135	11550	0	0
රත්මලාන Rathmalana	155	42	118	194	365	0	0
මොරටුව Moratuwa	150	48	333	0	0	0	0
කැස්බෑව Kesbewa	779	979	335	158	29400	85	38
එකතුව - Total	15224	11324	3727	9374	1018005	1,420	428

* කිරි ගන්නා දෙනුන් ද ඇතුලත්ය.
* Include in Mitch Cattles

මූලාශ්‍රය -දිස්ත්‍රික් සංඛ්‍යාලේඛන අංශය,
Source - District Statistical Branch

e. Milk and Egg production in Colombo by DS division - Latest Available

ප්‍රාදේශීය ලේකම් කොට්ඨාශ මට්ටමින් කිරි හා බිත්තර නිෂ්පාදනය- 2012

Milk and Egg production by Divisional Level - 2012

වගුව, Table : 4.11

ප්‍රා.ලේ කොට්ඨාශය D.S. Division	එළකිරි Cow milk		මීකිරි Buffalo milk		බිත්තර Egg	
	කිරි ගන්නා එළ දෙනුන් ගණන Mitch Cattles	දෛනික නිෂ්පාදනය (ලීටර්) Daily production (L)	කිරි ගන්නා මී දෙනුන් ගණන Mitch Buffaloes	දෛනික නිෂ්පාදනය (ලීටර්) Daily production (L)	බිත්තර දමන කිකිළියන් ගණන Hens	දෛනික නිෂ්පාදනය Daily production
කොළඹ Colombo	20	36	8		995	920
කොලොන්නාව Kolonnawa	294	583	119	360	1025	870
කඩුවෙල Kaduwela	640	2139	298	2875	29535	2970
හෝමාගම Homagama	976	1968	389	4360	87250	81225
සීතාවක Seethawaka	578	1914	234	518	110265	69675
පාදුක්ක Padukka	525	1812	318	1716	27350	19862
මහරගම Maharagama	280	872	108	520	750	625
ශ්‍රී ජයවර්ධනපුර කොට්ටේ Sri jayawardanapura	140	48	6	0	225	168
තිඹිරිගස්යාය Thimbirigasyaya	0	0	0	0	0	0
දෙහිවල Dehiwala	32	68	8	52	3450	2465
රත්මලාන Rathmalana	40	0	14	0	175	82
මොරටුව Moratuwa	38	0	12	0	0	0
කැස්බෑව Kesbewa	29	3699	163	1395	16750	15325
එකතුව - Total	3,592	13139	1677	11796	277770	194187

මූලාශ්‍රය -දිස්ත්‍රික් සංඛ්‍යාලේඛන අංශය,
Source - District Statistical Branch

f. Meat production Colombo by DS division- Latest Available

ප්‍රා. ලේ කොට්ඨාශ මට්ටමින් නීත්‍යානුකූලව මස් පිණිස මරන ලද

සතුන් සංඛ්‍යාව - 2012

Meat production by Divisional Level 2012

වගුව, Table : 4.12

ප්‍රා.ලේ කොට්ඨාශය D.S. Division	නීත්‍යානුකූල අවසරය මත මරණ ලද සතුන් සංඛ්‍යාව No of animals killed on legal permission	
	එළහරක්- Cattles	එළුවන් - Goats
කොළඹ Colombo	®	48814
තිඹිරිගස්යාය Thimbirigasyaya	*	
දෙහිවල Dehiwala	*	*
රත්මලාන	*	*
මොරටුව Moratuwa	*	*
කැස්බෑව Kesbewa	*	*
මහරගම Maharagama	*	*
හෝමාගම Homagama	*	*
ශ්‍රී ජයවර්ධනපුර කොට්ටේ Sri jayawardanapura kotte	*	*
පාදුක්ක Padukka	*	*
සීතාවක Seethawaka	*	156
කොලොන්නාව Kolonnawa	363	97
කඩුවෙල Kaduwela	*	*
එකතුව - Total	363	49,067

* මස් පිණිස සතුන් නොමරයි.

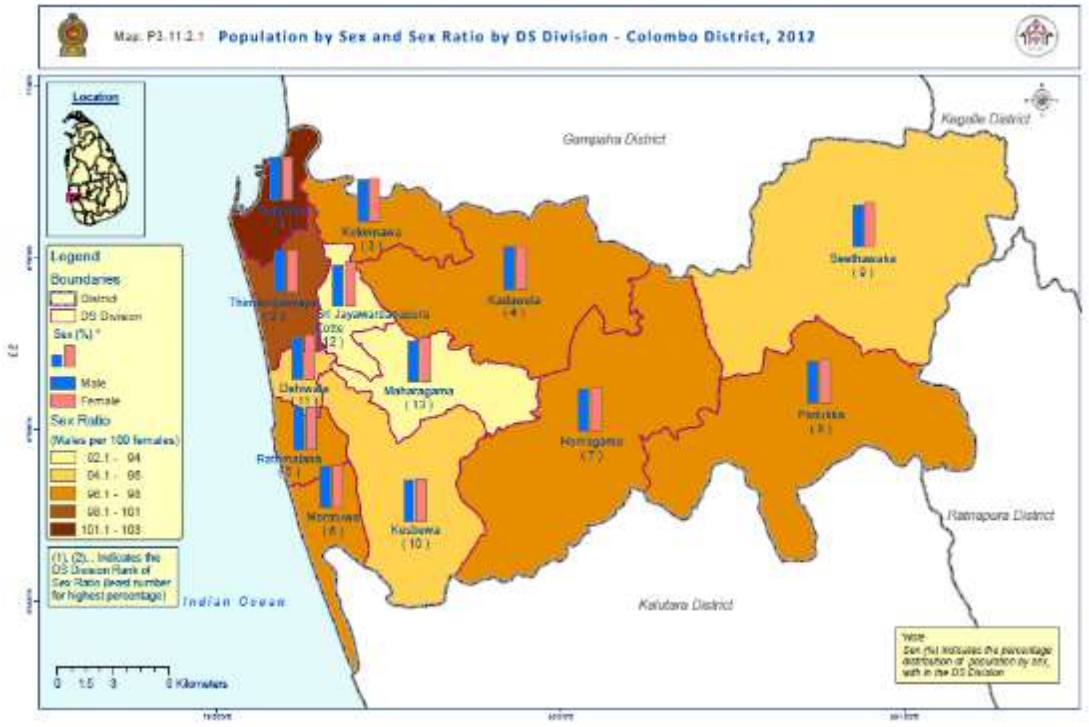
® පිටපළාත්වලින් නාගරික සුනාගාරය වෙත ගෙනවුත් නැවත පරීක්ෂා කරන ලද ගවමස් ප්‍රමාණය කි.ග්‍රෑ. 4,715,009

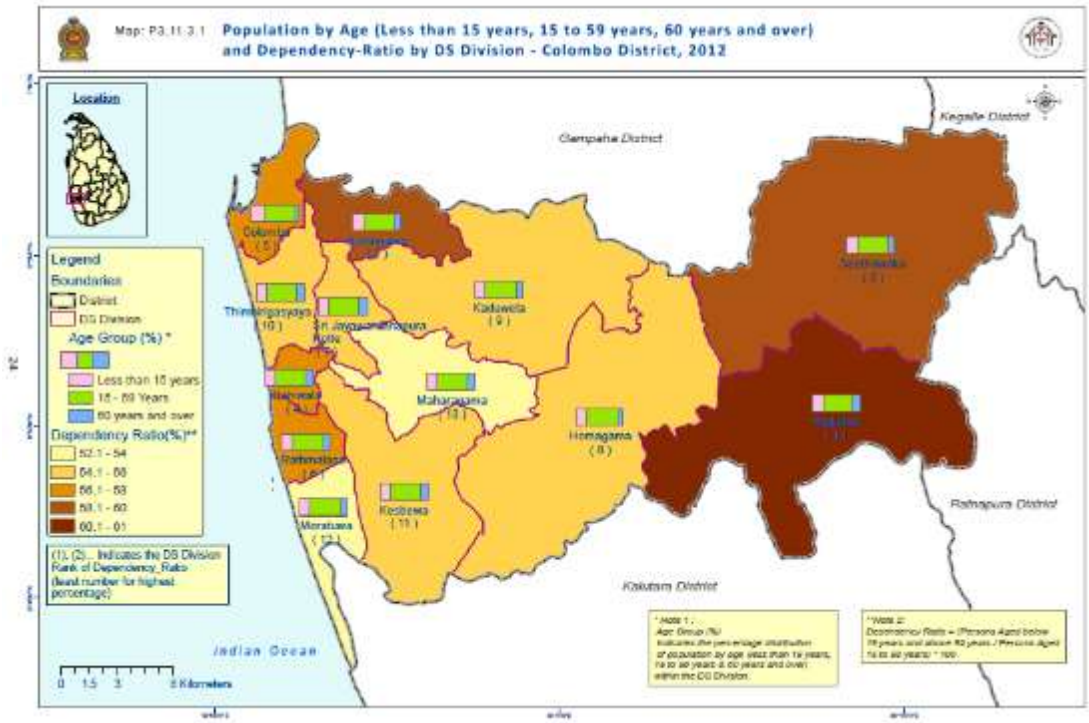
මූලාශ්‍රය -දිස්ත්‍රික් සංඛ්‍යාලේඛන අංශය,
Source - District Statistical Branch

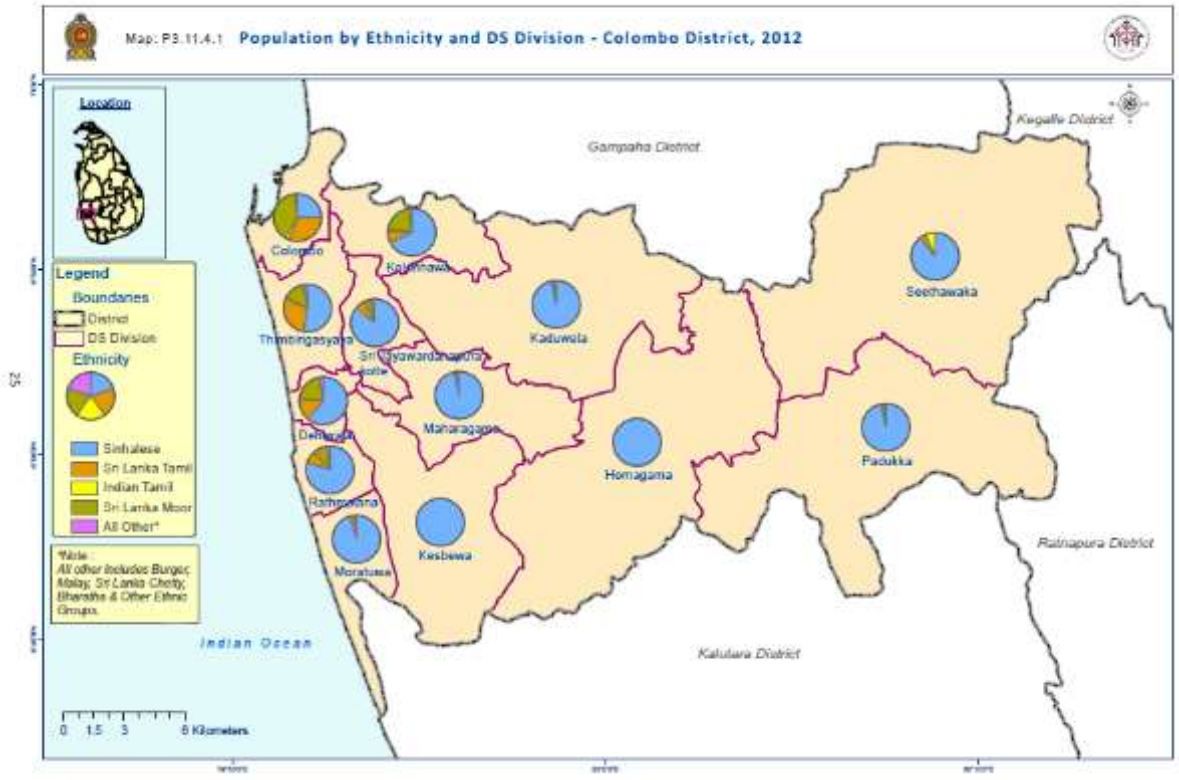
*do not slaughter animals

® Beef Amount that Recheck after getting from outstation 4,715, 009

Annex 3 – Population distribution by ethnicity, religion, gender and age in Colombo CRFS






Map: P3.11.4.1 Population by Ethnicity and DS Division - Colombo District, 2012
Location
Legend
Boundaries
District
DS Division
Ethnicity
Sinhalese
Sri Lanka Tamil
Indian Tamil
Sri Lanka Moor
All Other*
*Note :
All other includes Burger, Malay, Sri Lanka Chetty, Bharatha & Other Ethnic Groups
Gampaha District
Kegalle District
Ratnapura District
Kalutara District
Indian Ocean
Colombo
Kolonnawa
Thimbirigasyaya
Kaduwela
Seethawaka
Maharagama
Homagama
Padukka
Rathmalana
Moratuwa
Kesbewa
0 1.5 3 6 Kilometers

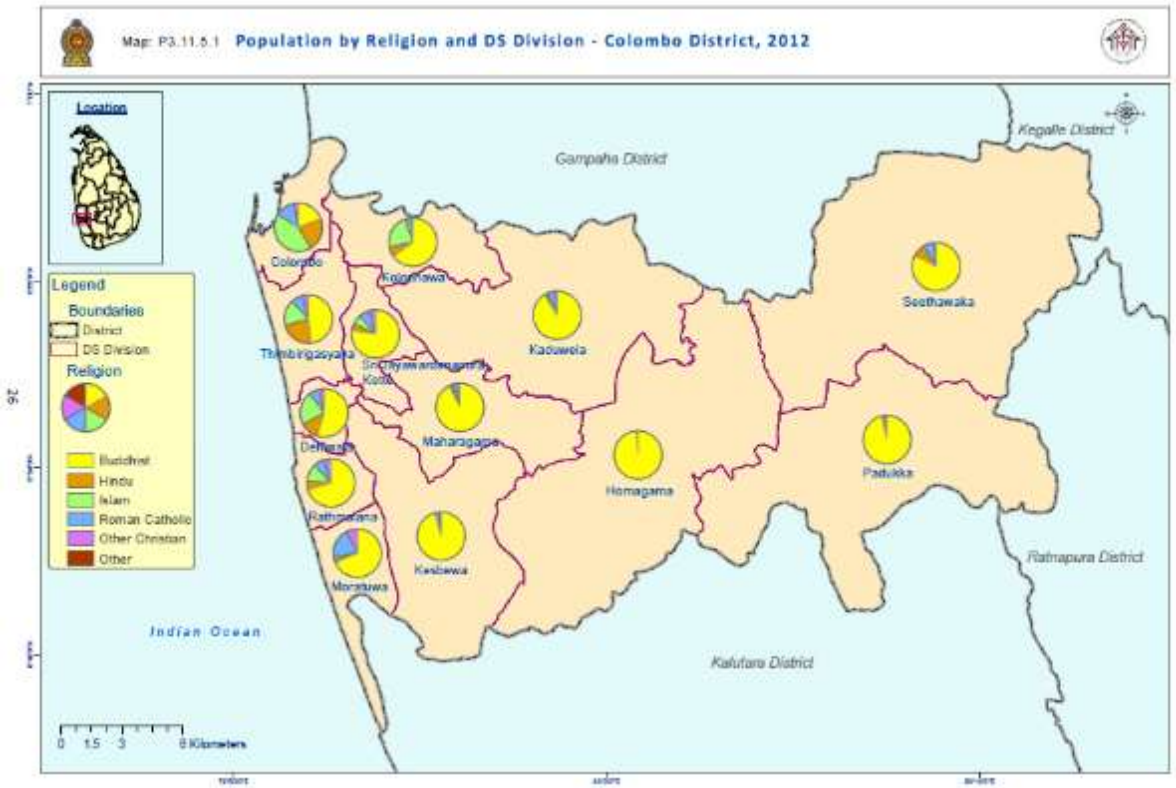

Map: P3.11.5.1 Population by Religion and DS Division - Colombo District, 2012
Location
Legend
Boundaries
District
DS Division
Religion
Buddhist
Hindu
Islam
Roman Catholic
Other Christian
Other
Gampaha District
Kegalle District
Ratnapura District
Kalutara District
Indian Ocean
Colombo
Kolonnawa
Thimbirigasyaya
Kaduwela
Seethawaka
Maharagama
Homagama
Padukka
Rathmalana
Moratuwa
Kesbewa
0 1.5 3 6 Kilometers

Table 3. Prevalence of thin, normal and overweight/obese in non-pregnant women by background characteristics

Background Characteristics	*BMI category (%)*				*Total*
	Underweight (BMI<18.5)	*Normal (BMI=18.5-24.9)*	*Overweight BMI=25.0-29.0)*	*Obese (BMI>30.0)*	
Age group (years)					
15-19	40.5	45.2	14.3	0.0	84
20-29	22.5	54.7	18.1	4.8	922
30-39	12.9	51.8	26.6	8.7	929
40-49	14.2	50.7	26.5	8.5	211
Sector					
Urban	11.3	45.4	28.3	15.0	533
Rural	18.7	55.5	21.6	4.2	1491
Estate	42.6	50.0	7.4	0.0	122
District					
Anuradhapura	16.9	53.7	26.4	3.0	201
Badulla	24.1	51.7	19.8	4.3	232
Colombo	12.1	52.8	27.1	7.9	214
Colombo MC	9.6	38.4	32.3	19.7	229
Hambantota	20.4	52,6	22.3	4.7	211
Jaffna	20.5	57.7	15.5	6.4	220
Kurunegala	19.2	49.5	25.3	6.0	182
Nuwaraeliya	22.5	59.9	11.8	5.9	187
Ratnapura	25.3	56.5	17.3	0.8	237
Trincomalee	12.0	54.5	26.2	7.3	233
Women's education level					
no schooling	20.0	58.2	18.2	3.6	55
primary	23.4	52.5	19.0	5.1	158
Secondary	18.1	49.5	24.2	8.3	678
Passed GCE (O/L)	18.5	54.2	21.7	5.7	757
Higher	15.2	54.1	23.9	6.7	460
Monthly household income					
< 9,000	21.9	52.4	21.4	4.3	748
9,000 - 13,999	15.9	55.4	21.6	7.1	408
14,000 - 19,999	12.2	56.8	25.5	5.5	329
20,000 - 31,999	16.0	49.1	24.3	10.6	350
≥ 32,000	9.6	51.4	28.8	10.3	146
Wealth index quintiles					
Poorest	26.2	57.4	13.9	2.5	432
Second	22.2	53.2	19.0	5.7	406
Middle	19.4	50.0	24.3	6.3	412
Fourth	13.2	52.4	25.8	8.6	418
Richest	11.1	50.4	28.7	9.8	478
Overall	18.2	52.7	22.5	6.7	2146

Prevalence and associations of overweight among adult women in Sri Lanka: a national survey
Renuka Jayatissa1, S M Moazzem Hossain2, Sandya Gunawardana1, J M Ranbanda1, Malsha Gunathilaka1, P C De Silva1
Sri Lanka Journal of Diabetes, Endocrinology and Metabolism 2012; 2: 61-68

Table 2.1: Mean and median monthly household income by sector, province and district – 2012/13

Sector / Province / District	Mean household income (Rs.)	Median household income (Rs.)
Sri Lanka	**45,878**	**30,814**
Sector		
Urban	69,880	42,267
Rural	41,478	29,376
Estate	30,220	24,087
Province		
Western	64,152	42,100
Central	40,146	28,900
Southern	41,834	28,921
Northern	34,286	23,571
Eastern	30,676	22,710
North Western	42,756	29,343
North Central	36,632	29,707
Uva	35,638	24,228
Sabaragamuwa	40,375	27,775
District		
Colombo	77,723	50,071
Gampaha	58,248	38,807
Kalutara	50,341	36,512
Kandy	43,138	30,371
Matale	35,004	26,441
Nuwara Eliya	38,013	28,152
Galle	39,746	28,205
Matara	41,666	28,227
Hambantota	45,850	32,267
Jaffna	34,788	23,446
Mannar	28,535	24,200
Vavunia	43,965	30,967
Mullaitivu	23,687	17,714
Kilinochchi	30,643	20,614
Batticaloa	25,483	20,359
Ampara	32,537	23,429
Trincomalee	34,577	24,436
Kurunegala	43,624	29,343
Puttalam	40,935	29,286
Anuradhapura	35,460	29,689
Polonnaruwa	39,197	30,145
Badulla	36,119	25,067
Moneragala	34,804	20,686
Ratnapura	42,429	27,391
Kegalle	37,655	28,524

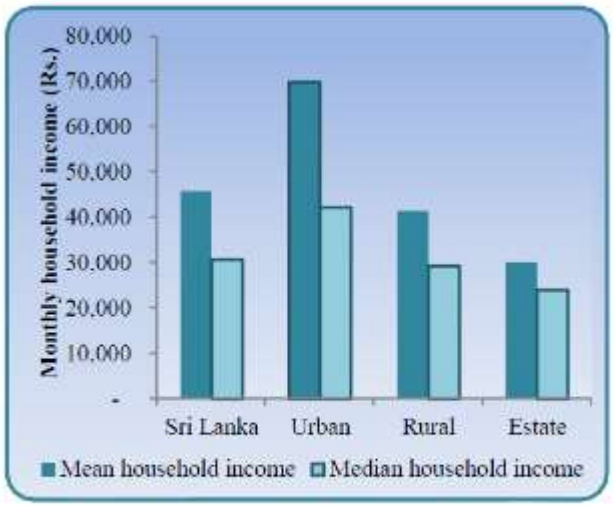


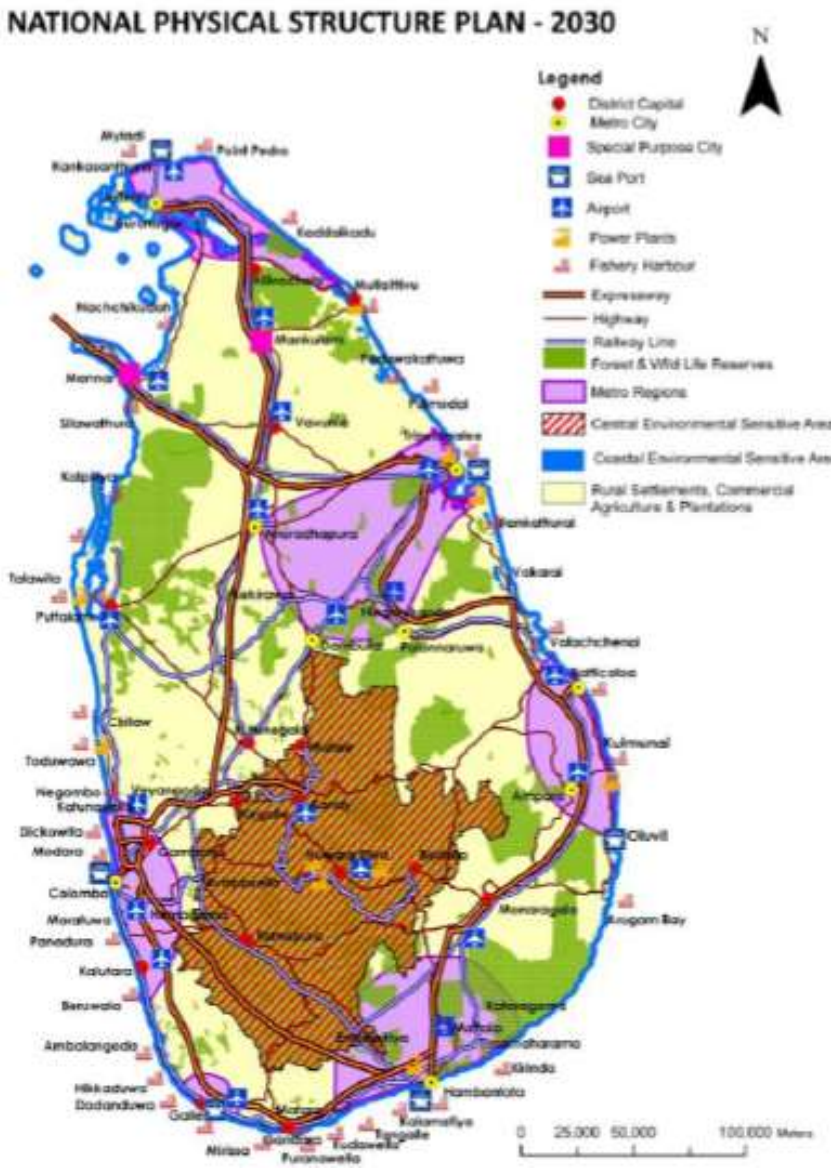
Figure 2.1: Mean and median of monthly household income by sector – 2012/13

Table 2.2: Mean and Median monthly household income by national household income decile -2012/13

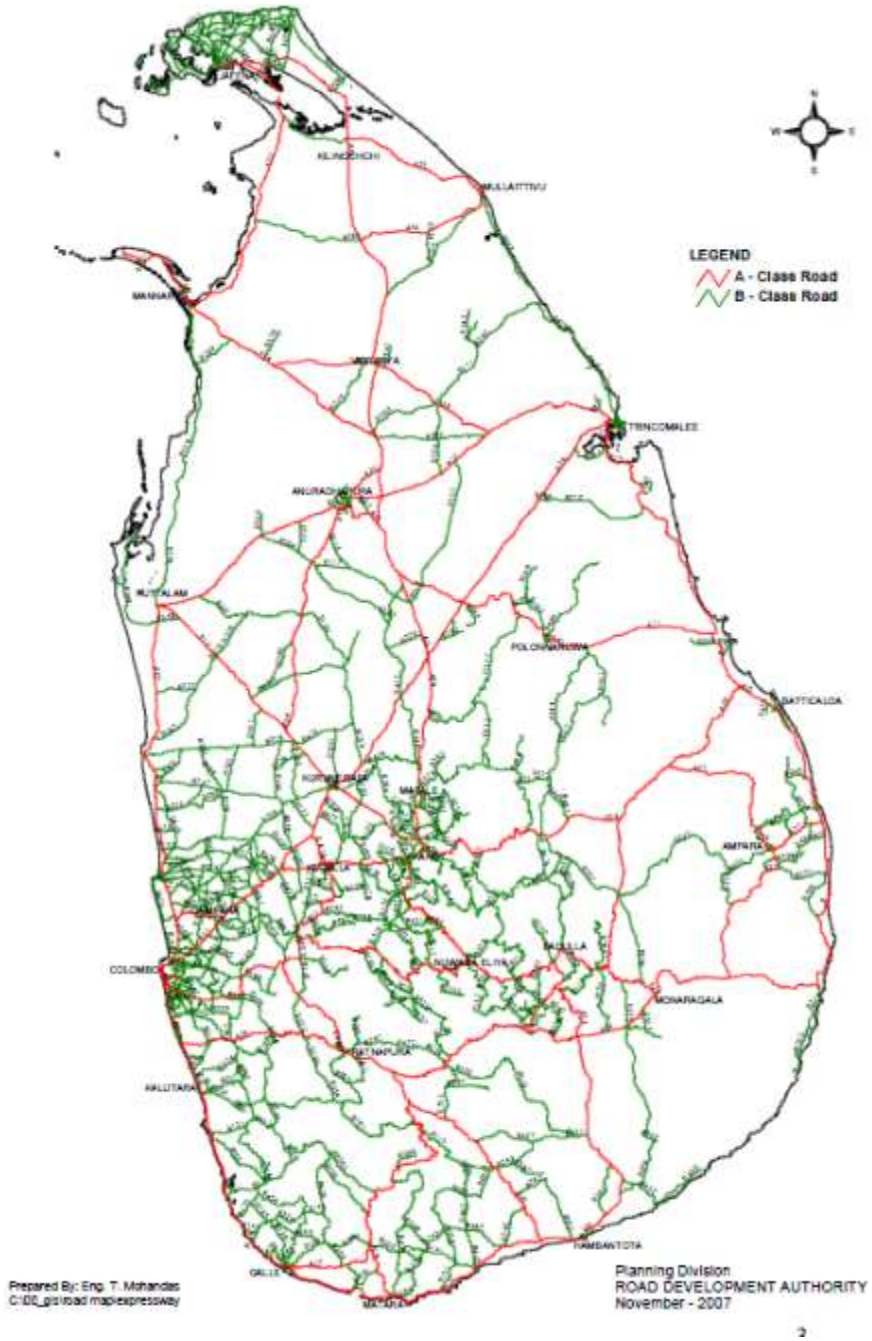
Decile group	Range (Rs.)	Mean (Rs.)	Median (Rs.)
All groups		**45,878**	**30,814**
1	Less than 10,836	6,700	7,029
2	10,836 - 16,531	13,790	13,850
3	16,532 - 21,286	18,962	18,944
4	21,287 - 25,903	23,589	23,563
5	25,904 - 30,814	28,291	28,236
6	30,815 - 36,758	33,597	33,500
7	36,759 - 45,000	40,582	40,543
8	45,001 - 57,495	50,640	50,425
9	57,496 - 83,815	68,362	67,173
10	More than 83,815	174,376	121,429

Source: Household income and expenditure survey 2012/2013


Proposed Expressway
Existing Roads
Kankasanthurai
Jaffna
Kilinochchi
Mullaitivu
Mannar
Mankulam
Vavuniia
Trincomalee
Anuradhapura
Kantale
Vakarai
Hingurukgoda
Habarana
Puttalam
Palavi
Dambulla
Polonnaruwa
Maho
Batticaloa
Chilaw
Kurunegala
Matale
Kulmunai
Negombo
Kandy
Ampara
Kegalle
Gampaha
Nuwara Eliya
Badulla
Colombo
Avissawella
Monaragala
Moratuwa
Ratnapura
Horana
Kalutara
Kataragama
Embilipitiya
Tissamaharama
Hambantota
Galle
Matara
0 22,500 45,000 90,000 Me



Source : Sri Lanka 2011-2030, National Physical Plan and Project Proposals



National highway network

Source: National road master plan 2007-2017;

Annex 7: Statistics on Food Imports in Sri Lanka

This appendix shows the relative significance food imports in composition of imports of Sri Lanka, quantities of food items imported in recent years and quantities and values of imports of major food products.

a. Composition of Imports of Sri Lanka- 2009-2014 (Rs.Mn)

Item	2009	2010	2011	2012	2013	2014
Food and Beverages	171,003	215,107	283,010	268,770	278,225	333,750
Mineral Products	235,002	261,006	487,862	549,812	619,058	651,431
Chemical and Resins	149,509	190,012	266,961	281,819	286,893	321,920
Leather, Wood and Paper	40,433	51,715	65,001	63,524	65,879	83,492
Textiles	178,029	207,058	263,087	298,837	276,072	326,373
Precious Stones	31,889	42,690	118,971	74,577	61,733	22,910
Base Metals	77,661	87,468	120,732	154,460	156,387	166,886
Machinery and Equipment	141,151	168,278	269,882	324,117	317,528	302,243
Transport Equipment	61,007	131,889	244,492	188,120	167,141	221,040
Other	36,878	39,996	58,470	78,618	88,489	82,788
Total	**1,122,562**	**1,395,219**	**2,178,468**	**2,282,654**	**2,317,405**	**2,512,833**

Source: Sri Lanka Customs

b. Import quantities by major commodities 2010-2014 (MT)

Item	2010	2011	2012	2013	2014
Rice	125,776	27,869	36,175	22,932	599,718
Wheat & Meslin	943,970	1,364,683	1,119,150	934,596	1,178,560
Flour	1,415	29,103	8,069	1,251	1,063
Sugar	539,198	596,551	558,957	538,976	509,467
Dhall (Mysoor)	134,340	151,339	113,993	150,889	153,381
Chilli(Dried)	37,707	42,735	40,665	44,060	47,757
Onion (Red)	11,908	6,807	7,017	15,386	11,839
Onion (Bombay)	158,086	170,731	145,912	168,874	150,534
Potatoes	129,878	130,511	110,823	123,204	118,220
Dried Fish[(a)]	48,686	49,949	40,730	38,897	36,189
Milk Products (Powder)	72,427	84,050	79,516	66,031	67,178

(a) Including Maldive fish and excluding dried prawns

Source: Sri Lanka Customs

c. Quantity and value of imports of major commodities- 2006-2014

9.5 Quantity and Value of Imports of Major Commodities, 2006-2014

Year	Rice		Wheat		Sugar		Crude oil		Fertilizer	
	Qty. ('000 MT)	Value (Rs. Mn.)	Qty. ('000 MT)	Value (Rs. Mn.)	Qty. ('000 MT)	Value (Rs. Mn.)	Qty. ('000 MT)	Value (Rs. Mn.)	Qty. ('000 MT)	Value (Rs. Mn.)
2006	12	577	1,200	20,679	525	23,256	16	106,699	633	17,036
2007	88	4,261	952	25,892	481	17,055	14	113,584	569	21,422
2008	84	4,730	919	40,563	575	22,350	14	143,159	773	62,420
2009	52	2,592	1,026	29,769	467	25,119	15	111,715	462	20,851
2010	126	6,741	1,052	29,120	548	41,077	13	120,180	649	27,157
2011	28	2,035	1,242	46,257	606	47,091	15	183,056	801	44,992
2012	36	3,083	1,084	45,105	569	43,872	11	157,758	640	39,859
2013	23	2,297	895	40,098	548	37,187	13	182,064	600	30,972
2014*	600	36,795	1,179	48,430	520	33,332	14	187,760	765	35,591

* Provisional

Note: Adjusted for lags and other factors in recording

Source : Central Bank of Sri Lanka

Annex 8 : Economic value (produces and retail price) of food

All Island Retail Prices Of Selected Items for Food 2013

Item	Unit	2013
Rice & Flour		
Rice - Nadu Red	Kg	61.76
- Nadu white	Kg	59.45
- raw red	Kg	55.72
- Samba	Kg	69.73
Flour - wheat	Kg	98.34
- kurakkan	Kg	578.00
- Black gram	Kg	267.71
Cereal preparations		
Bread	450g	59.03
Hoppers	each	12.05
Buns	each	22.53
Pulses		
Red Dhall	Kg	153.50
Mung Dhall	Kg	275.77
Black Gram Dhall	Kg	267.71
Green Gram (whole)	Kg	283.31
Cowpe (whole)	Kg	240.41
Maize	Kg	151.32
Ground Nuts	Kg	365.59
Gingelly Seeds	Kg	376.61
Yams		
Manioc	Kg	51.55
Sweet Potatoes	Kg	75.39
Potatoes	Kg	107.02
Up Country Vegetables		
Beans Butter	Kg	139.63
Beans Green	Kg	135.63
Cabbage Seed	Kg	102.30
Carrots	Kg	148.01
Leeks	Kg	128.29
Knol-Khol	Kg	106.59
Tomato - grade 1	Kg	110.33
Radish	Kg	79.94
Beet Root	Kg	119.91
Low Country Vegetables		
Red Pumpkin	Kg	76.45
Ash Plantain	Kg	92.00
Cucumber	Kg	69.44
Kekiri	Kg	66.47
Vetakolu	Kg	106.25
Long Beans	Kg	102.25
Drumsticks	Kg	195.50
Bandakka	Kg	93.36
Snake gourd	Kg	88.75
Bitter gourd	Kg	120.20
Ash Pumpkin	Kg	71.45
Brinjals	Kg	89.18
Kohila Yams	Kg	95.28
Capsicum	Kg	171.93
Leafy vegetables		
Mukunuwenna	bunch	20.78
Kankun	bunch	20.35
Gotukola	bunch	19.28
Nivithi	bunch	26.74

Sarana	bunch	24.55
Katuru murunga	bunch	21.44
Curry Staffs		
Dried chillies - grade 1	Kg	223.73
Pepper	Kg	1288.04
Tamarind	Kg	215.54
Goraka	Kg	336.16
Coriander	Kg	282.16
Turmeric(saffron)	Kg	663.11
Garlic	Kg	222.33
Metheseed	Kg	241.96
Cummin seed	Kg	656.28
Fannel seed	Kg	398.28
Mustard	Kg	288.68
Red onions (medium)	Kg	176.38
Bombay Onions	Kg	105.21
Cardomom	Kg	4169.91
Cloves	Kg	2674.05
Cinemon	Kg	1633.67
Salt	Kg	34.38
Limes	Kg	244.32
Coconut - medium	each	42.66
Coconut - small	each	36.66
Coconut - Avarage price	each	39.90
Coconut oil (loose)	750ml	197.63
Meat & Eggs		
Beef	Kg	465.57
Beef Liver	Kg	627.98
Mutton	Kg	1088.03
Pork	Kg	436.18
Chicken - fresh	Kg	459.91
Chicken - broiler	Kg	377.98
Eggs - ordinary (brown)	each	14.98
Eggs - farm (white)	each	14.25
Sea Fish		
Thora (seer)	Kg	1057.16
Paraw (trevelly)	Kg	714.67
Balaya (skip jack)	Kg	535.70
Kelawalla (Tuna)	Kg	719.80
Galmalu (mullet)	Kg	634.85
Kumbalawa (mackeral)	Kg	429.36
Mora (shark)	Kg	587.53
Talapath (sail fish)	Kg	752.29
Prawn - fresh	Kg	794.35
Halmessa (sprats)	Kg	379.40
Hurulla (Triencheal Sardine)	Kg	334.70
salaya(sardine)	Kg	197.07
Tinned Fish - "Delmage"	425g	235.05
Dried Fish		
Thora (seer)	Kg	1079.22
Paraw	Kg	814.75
Balaya	Kg	660.71
Katta	Kg	928.20
Kumbalawa	Kg	534.22
Keeramin	Kg	657.57
Halmessa (sprats)	Kg	613.23
Prawns	Kg	852.19
Maldive Fish	Kg	1787.46
Fruits		
Pineapple - murushi	each	97.96

King coconut	each	34.92
Banana - sour	Kg	64.37
- Kolikuttu	each	15.05
- Anamalu	each	12.88
Milk Food		
Fresh Milk - diary	750ml	67.89
Lakspray (pkt)	400g	315.41
Anchor (pkt)	400g	326.21
Lactogen(Half cream)	400g	405.60
Lactogen(Full cream)	400g	418.09
Condensed milk (Milk Maid)	397g	187.01
Groceries		
Tea dust (loose)	Kg	677.56
Cofee seed	Kg	504.45
Cofee powder (harischandra)	Kg	1158.57
Sugar - white	Kg	100.60
Fresh butter -local Highland	Kg	1251.49
Margarine - local	Kg	679.09
Papadam - loose	Kg	313.82
Juggery - kitul	Kg	455.12
Juggery - coconut	Kg	206.27
Juggery - sugar crane	Kg	171.08
Juggery - palmyrah	Kg	623.21
Veneger - coconut	375ml	69.97

Open Market Retail Prices of Selected Food Items in Colombo District: 2010 -2013

Item	Unit	2010	2011	2012	2013
Rice					
Naadu - Red	Kg	67.21	61.04	60.68	62.94
Naadu - White	Kg	60.75	59.35	59.76	61.59
Raw - Red	Kg	60.14	57.26	56.99	59.87
Samba (local)	Kg	72.03	68.63	70.37	72.29
Flour - Wheat	Kg	69.61	81.27	91.93	98.13
Bread	450g	40.11	48.50	52.75	59.95
Dhal - Mysore	Kg	165.50	148.61	145.11	156.34
Dhal - Lanka Mung	Kg	267.66	321.26	284.66	331.65
Cowpea Whole	Kg	181.54	220.13	232.43	261.00
Green Gram	Kg	219.08	198.90	241.30	294.89
Yams					
Manioc	Kg	49.46	65.10	66.30	67.31
Sweet Potatoes	Kg	71.95	72.25	89.01	96.40
Potatoes	Kg	92.03	101.29	106.97	110.94
Vegetables					
Ash Plantain	Kg	94.82	98.27	93.78	106.11
Ash Pumpkin	Kg	71.48	70.12	79.11	83.59
Bandakka	Kg	90.52	103.84	109.47	110.04
Brinjal	Kg	87.11	95.58	101.48	103.18
Bitter Grourd	Kg	121.13	137.42	146.42	142.03
Cucumber	Kg	65.65	77.07	75.72	79.87
Red Pumpkin	Kg	70.86	74.04	89.75	80.83
Snake Gourd	Kg	78.48	89.96	103.16	104.63
Beans - Green	Kg	126.68	150.28	132.68	141.03
Beans - Butter	Kg	147.44	185.88	191.20	190.97
Beans - Long	Kg	103.84	112.10	112.39	113.46
Beetroot	Kg	124.13	120.35	132.29	129.33
Cabbage Seed	Kg	92.10	100.00	100.52	113.30
Carrot	Kg	118.11	131.76	141.36	142.50
Drumstick	Kg	197.82	287.48	246.54	228.90
Knol - Khol	Kg	105.80	120.86	124.58	128.24
Raddish	Kg	73.78	77.60	90.98	95.36
Tomato - No 1	Kg	105.00	119.68	130.93	117.16
Vetakolu	Kg	96.37	107.16	111.88	117.72
Meat					
Beef (with & witout bones)	Kg	437.12	457.65	498.25	541.75
Mutton (with & without bones)	Kg	765.88	829.59	1062.01	1175.96
Pork fresh	Kg	433.50	470.11	451.40	428.94
Fish - Fresh					
Seer	Kg	924.64	1050.63	1163.79	1213.96
Paraw	Kg	658.19	705.28	796.11	785.07
Galmalu	Kg	609.42	632.42	714.38	701.01
Balaya	Kg	440.92	467.20	526.34	538.32
Shark	Kg	439.76	484.07	544.82	572.75
Salaya	Kg	144.34	151.19	179.95	175.05
Milk Foods					
Condensed Milk (milk maid)	397g	130.52	150.57	177.22	190.83
Powdered Milk					
Lactogen (Formula 1)	400g	318.80	340.46	389.55	410.48
Lactogen (Formula 2)	400g	282.61	305.73	358.65	420.35
Lakspray	400g	229.46	251.43	298.71	318.26
Anchor	400g	234.35	255.67	307.43	325.00

Item	Unit	2010	2011	2012	2013
Condiments					
Dried Chillies (Gr.1 &2)	Kg	202.01	282.96	234.97	235.81
Corriander	Kg	301.65	303.62	282.14	302.79
Salt	Kg	66.46	34.70	34.00	33.96
Saffron	Kg	728.14	780.33	654.56	671.21
Tamarind	Kg	155.93	264.47	218.02	195.49
Garlic	Kg	293.68	232.04	247.57	245.13
Vinegar	750ml	114.87	119.23	119.90	129.53
Uluhal	Kg	229.17	231.38	252.43	265.34
Suduru	Kg	562.27	589.56	647.77	704.24
Maduru	Kg	340.46	382.63	447.14	467.43
Mustard	Kg	242.69	242.48	286.72	322.89
Limes (medium & small)	Kg	166.12	218.75	255.32	299.64
Red Onions	Kg	115.98	177.50	119.00	182.26
Big Onions	Kg	82.45	61.88	61.88	61.88
Pepper	Kg	590.88	834.69	1404.11	1234.14
Coconuts (medium & Small)	each	31.85	40.76	34.43	43.16
Coconut oil (Loose)	750 ml	169.00	215.94	169.06	194.06
Fish - Dried					
Seer	Kg	896.90	919.44	1195.52	1285.62
Paraw	Kg	718.16	767.96	886.99	906.74
Koduwa	Kg	660.61	717.07	815.06	879.72
Spratts	Kg	355.05	365.17	454.39	671.58
Katta	Kg	819.91	839.17	991.31	1018.84
Maldive Fish	Kg	1128.35	1562.99	1785.92	1779.48
Groceries					
Cheese - Craft	250g	733.35	734.55	677.71	911.75
Fresh - Butter (Imported)	Kg	1163.25	1365.64	1390.25	1531.69
Fresh - Butter (Local)	Kg	797.64	1047.26	1239.17	1250.26
Biscuits (Maliban Cream Cracker)	Kg	358.58	368.42	388.37	394.74
Jam (M.D)	485g	223.90	204.44	233.90	261.97
Tea Dust	Kg	810.34	819.96	856.61	965.46
Sugar - White	Kg	93.76	95.85	101.01	100.95
Eggs (Med; & small)	each	13.61	11.73	10.89	14.06

Producer's Prices Of Locally Produced Agricultural, Livestock & Fisheries Products: Colombo District

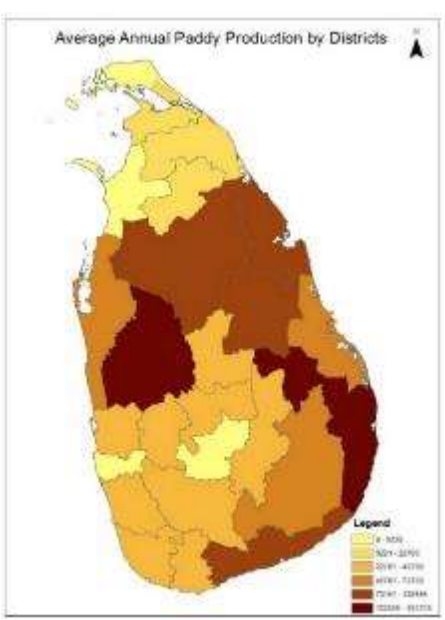
Item	Unit	2010	2011	2012	2013
Cereals					
Paddy - Red	Kg	36.29	-	-	-
Low Country Vegetablaes					
Ash Plantain	Kg	36.33	46.90	44.05	40.99
Bandakka	Kg	36.39	49.89	44.01	52.74
Beans Long	Kg	40.57	63.65	50.13	54.16
Bitter Gourd	Kg	55.68	75.48	68.22	68.50
Snake Gourd	Kg	32.89	49.92	45.26	41.99
Vetakolu	Kg	40.07	53.06	48.78	49.47
Kohila Yams	Kg	41.23	51.01	40.86	36.87
Cucumber	Kg	17.02	33.87	34.80	29.32
Brinjals	Kg	38.11	52.79	52.79	52.79
Dambala	Kg	45.73	66.56	46.92	49.85
Yams					
Manioc	Kg	17.90	33.29	36.91	41.35
Kiriala	Kg	45.00	108.13	50.00	68.64
Sweet potatoes	Kg	39.83	-	-	-
Fruits (Medium)					
Plantain - Sour	Kg	40.98	35.28	36.73	37.58
Plantain - Kolikuttu	Kg	86.33	95.33	74.32	81.37
Plantain - Anamalu	each	7.62	7.43	8.45	21.94
Papaw	Kg	55.28	37.41	37.63	50.57
Sea Fish					
Paraw	Kg	510.83	598.00	602.54	659.17
Balaya	Kg	385.83	481.00	492.57	566.00
Kelawalla	Kg	431.67	536.00	550.41	568.75
Spratts	Kg	123.33	155.00	170.00	125.00
Salaya	Kg	141.67	127.78	166.67	138.18
Milk,Eggs & Dried Fish					
Cow Milk+	1 Litre	36.87	40.91	43.64	52.91
Buffaloe Milk+	1Litre	44.90	47.16	47.52	55.71
Eggs - Hens-Brown(Medium)	each	13.54	11.14	10.01	12.07
Eggs - Hens-White(Medium)	each	12.95	10.74	9.57	11.67
Livestock- Fullgrown *					
Buffaloes	each	35077.08	40688.10	46555.56	54104.17
Cow - High Bred	each	28687.50	31369.42	35422.22	42665.67
Cow - Others	each	23492.69	25844.42	29600.00	32791.67
Goats	each	8603.27	10714.65	14869.05	16500.00
Pigs	each	9125.42	13327.45	14453.57	17243.75
Poutry - Full grown	each	214.74	254.10	286.40	335.27
Miscellaneous					
Coconut - Medium	100	2385.84	3176.20	2656.08	3542.04
Betel - Medium	1000	369.44	779.99	758.01	693.17
Arecanut - Raw	100	158.33	255.58	201.11	251.67

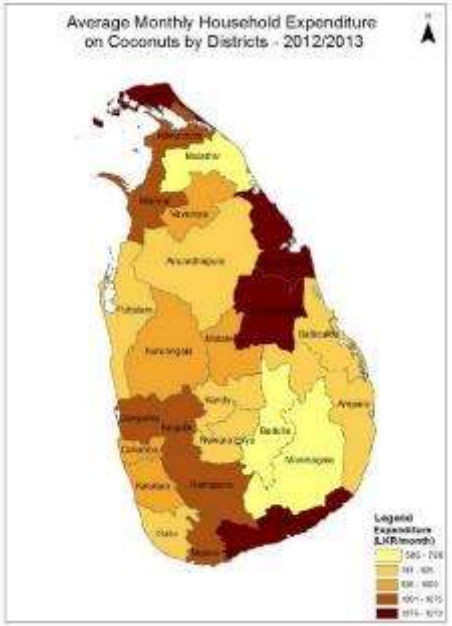
Annex 9 - Average monthly household consumption in quantity

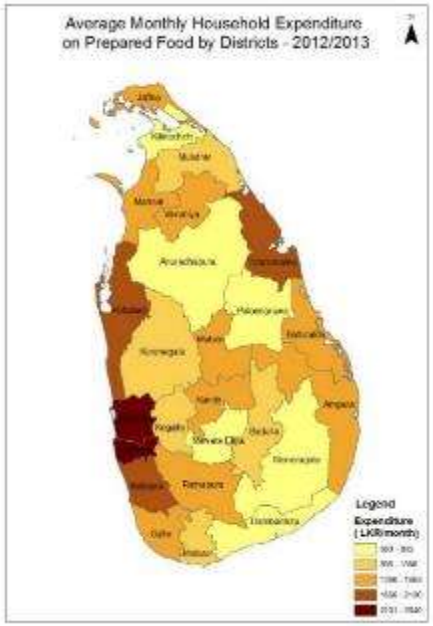
Table H3: Average monthly household quantity of selected food items by survey period

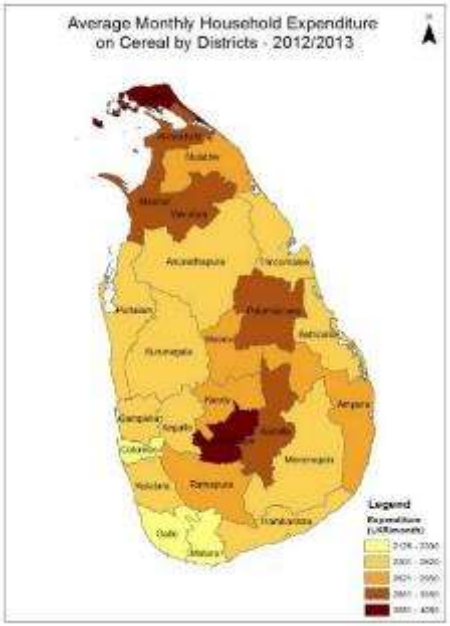
Food item	Unit	Survey Period								
		2012/13	2009/10	2006/07	2005	2002	1995/96	1990/91	1985/86	1980/81
Rice	(kg)	34.8	36.3	36.6	35.6	35.3	38	44.3	45.2	46.7
Wheat flour	(kg)	2.2	2.7	2.4	3.1	3.3	3.0	2.6	4.0	3.6
Bread	(kg)	3.6	5.1	6.2	7.3	10.2	12.5	9.9	9.3	7.8
Pulses	(kg)	3.0	2.8	3.1	2.9	3.0	-	2.6	1.7	1.4
Coconut (nuts)	(No.)	28.0	29.5	30	30	30	33	39	38	37
Meat	(kg)	1.6	1.4	1.4	1.6	1.3	-	1.2	1.1	0.8
Fish	(kg)	3.7	3.8	3.7	3.8	2.9	-	2.4	3.4	3.5
Dried fish	(kg)	1.2	1.3	1.4	1.3	1.4	-	1.3	1.4	1.4
Milk	(liters)	0.4	1.9	1.4	0.7	0.4	0.7	1.4	2.4	2.7
Eggs	(No)	11	10	11	10	10	12	11	7	7
Sugar	(kg)	4.3	4.9	5.2	5.6	5.3	5.6	5.8	6.0	3.8

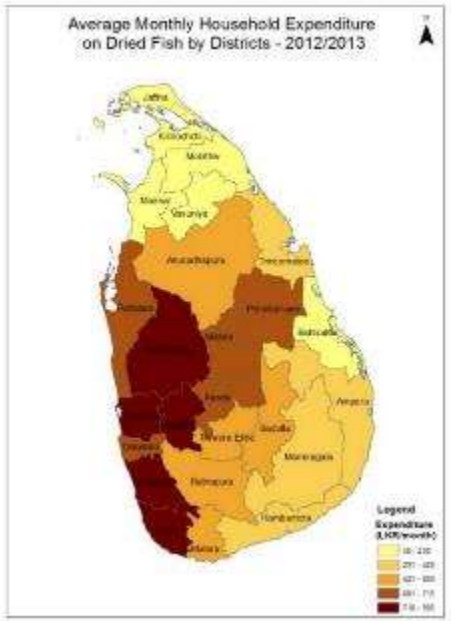
Annex 10 - Average monthly household consumption according to district



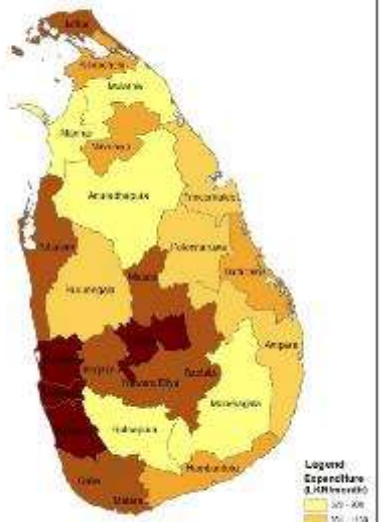






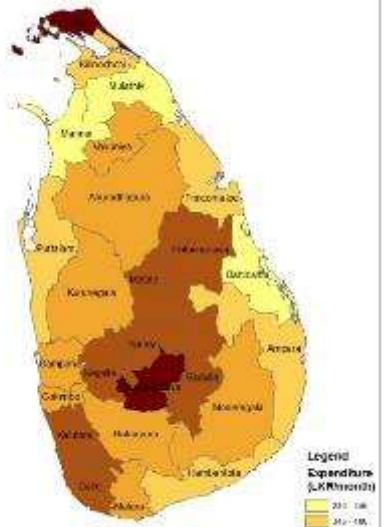


Average Monthly Household Expenditure on Milk & Milk food by Districts - 2012/2013



Average Monthly Expenditure on Other Food Items by Districts-2012/2013

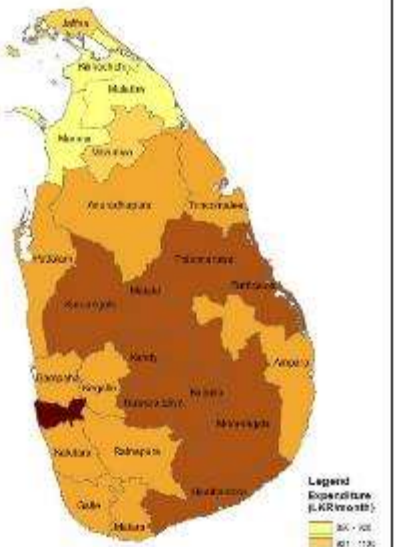
Average Monthly Household Expenditure on Pulses by Districts - 2012/2013



Average Monthly Expenditure on Sugar, Jaggery & Treacle Items by Districts-2012/2013

Average Monthly Expenditure on Fruits by Districts-2012/2013

Average Monthly Household Expenditure on Vegetables by Districts - 2012/2013



Average Monthly Household Expenditure on Fat & Oil by Districts - 2012/2013