This book by Fernando and De Silva presents the scenario of solid waste in Sri Lanka by going beyond purely technical and managerial discussions. It examines waste management in Sri Lanka also from a historical perspective, particularly through the analysis of waste discourses. It acknowledges that waste is perceived differently by different actors and between historical periods. Fernando and De Silva examine the institutional, socioeconomic and political factors that enable and constrain effective, environmentally friendly and gender-sensitive waste management. Given its broad scope and detailed analysis, we trust that the present book will be useful for government authorities, civil society and grassroots actors, and private parties to improve solid waste management in Sri Lanka and make it more sustainable.

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MUNICIPAL SOLID WASTE MANAGEMENT IN SRI LANKA

A study of municipal solid waste management in Dehiwala-Mt. Lavinia Municipal Council & Boralesgamuwa Urban Council of Sri Lanka

Schweizerischer Nationalfonds
UNIL | Université de Lausanne
Schweizerische Eidgenossenschaft
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Nishara Fernando
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Preface

South Asia is a region where waste generation is growing rapidly. Sri Lanka is no exception. Due to changing consumption styles and a growing urban population, waste management has recently become an important environmental and social issue. It has also gained increased attention from government authorities, the private sector, and non-governmental organizations in the country.

This book by Fernando and De Silva presents the scenario of solid waste in Sri Lanka by going beyond purely technical and managerial discussions. It examines waste management in Sri Lanka also from a historical perspective, particularly through the analysis of waste discourses. It acknowledges that waste is perceived differently by different actors and between historical periods. For example, while waste is seen as a resource for an informal recycler, it is perceived as an environmental hazard for residents if not collected regularly. The official views of waste have also changed over time. In colonial times, waste was seen as a nuisance that needs to be brought out of sight of the elites. This nuisance narrative is still widespread and has material effects. Few middle-class residents in greater Colombo, for example, are aware of the afterlife of their waste, including the disturbing social and environmental processes at the Karadiyana landfill. More recently, however, nuisance narratives have been complemented by environmental discourses that recognize the importance of waste management not to pollute land, water and air.

Fernando and De Silva examine the institutional, socioeconomic and political factors that enable and constrain effective, environmentally friendly and gender-sensitive waste management. The formal institutional structure related to solid waste management is highly complex and characterized by a multitude of actors with at times overlapping responsibilities. A significant waste crisis, that is, the deadly collapse of the Meethotamulla landfill, motivated government authorities to implement strict measures, such as mandatory waste segregation at source or the activation of an environmental police. These top-down measures were accompanied by a centralized approach to solid waste management relying on large landfills and waste incinerators. This experience

stands in contrast with other countries and regions, such as Nepal or Kerala, where our international project conducted extensive studies as well.

In Kathmandu and Alappuzha (Kerala), for example, waste crises gave rise to bottom-up initiatives that led to decentralized composting and the reduction of materials that end up on landfills. First insights suggest that these initiatives are quite successful and represent an interesting alternative in the South Asian context. For this to work, however, people's mindset in Sri Lanka would also need to change. This book shows that residents in two cities of the Colombo metropolitan area are generally satisfied with the municipal waste management system, or more precisely, with regular waste collection. The majority sees little need to take a more active role in waste management to achieve more environmentally friendly waste management that could also lead to more dignified waste work.

Given its broad scope and detailed analysis, we trust that the present book will be useful for government authorities, civil society and grassroots actors, and private parties to improve solid waste management in Sri Lanka and make it more sustainable.

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List of abbreviations

ASL	Aruwakkula Sanitary Landfill
ASP	Assistant Superintendent of Police
ATS	Aruwakkalu Transfer Station
CCET	Centre Collaborating with UNEP on Environmental Technologies
CEA	Central Environmental Authority
CEJ	Centre for Environmental Justice
CMC	Colombo Municipal Council
CHEC	China Harbor Engineering Company Limited
CPHI	Chief Public Health Inspector
DIG	Deputy Inspector General
DMMC	Dehiwala-Mount Lavinia Municipal Council
EE&A	Environmental Education and Awareness
EIAU	Environmental Impact Assessment Unit
EPC	Environmental Pollution Control
EPCU	Environmental Pollution Control Unit
EPR	Extended Producer Responsibility
GN	Grama Niladari
IETC	International Environmental Technology Centre
LA	Local Authorities

LGDP	Local Government Development Programme
LLDF	Local Loan and Development Fund
KTS	Kelaniya Transfer Station
KUC	Kolonnawa Urban Council
JICA	Japan International Cooperation Agency
MC	Municipal Council
MCR	Colombo Metropolitan Region
MOH	Medical Officer of Health
MoLGPC	Ministry of Local Government and Provincial Councils
MoMDE	Ministry of Mahaweli Development and Environment
MoMWD	Ministry of Megapolis and Western Development
MSWM	Municipal Solid Waste Management
MWMFRC	Mihisaru Waste Management Field Research Training Centre
NSWMSC	National Solid Waste Management Support Center
NEA	National Environmental Authority
NPPD	National Physical Planning Department
PC	Provincial Council
PHI	Public Health Inspector
PMMKGD	People's Movement against the Meethotamulla,
PP	Pilisaru National Solid Waste Management Project
PPPs	Public-Private Partnerships

SLILG	Sri Lankan Institute of Local Governance
SLLDC	Sri Lanka Land Reclamation and Development Corporation
SMEDRIC	Southwest Municipal Engineering and Research Institute of China
SWM	Solid Waste Management
SWMEPSC	Solid Waste Management & Environment Protection Standing Committee
SWMSP	Solid Waste Management Support Programme
SSP	Senior Superintendent of Police
TVEC	Tertiary and Vocational Education Commission
UDA	Urban Development Authority
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
WMA-WP	Waste Management Authority of the Western Province

1. Municipal Solid Waste Management (MSWM) in Sri Lanka

1.1 Introduction

On 14th April 2017, Meethotamulla open waste dumping site located in Kolonnawa, Colombo, Sri Lanka suddenly collapsed under its weight. The landslide-like event killed 28 people, destroyed numerous houses, and displaced 180 families (Jayaweera et al., 2019). This disastrous event prompted the public and the authorities to question the state of MSWM in Sri Lanka. Experts and the public alike recognized that the existing MSWM system lacked sustainability, and continuing to dump municipal solid waste in open dumping sites can lead to disasters similar to Meethotamulla in the future. As a result, the Government of Sri Lanka (GoSL) and local authorities took measures to alter the MSWM by introducing measures such as segregation at source, establishing waste-to-energy plants, building composting sites, etc. However, there is a clear lack of academic work that explores the state of MSWM post-Meethotamulla.

In this light, the authors decided to compile a brief yet comprehensive book to understand the MSWM in Sri Lanka, post-Meethotamulla. The aim was to fill the gap in the literature and provide policymakers and the public with an understanding of the MSWM architecture, governance, key stakeholders and pressure groups, social discourse and MSWM in Dehiwala-Mt.Lavinia Municipal Council (DMMC) and Boralesgamuwa Urban Council (BUC). The data presented in this book were collected during the period from 2019 to 2021. Therefore, it must be noted that some elements of municipal waste management mechanisms might have changed since then.

1.2 Defining Municipal Solid Waste Management

The definition of MSWM varies from one country to another. For instance, in developing countries MSWM refers to management of waste generated in a municipality by residencies, commercial properties and industrial institutions (Maalouf & Mavropoulos, 2023). However, in these countries due to lack of segregation at source municipal waste may include hazardous waste (Maalouf & Mavropoulos, 2023). In developed countries where waste generated in

municipalities are segregated at source, residential and commercial Municipal Solid Waste (MSW) include "*clothing, disposable tableware, yard trimmings, cans, office disposable tables, paper, and boxes"*, while institutional and industrial MSW contain *"restaurant trash, paper, classroom wastes, wood pallets, plastics, corrugated box, and office papers*" (Adhikari, Nam & Chakraborty, 2018).

According to Saleh (2019), successful management of MSW depends on the interrelationship between four key elements. They are (a) material generated at the source (b) handling, separation and storage at the site of waste generation (c) collection process and (d) disposal.

(a) Material generated at the source

As discussed previously, the material include MSW generated from sources such as residencies, commercial properties and industrial institutions. Hoornweg & Thomas (1999) identified a series of MSW sources, waste generators and types of solid waste in Asia (Please see Table 1.1).

Table 1.1 MSW sources, generators and types of MSW in Asia

Source	**Typical waste generators**	**Types of solid waste**
Residential	Single and multifamily dwellings	Food waste, paper, cardboard, plastics, textiles, leather, yard waste, wood, glass, metal, ashes, special waste (e.g., bulky items, consumer electronics, white goods, batteries, oil, tires, and household hazardous waste.).

Source	Typical waste generators	Types of solid waste
Industrial	Light and heavy manufacturing, fabrication, construction sites, power and chemical plants.	Housekeeping waste, packaging, food waste, construction and demolition materials, hazardous waste, ashes, special waste.
Commercial	Stores, hotels, restaurants, markets, office buildings, etc.	Paper, cardboard, plastics, wood, food waste, glass, metals, special waste, hazardous waste.
Institutional	Schools, hospitals, prisons, government centers.	Same as commercial.
Construction and Demolition	New construction sites, road repair, renovation sites, demolition of buildings	Wood, steel, concrete, dirt, etc.
Municipal services	Street cleaning, landscaping, parks, beaches, other recreational areas, water and wastewater treatment plants.	Street sweepings; landscape and tree trimmings; general waste from parks, beaches, and other recreational areas

Source	Typical waste generators	Types of solid waste
Process (manufacturing etc.)	Heavy and light manufacturing, refineries, chemical plants, power plants, mineral extraction and processing.	Industrial process waste, scrap materials, off-specification products, slay, tailings.
Agriculture	Crops, orchards, vineyards, dairies, feedlots, farms.	Spoiled food waste, agricultural waste, hazardous waste (e.g., pesticides).

Source: Hoornweg & Thomas, 1999

Hoornweg & Thomas (1999) revealed the array of sources that service providers have to be conscious of when managing MSW. Each source has a series of unique characteristics and a series of accompanying challenges for management.

(b) Handling, segregation, and storage at site of waste generation

It is commonly acknowledged that public has a key role to play in MSWM (Kien, 2018; Buckingham, 2020; Rakib & Haque, 2022). This involvement is particularly important when it comes to handling, separation (segregation) and storage of MSW. Handling of waste refers to the overall management of waste beginning with consumption of materials, production of waste, segregation, storage and handing over to service providers. Reduction of waste or reduction at the source is an important element of waste handling. Activities that reduce the amount of waste created are usually classified as "waste reduction" (Rogoff, 2013). In United States waste reduction is given priority over recycling and composting because the social, environmental, and economic costs are typically lower for waste reduction (Rogoff, 2013). According to Rogoff (2013) key waste reduction techniques are,

- changing the usage and purchasing habits of citizens.
- businesses voluntarily reducing the amount of waste material associated with goods and products.
- increasing internal reuse of materials, donations, or exchange of old items for new items in a community.

Segregation of waste at source refers to the separation of waste generated in a household, office, industrial institution etc. within the premises according to their composition (Penang Green Council, n.d.). MSW segregation is important as it significantly reduces the volume of MSW that service providers have to handle, which ultimately improves collection and disposal efficiency (Kihila, Wernsted & Kaseva, 2021). Moreover, waste segregation at source eases handling and processing, improves resource recovery, promotes reuse and recycling and reduce operational costs (Kihila, Wernsted & Kaseva, 2021). Scholars agree that waste segregation is an important step towards a circular economy (Maletz et al., 2018).

Nevertheless, it is important to bear in mind that segregation of MSW at source varies from one region to another. In developing countries segregation at source can be simple as bio-degradable and non-bio-degradable MSW while in developed countries it can be much more complex (Ferronato & Torretta, 2019). Previous studies have revealed that when waste producers are given containers to segregate waste and when monitory incentives are provided, willingness to segregate waste at source increases drastically (Alhassan, Kwakwa, & Owusu-Sekyere, 2020; Khanal, Giri & Mainali, 2023).

Proper storage of waste at source is a key element of successful MSWM. As discussed above different sources of MSW produce different types of MSW. The type of techniques and methods different producers of MSW have to use may vary due to,

(a) the nature of waste produced at source

(b) segregation requirements of the city/country

(c) MSW collection process.

In developing countries, some municipalities provide MSW producers with containers to temporarily store different types of waste (Delgado-Antequera, et al., 2021; Fereja & Chemeda, 2022).

Domestic MSW storage facilities can be classified as household (primary storage) and community (secondary storage). The capacity of a domestic MSW storage is based on (a) the number of people served by the unit, (b) the daily rate of waste generation per capita, and (c) the number of days between collections (Coad & Coffey, 2010). Moreover, the capacity of commercial and institutional storage units is determined according to the size and nature of the activities as well as the number of people involved. The type of container used in a domestic, commercial or an institutional storage facility should be determined after carefully considering (1) convenience, (2) size of the container, (3) loading mechanism, (4) shape of the container, (5) capacity to isolate waste and (6) durability etc. (Coad & Coffey, 2010).

A variety of containers are used for domestic MSW storage. These include plastic bags, cardboard boxes, plastic buckets, steel drums etc. Depending on the method of waste collection, the standardization of household storage bins could maximize labour and transport productivity, especially if household bins are directly loaded to vehicles by collection labourers (Coad & Coffey, 2010). Containers used in community waste storage facilities can be stationary (fixed) or portable. Stationary containers include uncovered masonry bunkers, covered or galvanized masonry bins, concrete or steel pipe sections (Coad & Coffey, 2010; Santos, et al. 2022).

(c) Collection process

Different countries use various types of collection systems to collect MSW from waste sources. These collection methods can be divided into two categories (Dahlén, 2008). According to Dahlén, they are collection close to properties and collection at drop-off points (Bring systems). The collection close to property method (also called door-to-door collection) refers to curbside waste collection from MSW sources. When using this MSW collection approach, waste management service providers have to employ collection vehicles and waste collectors to collect and transport MSW.

Bring systems on the other hand expects the waste producers to bring waste generated at their respective sources to a designated collection point. These collection points can vary according to their functions. For instance, a drop-off point may usually only cater to recyclable wastes (Dahlén, 2008). Some bring systems have recycling centers, that has the capacity to manage and treat bulky waste, garden waste, electronic products, hazardous waste, etc. Collecting MSW using community bins is the most utilized collection method in developing countries (Haseeb, 2020). According to some scholars using a combination of bring system and collection close to properties in waste collection can be sustainable and increase resource recovery rates (Mwanza, Mbohwa & Telukdarie, 2018).

MSW transportation is an essential element in a MSWM collection system (Das & Bhattacharyya, 2015; Putri, Muda & Alia, 2019). It is a sub-system that moves waste from the generator to temporary collection points, to waste treatment facilities, or directly to the final disposal sites (Chaerul & Mulananda, 2018). Transporting MSW is a complex process that requires transportation vehicles such as dump trucks, tractors, landfill tippers, compactions vehicles, dumper placers, trains, heavy lifting machinery and other mechanical transport systems (Alaev & Efimova, 2022). The selection of MSW transportation vehicles is carried out after carefully considering multiple factors including,

1. waste generation rates
2. waste density
3. waste volume per capita
4. waste constituents
5. loading heights
6. traffic conditions and restrictions
7. local manufacture and sustainability
8. transport distance and road conditions
9. labour involvement in decision making etc. (Coad & Coffey, 2010).

MSWM service providers have to build “transfer stations” in instances where the distance between the MSW collection points and the final disposal site/s is significantly far (Singh, Gupta & Chaudhary, 2014; Yadav et al., 2020). These transfer stations reduce transportation expenses by reducing the distance each vehicle has to travel and makes the transportation process economical. Transfer stations provide partial or complete solid waste processing such as sorting, shredding, compacting, baling, or composting with the objective of reducing the volume and recovering reusable materials (Singh, Gupta & Chaudhary, 2014).

(d) Disposal of MSW

Disposal of MSW refers to the final stage in the management process where waste materials generated by households, businesses, institutions, and industries are permanently and safely discarded (Tchobanoglous, Theisen, & Vigil, 2014). It involves the removal and placement of waste in designated disposal facilities, such as landfills or incinerators, with the goal of minimizing potential risks to human health and the environment (Panda, Singh, & Mishra, 2016). MSW disposal aims to prevent the accumulation of waste in populated areas, reduce the release of hazardous substances, and mitigate the negative impacts associated with uncontrolled waste accumulation.

The disposal process typically involves various measures to ensure proper containment, such as the use of liners, leachate collection systems, and air pollution control technologies in the case of incineration (Tchobanoglous et al., 2014). While disposal is a necessary component of waste management, efforts are increasingly focused on reducing the amount of waste generated, promoting recycling and resource recovery, and implementing sustainable waste management practices to minimize the reliance on traditional disposal methods (Blight, Fourie, & Weber, 2017). Key MSW disposal methods are,

1. **Landfilling:** Landfilling is the most common method of MSW disposal globally. Landfills offer several advantages, including low implementation costs, flexibility, and the potential for energy generation through landfill gas capture (Tchobanoglous et al., 2014).

However, there are several drawbacks to consider. Landfills produce harmful gases and leachate, which can contaminate soil and water sources (Blight et al., 2017). Additionally, land scarcity and public concerns about odour, pollution, and visual impact limit the expansion of landfills in urban areas.

2. **Incineration:** Incineration, or waste-to-energy (WTE), involves the controlled combustion of MSW to generate heat and electricity. This method reduces waste volume, mitigates greenhouse gas emissions, and produces energy (U.S. EPA, 2020). Incineration can be an effective solution for waste management in densely populated areas with limited land resources. However, it faces criticism due to potential air pollution, including the emission of toxic substances like dioxins and heavy metals (U.S. EPA, 2020). Advanced air pollution control technologies can mitigate these concerns, but they add to the overall cost.

3. **Recycling:** Recycling is a crucial component of sustainable waste management. It involves sorting and processing waste materials to create new products (Panda et al., 2016). Recycling conserves natural resources, reduces energy consumption, and decreases the amount of waste sent to landfills or incinerators. Various materials, such as paper, plastic, glass, and metal, can be recycled. However, challenges exist, such as the need for efficient collection systems, public awareness, and market demand for recycled products (Panda et al., 2016). Enhanced education and infrastructure investment are key to maximizing recycling rates.

4. **Composting:** Composting is the natural decomposition of organic waste, such as food scraps and yard trimmings, into nutrient-rich soil amendments. It is an environmentally friendly method that reduces methane emissions from landfills while producing valuable compost for agriculture and landscaping (EPA, 2021). Composting can be implemented at the individual, community, or industrial scale. However, challenges include the need for proper waste segregation

and management practices to avoid odor, pests, and contamination issues (EPA, 2021). Community engagement and education programmes can promote widespread adoption of composting.

5. **Waste-to-Fuel Conversion:** Emerging technologies enable the conversion of MSW into alternative fuels, such as biofuels or bio-gas. These methods involve the breakdown of waste materials through biochemical or thermochemical processes. Waste-to-fuel conversion offers the potential for resource recovery, reduction in landfill usage, and renewable energy production. For example, the Edmonton Waste-to-Biofuels Facility in Canada uses gasification and Fischer-Tropsch technology to convert MSW into biofuels (Enerkem, n.d.). However, these technologies are still in the early stages and face technological and economic barriers for large-scale implementation (Ghosh et al., 2018). Further research and development are necessary to optimize efficiency and cost-effectiveness.

The interrelationships between these elements are dictated by the nature and characteristics of each element. For instance, the nature of material generated in a given location dictates the nature of handling, processing and storage it requires. In a city where MSW is segregated at source the handling, processing and storage at the site of generation can be complex. Households would require specifically build spaces and facilities to safely and accurately segregate, process and store waste. However, in a city where segregation at source is not mandatory the service providers will have to build specialized facilities to segregate, process and store MSW and employ a significantly large labour force. If not, the service providers will have to dispose of MSW unsustainably into open and unsanitary waste dumps as mixed MSW.

1.2 Municipal Solid Waste Management in Sri Lanka

The management of solid waste in Sri Lanka presents a complex and pressing issue that require comprehensive strategies and collaborative efforts to fix. As stated in the Status of Waste Management in Sri Lanka report (2017), the country generates a staggering 7,000 metric tons of solid waste per day. This high volume of waste poses significant environmental and health risks if not

properly managed. The Western Province, comprising districts such as Colombo, Gampaha, and Kalutara, contributes to the majority of solid waste generated, accounting for nearly 60% of the country's total waste.

The responsibility for waste collection lies with the local authorities, and the daily collection efforts island-wide amount to approximately 3,242 metric tons (Hikkaduwa et al., 2015). Within the Western Province, Colombo District emerges as the primary waste generator due to high population density. With a daily collection of 1,284 metric tons, the challenge of managing solid waste in this district is particularly pronounced. Municipal councils, including those in Colombo, Dehiwala-Mt. Lavinia, Sri Jayewardenepura, and Moratuwa, play a crucial role in waste collection, with each council facing unique challenges and requirements.

A significant portion of the MSW generated in Sri Lanka comprises of bio waste, which refers to the biodegradable organic fraction that undergoes decomposition. Specifically, approximately 59.2% of the collected MSW is food waste, which contains about 65% moisture content (Menikpura, Gheewala, & Bonnet, 2012). It contains not only moisture but also valuable nutrients and minerals that can be recovered for various value-added applications. In 2012, the average Organic Fraction of Municipal Solid Waste (OFMSW) generated in Sri Lanka was recorded to be 1301.5 tons per day, and this amount has been increasing due to population growth and the associated rise in consumption patterns (Samarasiri et al., 2017).

This substantial amount of bio-waste presents both challenges and opportunities for solid waste management in Sri Lanka. On one hand the organic fraction can contribute to environmental pollution and pose health hazards if not managed properly. On the other hand, there is great potential to harness the value of this waste stream through effective waste management practices. By implementing appropriate technologies and processes, the valuable nutrients and minerals present in bio waste can be recovered and utilized for beneficial purposes. Efficient organic waste management systems such as composting and anaerobic digestion can be employed to process the organic fraction of municipal solid waste.

Currently, in Sri Lanka, there are 24 municipal councils, 41 urban councils, and 276 Pradeshiya Sabhas responsible for waste management (Commonwealth Local Government Forum, 2018). The main sources of income for these local government bodies are budgetary allocations from the central government, as well as tax and non-tax revenues. The per capita daily generation of waste varies across different types of councils. Municipal councils have an estimated waste generation rate of 0.75 kg per day per person, urban councils generate around 0.6 kg per day per person, and Pradeshiya Sabhas generate approximately 0.4 kg per day per person (UNESCAP, 2018). These figures provide an indication of the average amount of waste generated by individuals per day within each council type.

Waste collection is primarily carried out through door-to-door collection and curbside collection methods. A range of vehicles including hand carts, carts, tractors, tippers, and compactor trucks are utilized by the local government bodies to facilitate this process (Commonwealth Local Government Forum, 2018).

1.3 Research Methodology

1.3.1 Types of data

Both primary and secondary data were collected to obtain a comprehensive understanding of the situation in the settlement. As the study sought to comprehend the MSWM system in Sri Lanka, secondary data was used to obtain an overview and a general understanding of MSWM in the country and selected locations.

Primary data was collected to gather data on the discourse on MSWM about current waste management practices (including segregation and disposal). In accordance with the objectives, the study collected qualitative and quantitative data. The study gathered quantitative data related to waste generation, waste segregation, disposal, and management practices, apart from demographic information. Qualitative data provides details on waste management discourse, problems, opinions on efficiency and the impact of the collapse of the Meethotamulla dumping site.

1.3.2 Research Method

In-depth interviews were deemed as the most suitable method for primary data collection. These methods permitted the research team to collect primary data from a large number of respondents efficiently. It also enabled simultaneous collection of qualitative and quantitative data from respondents.

1.4 Data collection

1.4.1 Review of Secondary Data

The review of secondary data consisted of a document analysis. Specific data on existing waste management systems, practices, waste generation, and the composition of waste were gathered from the review.

1.4.2 Primary Data Collection Technique

In-depth interviews with selected officials, elected members and informal waste workers

In-depth interview schedules were utilized to collect qualitative data from selected officials, elected members and informal waste workers. The schedules included open-ended questions that covered dimensions such as waste management, disposal, waste collection issues, informal waste collection, impacts caused by the collapse of the Meethotamulla dumping site. The schedule was originally developed in English and later translated into Sinhala.

1.5 Sample Selection Criteria

The purposive sampling method was utilized to select respondents for the in-depth interviews with officials, elected members, informal waste workers and owners.

1.6 Sample Size

Overall, 138 respondents were selected to carry out in-depth interviews. The respondents ranged from Central government officials, local council officials, elected members, formal and informal waste workers. The number of respondents selected from each category is given below.

Table 1.2 Sample size

Type of Respondent	Sample size
1. National Government officials	21
2. Local council officials	19
3. Elected members	15
4. Formal waste workers	50
5. Informal waste workers	33
Total	**138**

Source: Own data

1.7 Primary data collection

Primary data collection was carried out by trained research assistants who had completed an honours degree in Sociology. These research assistants were trained in a workshop prior to the initiation of data collection to familiarize them with the data collection tools. Data collection was carried out from 10th February 2019 to 18th April 2022. The data collection process was supervised by the co-authors. The duration of each interview was approximately 40 to 45 minutes.

1.8 Data analysis

Qualitative data collected through in-depth interviews was coded by hand and later analyzed using thematic analysis technique.

1.9 Challenges

The authors had to endure multiple challenges during the study. Key challenges included,

1. Obtaining approval from local council

The authors had to obtain approval from the DMMC and BUC to carry out data collection activities. After officially requesting permission, the researchers had to wait almost 3 months until permission was granted to begin

data collection. This delay impacted the research in multiple ways. For example, the research team originally recruited 10 research assistants to carry out data collection, but the delay in obtaining approvals made it difficult to retain them as they had other engagements. Eventually, 10 new research assistants had to be recruited and trained to collect data.

2. Spread of the COVID-19 virus

With the spread of the COVID-19 virus, the administration of the University of Colombo issued instructions to refrain from engaging in data collection activities. Therefore, the researchers had to temporarily pause data collection activities in multiple instances. This further complicated the data collection activities as many of the originally recruited research assistants quit the data collection activities. Consequently, researchers had to employ new research assistants and train the new recruits.

3. Reluctance of some respondents to participate in the in-depth interviews due to health concerns

Some respondents were reluctant to participate in the study due to the spread of the COVID-19 virus. As a countermeasure, the research team had to avoid these respondents and select new ones. It was especially difficult to get hold of informal waste workers during the lock down periods imposed by the Government of Sri Lanka.

1.10 Summary of Chapters

Chapter one introduces the book to the reader touching on topics such as municipals solid waste, types of MSW, waste management methods etc. Further the chapter elaborates on the research methodology and discusses the key challenges authors experienced while conducting the study.

Chapter two of the book delve into the intricate landscape of municipal solid waste management in Sri Lanka, providing a comprehensive understanding of the roles and responsibilities of institutions at the national, provincial, and local levels.

Chapter three delves into regulation and policies governing municipal solid waste management (MSWM) in Sri Lanka. It aims to provide a comprehensive

analysis of the existing regulatory framework, policy initiatives, and institutional arrangements related to waste management. By critically examining the effectiveness and consequences of these regulations and policies, this chapter seeks to identify the challenges and opportunities in the MSWM sector and propose recommendations for a more robust and sustainable waste management system in Sri Lanka.

To examine the official discourse on MSWM, chapter four utilizes secondary data sources including ordinances, acts, and policies. A systematic review method was employed to select and analyze these secondary data sources. The analysis encompasses all relevant policy documents, acts, and ordinances issued in Sri Lanka since colonial times. In addition to secondary data, primary data was collected through in-depth interviews with 24 national and local-level experts, government officials, practitioners, and policymakers.

Chapter five delves into the intricate history of the Meethotamulla dumping site, explains the multifaceted factors that led to its collapse, and examines the far-reaching consequences this disaster had on the entire landscape of solid waste management in Sri Lanka.

Chapter six delves into the initiatives and intricate strategies employed by the Dehiwala-Mt. Lavinia Municipal Council and the Boralesgamuwa Urban Council, shedding light on their efforts to navigate the multifaceted landscape of waste management. From the generation of waste to the intricacies of collection methods, the chapter scrutinizes the mechanisms these councils have adopted, while also examining the crucial task of responsible disposal. Moreover, the chapter unveils the challenges these councils confront in their pursuit of effective and sustainable waste management practices.

Chapter seven summarizes the key findings of the book and outlines the significance of the findings to better the MSWM sector in Sri Lanka.

2. The Institutional Architecture of MSWM in Sri Lanka

2.1 Introduction

Municipal solid waste management is a pressing issue that requires coordinated efforts and effective governance at various levels. In the context of Sri Lanka, the challenges associated with rapid urbanization and population growth necessitate a robust waste management framework. This chapter aims to delve into the intricate landscape of municipal solid waste management in Sri Lanka and provide a comprehensive understanding of the roles and responsibilities of institutions at the national, provincial, and local levels. Throughout this chapter, an examination of the rules, policies, and regulations relevant to solid waste management will be conducted. This includes an exploration of the national waste management strategy, the legal framework outlined in the National Environmental Act, and other relevant policies aimed at promoting sustainable waste management practices.

2.2 Municipal Solid Waste Management Architecture in Sri Lanka

The municipal solid waste management architecture in Sri Lanka exhibits a unique blend of decentralization and centralization. While on the surface it appears to be a decentralized system, a closer examination reveals elements of centralization. At the national level, key organizations such as ministries and authorities are responsible for policy and rule development, supervision, and funding. These institutions play a crucial role in setting the overall framework for waste management practices across the country. They formulate policies, develop regulations, and provide guidelines to ensure the proper handling and disposal of municipal solid waste.

At the provincial level, the responsibility for waste management falls under the purview of Provincial Councils and their associated institutions. They are tasked with supervising waste management activities, providing funding, and formulating regulations tailored to the specific needs and challenges of each province. These provincial-level institutions work in conjunction with the national organizations to ensure that effective waste management practices are implemented at the local level.

At the local level, the responsibility for the collection, treatment, and disposal of municipal solid waste rests with the local councils. These councils, such as municipal councils and urban councils, have direct authority over waste management within their respective areas. They are responsible for implementing waste collection systems, establishing treatment facilities, promoting waste segregation at source, and ensuring that proper disposal practices are followed. Local councils collaborate with the provincial and national institutions to align their efforts with the broader waste management objectives set at higher levels.

Overall, the MSWM architecture in Sri Lanka demonstrates a system where national-level organizations provide the policy and regulatory framework, provincial-level institutions supervise and fund waste management activities, and local councils play a pivotal role in day-to-day management and operation.

2.3 National Level Institutions

Several ministries and authorities are responsible for managing MSWM at the national level. The following section of the chapter briefly discuss these institutions.

2.3.1 Ministry of Local Government and Provincial Councils

The Ministry of Local Government and Provincial Councils is responsible for coordinating and overseeing waste management activities at the provincial and local levels. Its key roles include:

1. Policy Development and Implementation

The Ministry of Local Government and Provincial Councils plays a crucial role in formulating policies, guidelines, and regulations related to MSWM in Sri Lanka. These policy initiatives aim to provide a comprehensive framework for waste management practices and promote sustainable waste management solutions.

One example of the ministry's policy development efforts is the National Solid Waste Management Policy. This policy, introduced in 2017, serves as a guiding document for waste management practices in Sri Lanka. It outlines

strategies and objectives to improve waste collection, recycling, and disposal practices, with an emphasis on reducing environmental pollution and promoting public participation (Ministry of Local Government and Provincial Councils, 2017). The policy sets targets and guidelines for waste management practices across the country and provides a roadmap for sustainable waste management.

In addition to the national policy, the ministry also collaborates with provincial councils to develop region-specific waste management policies and guidelines. For instance, the Western Province Waste Management Authority (WPWMA), under the supervision of the ministry, developed the Western Province Solid Waste Management Policy. This policy focuses on waste reduction, recycling, and environmentally sound disposal methods specific to the Western Province (WPWMA, n.d.). Such regional policies enable localized waste management solutions that address the unique challenges and characteristics of different provinces. Through these policy development and implementation efforts, the Ministry of Local Government and Provincial Councils seeks to improve waste management practices, promote sustainable waste management solutions, and ensure compliance with environmental regulations.

2. Capacity Building and Training

To enhance waste management capabilities at the provincial and local levels, the Ministry, focuses on capacity building and training initiatives. These programmes aim to improve knowledge and skills related to waste collection, segregation, and recycling among waste management professionals and stakeholders.

For example, the Solid Waste Management Support Programme (SWMSP) conducted by the Ministry aimed to strengthen the capacities of local authorities and communities in waste management. The programme included training sessions on waste collection, recycling, composting, and landfill management (Ministry of Local Government and Provincial Councils, 2017).

Furthermore, the ministry has collaborated with international organizations to enhance capacity building efforts. For instance, the Japan International Cooperation Agency (JICA) has partnered with the ministry to implement capacity building programmes for waste management professionals in Sri Lanka. These programmes focus on technology transfer, knowledge sharing, and best practices in waste management (Ministry of Local Government and Provincial Councils, 2018). Such collaborations enable the ministry to access international expertise and resources, facilitating comprehensive capacity building in waste management.

In terms of funding, the ministry has allocated resources to support capacity building and training programmes. For instance, the Local Government Development Programme (LGDP), funded by the Asian Development Bank (ADB), includes provisions for capacity building activities related to waste management. This funding has supported the implementation of training programmes, workshops, and awareness campaigns for waste management professionals and community members (Ministry of Local Government and Provincial Councils, 2018).

3. Resource Allocation and Funding

The ministry plays a crucial role in allocating resources and providing financial support for waste management projects. One example of resource allocation is the establishment of the Karadiyana Waste Management Facility in Colombo. This state-of-the-art landfill project received significant financial investment from the Ministry of Local Government and Provincial Councils. Approximately 2.8 billion Sri Lankan Rupees were allocated for the construction, operation, and maintenance of the facility in 2018 (Ministry of Local Government and Provincial Councils, 2018). This funding facilitated the development of advanced waste management infrastructure that adheres to environmental standards and promotes sustainable waste disposal practices.

In addition, the implementation of the Green Cities Development Programme showcases the ministry's commitment to securing external funding for waste management projects. This programme has received support from international funding agencies such as the ADB. These funds were utilized for

the improvement of waste collection systems, the establishment of recycling facilities, and the implementation of public awareness campaigns, among other initiatives.

In 2018, approximately 5 billion Sri Lankan Rupees were allocated through the LGDP for waste management initiatives, aiming to improve waste collection and disposal systems at the local level (Ministry of Local Government and Provincial Councils, 2018).

These examples demonstrate the Ministry of Local Government and Provincial Councils' efforts in resource allocation and funding for MSWM in Sri Lanka.

4. Monitoring and Evaluation

Monitoring and evaluating plays a crucial role in assessing the effectiveness and the impact of MSWM initiatives in Sri Lanka. By systematically evaluating the progress and outcomes of these projects, the Ministry of Local Government and Provincial Councils identify areas for improvement and make informed decisions for future strategies.

The ministry conducts regular evaluations to analyze the efficiency and effectiveness of waste collection processes in urban areas. For instance, a comprehensive evaluation of waste collection systems in Colombo in 2019 highlighted the need for improved collection efficiency and the implementation of segregated waste collection practices. The findings from this evaluation were utilized to develop targeted interventions and allocate resources accordingly (Ministry of Local Government and Provincial Councils, 2019).

Furthermore, monitoring and evaluation efforts extend to waste disposal sites and treatment facilities. Regular inspections and assessments are carried out to ensure compliance with environmental regulations and the proper functioning of these facilities. These evaluations help identify any operational shortcomings and recommend corrective actions. Public participation and awareness are also important aspects of monitoring and evaluation. The ministry, in collaboration with local authorities, conducts surveys and

feedback mechanisms to gauge public satisfaction, knowledge, and behavioral change regarding waste management practices. These assessments provide valuable insights into the effectiveness of awareness campaigns, public education programmes, and community engagement initiatives.

2.3.1.1 National Solid Waste Management Support Center

Established to address the increasing challenges of solid waste management, the National Solid Waste Management Support Centre (NSWMSC) serves as a centralized authority under the Ministry of Local Government and Provincial Councils. The NSWMSC was established in 2007 with the objective of providing technical expertise, guidance, and support to local authorities and other stakeholders involved in solid waste management. Its establishment was a response to the growing concerns regarding the inefficient waste management practices and the need for a systematic and integrated approach to address the issue (Karunarathne, 2015).

Formulating Policies

The primary role of the NSWMSC is to formulate national policies, guidelines, and standards for solid waste management in Sri Lanka. It develops strategies and action plans to improve waste management practices, focusing on waste reduction, recycling, and environmentally friendly disposal methods. The center collaborates with relevant government agencies, local authorities, and international organizations to ensure the implementation of effective waste management policies (State Ministry of Provincial Councils and Local Government Affairs, n.d.).

Capacity Building

NSWMSC has engaged in impactful capacity building activities through collaborations with international organizations. These partnerships have yielded fruitful outcomes in terms of knowledge transfer and technical assistance. For instance, the NSWMSC, in collaboration with the United Nations Development Programme (UNDP), has conducted training programmes on sustainable waste management practices (Ministry of Local Government and Provincial Councils, 2018). Furthermore, the NSWMSC has partnered with the ADB to implement capacity building initiatives in solid waste management. Through these collaborations, the center has facilitated

study tours and knowledge-sharing sessions with waste management experts from countries with successful waste management systems. Participants have had the opportunity to learn from international experiences and adapt relevant strategies to the Sri Lankan context (Ministry of Local Government and Provincial Councils, 2018).

Another notable example is the collaboration between the NSWMSC and the JICA. The center has benefited from JICA's expertise in waste management technologies, waste-to-energy systems, and landfill management. Through training programmes and knowledge-sharing workshops, waste management professionals have gained insights into the efficient operation and maintenance of waste treatment facilities. This has facilitated the transfer of technical know-how and supported the development of sustainable waste management practices in Sri Lanka (Ministry of Local Government and Provincial Councils, 2018).

Knowledge Management and Information Dissemination

In addition to capacity building, the NSWMSC plays a crucial role in knowledge management and information dissemination. NSWMSC regularly conducts workshops, seminars, and conferences to disseminate information and promote dialogue among stakeholders. These events bring together experts, practitioners, and policymakers to share experiences, discuss challenges, and explore innovative solutions in waste management.

2.3.2 Ministry of Environment

The Ministry of Environment of Sri Lanka plays a crucial role in managing various environmental issues, including MSWM. It formulates policies, regulations, and guidelines for waste management practices, aiming to ensure sustainable waste disposal and resource recovery (Ministry of Environment, n.d.). The Ministry of Environment of Sri Lanka utilizes the Central Environmental Authority (CEA) as its principal regulatory agency for waste management.

2.3.2.1 Central Environmental Authority

The CEA, established under the National Environmental Act No. 47 of 1980, operates under the oversight of the Ministry to implement waste management policies and regulations throughout the country (Central Environmental Authority, n.d.). Within the CEA, there are specialized units dedicated to managing municipal solid waste effectively. These units include the Solid Waste Management Unit (SWMU), the Environmental Pollution Control Unit (EPCU), and the Environmental Impact Assessment Unit. (EIAU)

Solid Waste Management Unit

The SWMU was established on June 1, 2018, as part of the Waste Management Division. Its primary objective is to create a clean and healthy environment by promoting effective and efficient implementation of MSWM Systems throughout the country. The unit focuses on mainstreaming sustainable waste management practices to ensure a better quality of life for all citizens (Solid Waste Management Unit, 2023).

The SWMU comprises three main cells, each with specific roles and responsibilities. The first cell is the **Policy & Technical Interventions cell**, which is responsible for developing national, provincial, and district-level initiatives for policies, strategies, guidelines, and plans regarding solid waste management. This cell plays a crucial role in formulating comprehensive and sustainable approaches to waste management (Solid Waste Management Unit, 2023).

The second cell is the **Implementation & Enforcement cell**, which focuses on the enforcement of waste management regulations and initiatives. This cell ensures that waste management practices are implemented effectively and that all relevant laws and regulations are followed. It oversees compliance and takes necessary actions to enforce waste management standards (Solid Waste Management Unit, 2023).

The third cell is the **Implementation of Special Projects cell**, which is responsible for managing and executing solid waste management-related special projects. This includes activities such as the operational maintenance

and improvement of the Dompe Sanitary Landfill and the Gampaha District Integrated Solid Waste Management Project. These special projects aim to address specific waste management challenges and improve waste management infrastructure and services (Solid Waste Management Unit, 2023).

Environmental Pollution Control Unit

The EPCU undertakes several crucial functions aimed at preventing, minimizing, and controlling environmental pollution. Firstly, it implements the Environmental Recommendation (ER) Procedure for the siting of new industries. This procedure ensures that appropriate measures are taken to assess and mitigate potential environmental impacts before granting approval for the establishment of new industries.

Secondly, the unit administers the Environmental Protection License (EPL) Scheme. This scheme serves as a regulatory tool for monitoring and controlling the pollution levels of existing industries. It sets specific requirements and conditions that industries must comply with to minimize their environmental footprint. The unit also plays a role in granting concurrence for the EPL of Board of Investment (BOI) approved prescribed industries. This process involves reviewing the environmental impact assessment reports submitted by these industries and providing consent based on compliance with environmental standards and guidelines.

In addition, it engages in technical interventions and industrial facilitation. It provides guidance and support to industries in implementing pollution control measures, promoting the use of cleaner technologies, and ensuring compliance with environmental regulations. The EPCU is actively involved in the formulation of policies, standards, and guidelines to enhance environmental quality. These measures aim to set clear benchmarks and requirements for industries and other stakeholders to follow, promoting sustainable practices and pollution prevention (Environmental Pollution Control Unit, 2023).

Environmental Impact Assessment Unit

The EIAU procedure is designed to assess and evaluate the potential environmental impacts of development projects. By assessing the

environmental implications, the EIA procedure facilitates informed decision-making, enabling the CEA to evaluate the feasibility of proposed projects and their potential impacts on the environment.

Through comprehensive environmental assessments, the EIA helps officials evaluate the potential consequences of a project on the environment, taking into account factors such as ecological systems, natural resources, and community well-being. Moreover, the EIAU empowers project proponents by guiding them in achieving their objectives in a more successful manner. By identifying potential environmental challenges and suggesting suitable mitigation measures, the EIAU enables project proponents to address concerns raised by stakeholders and regulatory bodies (Environmental Impact Assessment Unit, 2023).

The unit takes measure to increase the capacity of professionals involved in environmental impact assessment. Accordingly, in partnership with the Centre for Environmental Studies at the University of Peradeniya, it organizes a comprehensive 10-day Intensive course on Environmental Impact Assessment (EIA). This course is designed to provide in-depth knowledge and training on all aspects of the EIA process. Participants gain a thorough understanding of the EIA procedures, methodologies, and best practices involved in conducting an EIA (Environmental Impact Assessment Unit, 2023).

Pilisaru Municipal Solid Waste Management Project

The Pilisaru project was a special project undertaken by the CEA to address MSWM in Sri Lanka. The Pilisaru National Solid Waste Management Project (PP) was established within the Central Environmental Authority (CEA) of Sri Lanka on January 1, 2008, following the approval granted by the Cabinet of Ministers on December 19, 2008 (Dassanayake, 2011). This project operates under the overall guidance of the National Pilisaru Platform, a high-level National Committee on Solid Waste Management co-chaired by the Secretaries of the Ministries of Environment & Natural Resources and Local Government & Provincial Councils (MoLGPC).

The financial provisions for the project amount to approximately 5.675 billion Sri Lankan rupees (Dassanayake, 2011). These funds were expected to be derived mainly from two sources: annual budget allocations from the General Treasury amounting to 2.675 billion Sri Lankan rupees, and revenues generated

through the "Green Levy," which was announced during the 2008 Budget Speech (Dassanayake, 2011).

The Pilisaru waste management project encompasses several key objectives aimed at improving solid waste management practices in Sri Lanka. These objectives include:

1. Preparation of a national policy on Solid Waste management.
2. Preparation of strategies for solid waste management.
3. Provision of training on effective solid waste management, including education and awareness for relevant officers.
4. Provision of necessary facilities for the implementation of solid waste management projects and programmes.
5. Strengthening the legal framework for solid waste management. (CEA, 2018).

The project supported the establishment of over 100 major composting plants in collaboration with local authorities. Some of the composting plants established under this initiative include:

- Pothuwilkubura Compost Plant, located in Kolonnawa.
- Pohorawatta Compost Plant, situated in Kalutara.
- Keerikkulama Compost Plant at Nuwaragampalatha, Anuradhapura.
- Madirigiriya Compost Plant, located in Polonnaruwa.
- Monroviawatta Compost Plant in Hikkaduwa.

These composting plants have played a significant role in managing organic waste and promoting sustainable waste management practices in their respective regions (Fernando, 2011). According to Sena (2019), 119 composting projects out of 137 composting projects implemented, were in operation assisted by the Pilisaru programme. According to a study conducted by Dinushika (2021) the majority (83%) of the 20 compost plants established in the Southern and Western regions of Sri Lanka under the project currently operational. She further revealed that the sites have a production capacity of approximately 386 tons per month, which accounts for about 67% of the total

designed capacity (Dinushika, 2021).

Findings highlights several reasons for the failure of certain composting sites within the project. Poor waste management practices, including inadequate financial assistance and technical expertise, deficiencies in site selection and design considerations, low institutional commitment, limited community involvement, poor compost quality, and lack of regular monitoring of the composting process were identified as contributing factors (Dinushika, 2021). The Pilisaru Project promotes the use of compost bins for the disposal of organic waste generated in households. Approximately 30,000 plastic compost bins have been distributed to various entities, including local authorities, schools, government institutions, and religious places, based on their specific requests for managing the organic portion of their municipal solid waste (Fernando, 2011).

Furthermore, the project has provided waste segregation bins, which come in three different colors for the separate disposal of paper, glass, and polythene/plastics, to government institutions, schools, and religious places free of charge. This initiative promotes the practice of waste segregation and encourages responsible waste management practices within these institutions (Fernando, 2011).

The Pilisaru project has undertaken various awareness-building activities aimed at promoting sustainable waste management practices among individuals, communities, and institutions (Dassanayake, 2011). One of the key awareness-building initiatives implemented by the Pilisaru project is community education programmes. These programmes involved conducting workshops, seminars, and awareness campaigns in collaboration with local authorities, schools, and community organizations. Through these platforms, the project disseminates information on waste management practices, emphasizing the benefits of waste segregation and the proper disposal of different waste streams. These initiatives aim to change attitudes and behaviors towards waste management, encouraging individuals to actively participate in waste segregation and recycling practices (Conlon, Jayasinghe & Dasanayake, 2019).

It utilizes various communication channels to raise awareness on waste management. These include the distribution of educational materials such as brochures, pamphlets, and posters, as well as the use of mass media platforms such as television, radio, and social media. Furthermore, the project actively engages schools and educational institutions in its awareness-building efforts (Sena, 2019). It conducts programmes and initiatives targeting students, including awareness sessions, competitions, and the establishment of waste management clubs called "*Pilisaru Pivithuru Balaka*". By involving the younger generation, the Pilisaru project aims to foster a sense of environmental responsibility and ensure the adoption of sustainable waste management practices from an early age.

2.3.3 Ministry of Mega-polis and Western Province Development

The former Ministry of Mega-polis and Western Province Development was established in 2015, as part of the government's efforts to streamline urban planning, infrastructure development, and socio-economic growth in the region. It was tasked with coordinating and implementing various initiatives to transform the Western Province into a well-planned, efficient, and sustainable urban region. Its responsibilities included urban planning, infrastructure development, transportation management, environmental conservation, and social welfare (Ministry of Mega-polis and Western Province Development, 2016).

The Ministry of Mega-polis and Western Province Development in Sri Lanka oversaw several key departments, statutory institutions, and projects. These included the National Physical Planning Department (NPPD), responsible for formulating national physical plans and guiding land use policies. The Urban Development Authority (UDA) is another important entity under the ministry, tasked with planning and regulating urban development activities in designated areas. Additionally, the Sri Lanka Land Reclamation and Development Corporation (SLLDC) focused on reclaiming land and implementing development projects to support urban growth and infrastructure expansion (Ministry of Mega-polis and Western Province Development, 2016).

Metro Colombo Waste Management Project

The Metro Colombo Waste Management Project is a significant initiative implemented by the Ministry of Mega-polis and Western Province Development, to address the growing waste management challenges in the Colombo Metropolitan Area. The project aims to establish a sustainable and integrated waste management system in the region, incorporating various components such as waste collection, transportation, disposal, and recycling. The key objectives of the Metro Colombo Waste Management Project include improving waste collection efficiency, reducing the reliance on open dumping, promoting waste segregation at the source, and enhancing recycling and resource recovery practices (Ministry of Mega-polis and Western Province Development, 2016).The project focuses on implementing modern waste management technologies and best practices to minimize environmental pollution, optimize resource utilization, and enhance the overall quality of life for residents.

Building a sanitary landfill at Aruwakkaru, Puttlam

The Metro Colombo Waste Management Project encompasses the construction of a semi-aerobic sanitary landfill with a capacity of 1200 tons per day. This landfill will be situated on a 47-hectare site in Aruwakkalu, located in the Puttalam District (Ministry of Megapolis and Western Province Development, 2016). The construction of the landfill is being undertaken by a collaborative consortium consisting of China Harbor Engineering Company Limited (CHEC), renowned for their involvement in the construction of the Port City, and the esteemed Southwest Municipal Engineering and Research Institute of China (SMEDRIC) (Wijedasa, 2022).

Image 2.1 Aruwakkalu sanitary landfill

Source: News.lk (2020)

While its primary purpose is to cater to the municipal solid waste generated within the Metro Colombo Region (MCR), it is worth noting that the landfill will also accept waste from local authorities in the Puttalam District. This inclusive approach aims to extend the benefits of the project to a wider area (Ministry of Mega-polis and Western Province Development, 2016).

To facilitate waste collection and transportation, a transfer station will be established in Kelaniya. This station will serve as a central collection point for the waste generated within the MCR (Ministry of Megapolis and Western Province Development, 2016). Once collected, the waste will be transported to the Aruwakkalu landfill via train, ensuring efficient and cost-effective waste transportation. Additionally, compactor trucks will be responsible for delivering waste from the Puttalam District to the Aruwakkalu Sanitary Landfill site, further ensuring that waste management needs are met in both the MCR and Puttalam District (Ministry of Mega-polis and Western Province Development, 2016).

The Metro Colombo Waste Management Project encompasses activities in two distinct locations: Kelaniya and Aruwakkalu. The first location, Kelaniya, will be home to the Kelaniya Transfer Station (KTS) (Ministry of Megapolis and Western Province Development, 2016). This facility will serve as a central point for receiving and collecting waste before it is loaded and transferred to the designated destination, the Aruwakkalu Sanitary Landfill.

The project activities in Aruwakkalu are divided between two closely situated sites: the Aruwakkalu Transfer Station (ATS) and the Aruwakkalu Sanitary Landfill (ASL). These two sites work in tandem to facilitate efficient waste management. The Aruwakkalu Transfer Station acts as an intermediate hub where waste is temporarily stored and prepared for further transportation or processing. From there, the waste is then transported to the adjacent Aruwakkalu Sanitary Landfill for appropriate disposal (Ministry of Megapolis and Western Province Development, 2016).

Current Status

The commencement of the waste treatment process at the Aruwakkalu solid waste management facility is slated for the latter part of 2024 (Range, 2023). The construction of the landfill was delayed due to the financial constrictions caused by the onset of COVID-19 virus, inundation of the facility in flood water in 2020, financial crisis experienced by Sri Lanka since 2021 (Wijedasa, 2022). Once the Aruwakkalu site is completed, the transportation of waste to the facility via train will require an additional six months, contingent upon the completion of the waste transfer station in Kelaniya. The government of Sri Lanka has purchased two Chinese power sets comprising four engines for the Aruwakkalu Sanitary Landfill Project. Once the transit point is fully operational, these trains will embark on a daily journey to Aruwakkalu, facilitating the transportation of the day's accumulation of solid waste from the Colombo Metro area and its suburban regions. To mitigate any disruptions to daytime traffic, the trains will operate exclusively during nighttime hours (Range, 2023).

2.3.4 Ministry of Health

The Ministry of Health (MoH) in Sri Lanka plays a significant role in municipal solid waste management (MSWM) by actively contributing to the proper disposal and management of medical waste. The MoH exercises authority over the formulation, monitoring, and regulation of medical waste practices. To encourage the appropriate handling and disposal of medical waste, the MoH has introduced the National Policy for Healthcare Waste Management. This policy aims to provide evidence-based recommendations to healthcare professionals and other staff members, emphasizing the management of hospital-generated waste with minimal environmental harm (World Bank, 2001). By implementing this policy, the MoH contributes to the overall improvement of MSWM practices, safeguarding public health and minimizing the environmental impact of medical waste disposal and by restricting contamination of MSW with medical waste.

Secondly, the MoH contributes to the MSW via the offices of Medical Officer of Health (MOH). The Public Health Officers (PHI) of the MOH with their expertise in public health and environmental sanitation, are responsible for ensuring the effective implementation of waste management practices at the grassroots level. They provide services such as, monitoring and surveillance, community engagement, enforcement of waste management regulations, and promoting sustainable waste management practices.

Waste monitoring and surveillance

PHIs actively engage in MSW monitoring and surveillance to assess the state of waste management practices in their respective areas. They conduct regular inspections of households, commercial establishments, and public spaces to ensure compliance with waste management regulations and guidelines. Through their surveillance activities, PHIs identify sources of waste generation, assess waste handling practices, and monitor the condition of waste storage facilities.

Community engagement and education

PHIs actively engage with communities to raise awareness about proper waste management practices. They conduct educational campaigns, workshops, and training programmes to promote waste segregation, recycling, and the adoption of sustainable waste management practices at the household and community levels. PHIs work closely with community leaders, school authorities, and local organizations to disseminate information on waste management and encourage behavioral changes. By empowering communities with knowledge and practical guidance, PHIs foster a sense of responsibility and ownership in waste management.

Enforcement of waste management regulations

PHIs are responsible for enforcing waste management regulations and guidelines set by the relevant authorities. They conduct regular inspections of waste collection points, dumping sites, and waste transport vehicles to ensure compliance with regulations regarding waste segregation, storage, transportation, and disposal. PHIs have the authority to issue warnings, fines, and legal notices to individuals or entities found to be in violation of waste management regulations. Their enforcement activities create a deterrent effect, promoting compliance and fostering a culture of responsible waste management.

2.3.5 Ministry of Defense

The Ministry of Defense actively participates in the municipal solid waste management (MSWM) system of Sri Lanka through its specialized unit within the Sri Lanka Police known as the "Environmental Police." This division was established in 2010 under the directive of former Secretary of Defense, Gotabaya Rajapaksha, and was led by the late Deputy Inspector General (DIG) Anura Senanayake, initially known as the "Environmental Operation." The primary objective of this division was to provide assistance to officials from the Colombo Municipal Council and Sri Lanka Land Reclamation and Development Corporation in enforcing waste disposal regulations, ensuring environmental protection, and effectively managing canals (Hettiarachchi & Silva, 2010).

Due to the success of the initiative the operation was later converted into the "Environmental Division" and was established in 136 police districts. The 12-member unit consists of an Officer-in-Charge or Inspector, a Sub-Inspector, two Sergeants, six police constables, and two women police constables. Operating in collaboration with relevant stakeholders, particularly local government bodies, these units are assigned with broad responsibilities (Hettiarachchi & Silva, 2010).

These encompass overseeing the collection and disposal of garbage, addressing the issue of indiscriminate dumping on roads, tackling mosquito breeding sites in households, removing obstacles on pavements and unauthorized constructions, cracking down on illegal activities such as unauthorized land filling, forest encroachment, illegal gem-mining and sand mining, air pollution, unhygienic food preparation in stalls and restaurants, and enforcing laws pertaining to hoardings, banners, and cutouts (Hettiarachchi & Silva, 2010).

Recognizing the need for streamlined monitoring, all 136 Police Environmental Police Units were later brought together under a single umbrella, leading to the establishment of the Police Environment Protection Division (Hettiarachchi & Silva, 2010). This division, under the leadership of DIG Senanayake, was further expanded to include DIG Cecil Perera, SSP Quintus Raymond, an ASP, and an Officer-in-Charge. This consolidation aimed to facilitate better oversight and coordination, ensuring efficient environmental protection efforts (Hettiarachchi & Silva, 2010).

The division was re-established in year 2019 as the unit was dysfunctional from 2015 to early 2019 with the change of the government. After the election of the Gotabaya Rajapakshe as the President of the country, he took action to reactivate the environmental police unit, demonstrating a strong commitment to environmental protection. The reinstatement process involved the establishment of environmental units in all police stations, strategically deploying officers throughout the road network. Moreover, the President appointed a new DIG and a dedicated director to lead and oversee the Environmental Unit's operations. In addition, they diligently monitored and evaluated the beautification initiatives undertaken by local councils, ensuring

that these activities align with sustainable practices and contribute to the preservation of the environment.

2.4 Provincial Institutions

2.4.1 Introduction to Provincial Councils (PCs)

The establishment of Provincial Councils in Sri Lanka introduced an intermediate level of government within the existing national and local governmental system. This significant decision was made through the 13th Amendment to the Constitution, and the Provincial Councils Act No. 42 of 1987 provided the operational procedures for their functioning. This legal framework involved the decentralization of specific governmental powers and functions from the central level to the provincial level (Paffrel, n.d.).

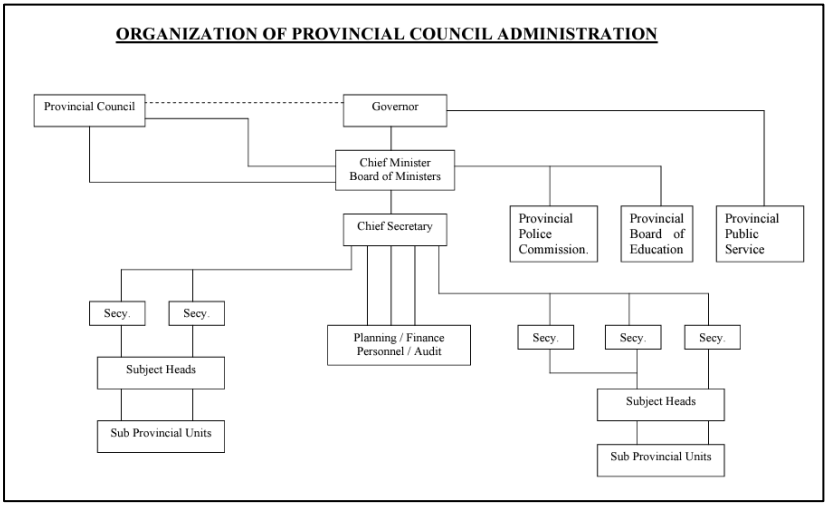
The creation of Provincial Councils brought about a new set of structures and positions with the authority to exercise powers and functions at the provincial level. These structures define the roles, responsibilities, and relationships of a Provincial Council within the broader governmental context (Paffrel, n.d.).It is crucial to note that Provincial Councils do not operate in isolation but rather function within the existing system of government, resulting in changes to its structure and functioning. Therefore, Provincial Councils are distinct governmental entities that operate within the larger framework of the national and local government system.

Among the nine provinces in Sri Lanka, the establishment of eight Provincial Councils took place in 1988. It is important to note that the Northern and Eastern provinces were temporarily merged into a single entity under the provisions of the Provincial Councils Act 42 of 1987 (Section 37 1A) (Mudalige & Abeysinghe, 2021). However, the North East Provincial Council ceased its functioning in 1989 due to administrative difficulties, leading to the government taking over its administration. The temporary merger came to an end in 2009 following a Supreme Court decision, resulting in the demerger of the two provinces (Mudalige & Abeysinghe, 2021).

The establishment of a Provincial Council occurs upon the election of its members in adherence to the legislation concerning Provincial Council

elections (Paffrel, n.d.). The Constitution allows for the Parliament to authorize the formation of an administrative unit comprising two or three contiguous Provinces, each with a single elected Provincial Council, a Governor, a Chief Minister, and a Board of Ministers. The Parliament also has the authority to decide whether such Provinces should continue to be administered as a unified entity (Paffrel, n.d.).

Figure 2.1 Organization of provincial council administration



Source: Pafferal, n.d.

2.4.2 Provincial Councils and MSWM

Provincial Councils in Sri Lanka shoulder significant responsibilities in municipal solid waste management (MSWM) and are instrumental in implementing the national policy framework. The National Policy on Waste Management (2019) outlines key responsibilities of the Provincial Councils in relation to MSWM.

1. Performance monitoring, recording, evaluation, and annual reporting are vital components of the Provincial Councils' responsibilities. They

establish feedback mechanisms to gather information on waste management activities and assess their outcomes. This data-driven approach enables them to evaluate the effectiveness of their strategies and make informed decisions for continuous improvement.

2. A crucial aspect of the Provincial Councils' role is to provide essential resources to local authorities for effective waste management implementation. This includes allocating the required cadre, vehicles, machinery, and equipment to facilitate waste collection, transportation, treatment, and disposal. Additionally, they invest in building the capacity of relevant staff through periodic administrative, managerial, and skills development programmes. This ensures that local authorities have the necessary expertise and knowledge to tackle waste management challenges effectively.

3. Infrastructure development is another responsibility undertaken by the Provincial Councils. They allocate lands for waste storage, treatment, and disposal facilities within their provinces. By providing the necessary infrastructure, they create a solid foundation for sustainable waste management practices and ensure the proper handling and disposal of waste materials.

4. The Provincial Councils actively engage in public education and awareness campaigns to promote responsible waste management practices among the general population. Through continuous efforts, they strive to instill a sense of environmental consciousness and encourage behavior change. By raising awareness about the importance of waste reduction, recycling, and responsible waste disposal, they aim to minimize waste generation and foster a culture of sustainability.

5. In their capacity as overseers of waste management activities, the Provincial Councils monitor and evaluate the performance of local authorities. They report the performance annually to the general public, ensuring transparency and accountability. Recognizing and disseminating best practices through performance appraisal schemes further encourages local authorities to strive for excellence in waste management.

6. To facilitate effective waste management, the Provincial Councils ensure sufficient budgetary provisions for local authorities on an annual basis. They link budget allocations with strict monitoring and evaluation, ensuring that the funds are utilized effectively and efficiently. By holding local authorities accountable for their performance, the Provincial Councils strive to ensure the delivery of quality waste management services to the public (Ministry of Environment, 2019).

As discussed above the Provincial Councils have the authority to establish statutory institutions to carry out specific tasks within its jurisdiction. Accordingly, the Western Provincial Council has established the Waste Management Authority of Western Province to manage MSW within the province.

2.4.3 Waste Management Authority of Western Province

The Waste Management Authority of the Western Province (WMA-WP) was established in 2005 under the Western Province Waste Management Statute No. 09 of 1999. Subsequent amendments were made to strengthen the statute in 2007, and presently, the WMA-WP operates under the revised legislation (Waste Management Authority of the Western Province, n.d.). Since its inception, the WMA-WP has accumulated extensive expertise and has made significant contributions to the field of waste management as a facilitating agency.

The key objectives of the WMA-WP are,

1. To proactively prevent the accumulation of waste in the environment and ensure the maintenance of a clean atmosphere for the well-being of the public, as well as the preservation of the local fauna and flora within the province.

2. To strategically plan, provide advice, organize, and supervise the regulation of waste disposal, transportation, and storage activities within the Western Province, ensuring that these actions do not pose any hazards to the environment and public health.

3. To conduct research focused on recycling and reusing waste materials, exploring innovative methods for resource recovery and waste reduction.

4. To issue directives aimed at rehabilitating polluted areas, regions, and zones resulting from improper waste disposal, while actively implementing measures and overseeing associated activities.

5. To collaborate and coordinate with local authorities, institutions, and individuals involved in waste management projects within the province, whether they receive local or foreign assistance, ensuring proper supervision and integration of efforts.

6. To publish papers, reports, books, information, and notices in collaboration with other provincial institutions or independently, actively raising public awareness and disseminating knowledge on effective waste management practices.

7. To establish partnerships and collaborate with domestic and international organizations that share similar objectives to the Authority, working collectively towards sustainable waste management solutions.

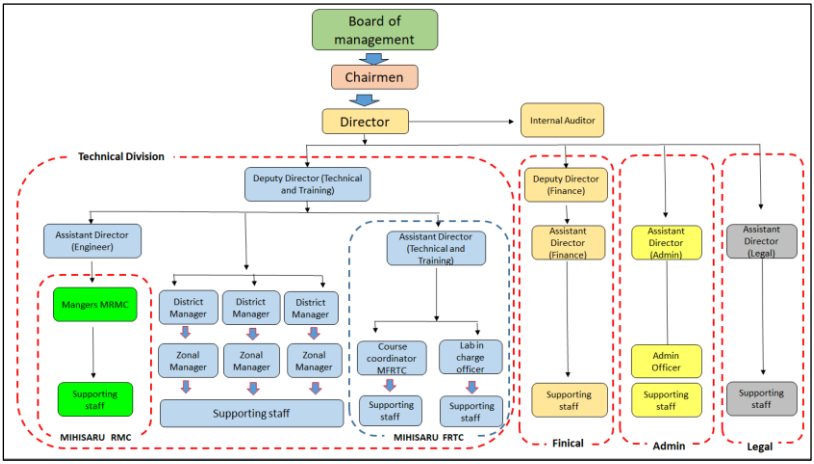
8. To conduct research initiatives that seek to mitigate the proliferation of waste, enhance public awareness, and develop specific measures to address waste-related challenges (Waste Management Authority of the Western Province, n.d.).

Organizational Structure

The Director of the WMA-WP assumes the role of Chief Executive Officer, entrusted with the implementation of the statutory provisions in accordance with the directives provided by the Board of Management (Waste Management Authority of the Western Province, n.d.). The WMA-WP operates primarily through four departments: Technical, Financial, Administration, and Legal. Currently, it boasts a total human resource capacity of 110 individuals. Within the Mihisaru Resource Management Centre, there

are contract-based employees, and their collective number currently stands at approximately 70. (Waste Management Authority of the Western Province, n.d.).

Figure 2.2 Organization of Waste Management Authority of the Western Province



Source: Waste Management Authority of the Western Province, n.d.

Services and Products

1. Management of Landfills in Western Province

WMA-WP manages the landfills in the Western Province by monitoring and supervising waste disposal, recycling and recovery activities. The main open dumping site managed by the WMA-WP is the Karadiyana waste management Center. Situated on a sprawling 37-acre expanse, the Mihisaru Resource Management Centre stands as a testament to transformation, having once served as an open dumping site for three decades. In 2010, the WMA-WP seized this land and developed it into a state-of-the-art facility.

Within this establishment, one can find a large-scale compost yard with a monthly production capacity of 2500 metric tons, alongside a well-equipped waste transfer station and a meticulously controlled dump site. The Mihisaru

Resource Management Centre, with its infrastructure and expertise, extends its services to over seven local government authorities in the Colombo district, catering to the diverse needs of a population surpassing one million.

2. Production of compost and organic fertilizer

The Authority produces a number of compost and organic fertilizer under the brand name “MIHISARU” and “MIHILAK”. These products are produced using carefully sorted biodegradable MSW and adhere to the stringent quality standards of MIHISARU Resource Management Centers operated by WMA-WP (Waste Management Authority of the Western Province, n.d.). These products undergo frequent quality inspections carried out by the Authority, they are available as personalized solutions, where the blending process is tailored to meet the specific needs of farmers.

3. Registration of waste management related service providers

In accordance with Waste Management Regulations No. 01 of 2008, all entities engaged in waste management endeavors, excluding local government authorities, are subject to the oversight of provincial councils. These entities are required to acquire a valid license from the provincial council to carry out their services within the Western Province. The WMA-WP facilitates the standardization of services provided by these licensed entities.

4. Training programmes

WMA-WP provide specialized trainings for individuals engaged in waste management at various tiers. These comprehensive programmes are delivered through the "MIHISARU" Waste Management Field Research Training Centre (MWMFRC), located in Kesbewa. This center is registered with the Tertiary and Vocational Education Commission (TVEC) under the designation P01/0948. It conducts practical field research programmes and provides both on-site and off-site vocational training, offering a diverse range of courses tailored to multiple target audiences across different levels within the waste management.

5. Laboratory services

The "MIHISARU" Laboratory service is presently accessible to our esteemed clientele, encompassing those who require comprehensive test reports on compost quality, water quality, and other relevant aspects, thereby facilitating their attainment of various recognized certifications.

6. Awareness programmes on MSWM

The Authority conducts an array of awareness training for multitude of audiences including schools, pre-schools, government institute, hospitals, sanitary workers, community etc. These programmes include;

- PIVITHURU PASALA - Pristine Schools programme
- PIVITHURU AYATHNA - Pristine Institutions programme
- PIVITHURU SUWAPIYASA - Pristine Hospitals programme
- PIVITHURU PURA Program - Pristine Village programme
- PARISARA MITHURO - Environment Friends programme
- PARISARA KEKULO - Pre-school programme

(Waste Management Authority of the Western Province, n.d.).

2.5 Local Councils

The primary legislations pertaining to local government bodies encompass the Urban Councils Ordinance of 1939, the Municipal Councils Ordinance of 1947, and the Pradeshiya Sabhas Act of 1987 (No. 15) (Commonwealth Governance,2017). The local government shoulder the responsibility of overseeing day-to-day administration and supervision at the local level. Sri Lanka consists of nine second-tier provinces and a robust network of 341 third-tier local government entities, comprising 24 Municipal Councils, 41 Urban Councils, and 276 Pradeshiya Sabhas. (Commonwealth Governance, 2017).

The mandate of Local Councils entails the provision of services aimed at enhancing the comfort, convenience, and overall welfare of the community within their respective jurisdictions. The purview of responsibilities

undertaken by local authorities encompasses:

- Regulatory and administrative functions, ensuring compliance with regulations and efficient management of local affairs.
- Promotion of public health and sanitation, safeguarding the well-being and hygienic conditions of the community.
- Implementation of environmental sanitation measures, addressing waste management and pollution control to preserve the ecological balance.
- Maintenance and management of public thoroughfares and essential public utility services, such as water, electricity, and transportation infrastructure, to facilitate the smooth functioning of the community.

  (State Ministry of Provincial Councils and Local Government affairs, n.d.)

2.5.2 Local Councils and MSWM

Local Councils play a crucial role in the effective management of municipal solid waste, including night soil and wastewater, by undertaking various responsibilities in alignment with national policies and objectives. These responsibilities encompass the following:

1. Development of strategies and action plans: Local Councils are tasked with formulating comprehensive strategies and action plans for waste management in accordance with the national policy. These plans are aimed at achieving the objectives outlined in the national policy and are implemented in collaboration with relevant institutions at the local, provincial, and national levels.

2. Provision of infrastructure facilities: Local Councils are responsible for providing the necessary infrastructure facilities for the storage, treatment, and disposal of waste within their respective areas. This includes establishing suitable facilities and ensuring their efficient operation to effectively manage waste.

3. Maintenance of cleanliness: Collaborating with the general public, Local Councils strive to maintain cleanliness in their areas. This involves implementing measures to prevent haphazard disposal of waste, which can lead to environmental and health problems as well as public nuisance. By promoting cleanliness, Local Councils contribute to creating a hygienic and pleasant living environment for residents.

4. Introduction of incentive schemes: Local Councils introduce incentive schemes to encourage maximum citizen participation in waste management activities and minimize waste generation in their areas. These schemes aim to incentivize responsible waste disposal practices, recycling initiatives, and the adoption of sustainable waste management practices among the community.

5. Monitoring and evaluation: Local Councils continuously monitor and evaluate the performance of waste management activities in their areas. They regularly assess progress and report to national authorities and the general public, ensuring transparency and accountability. Feedback mechanisms are established to facilitate community engagement and incorporate public input in decision-making processes.

By fulfilling these responsibilities, Local Councils contribute significantly to the efficient and sustainable management of municipal solid waste. Their efforts help mitigate environmental and health risks, promote community participation, and foster a cleaner and healthier living environment for all residents.

2.6 Discussion

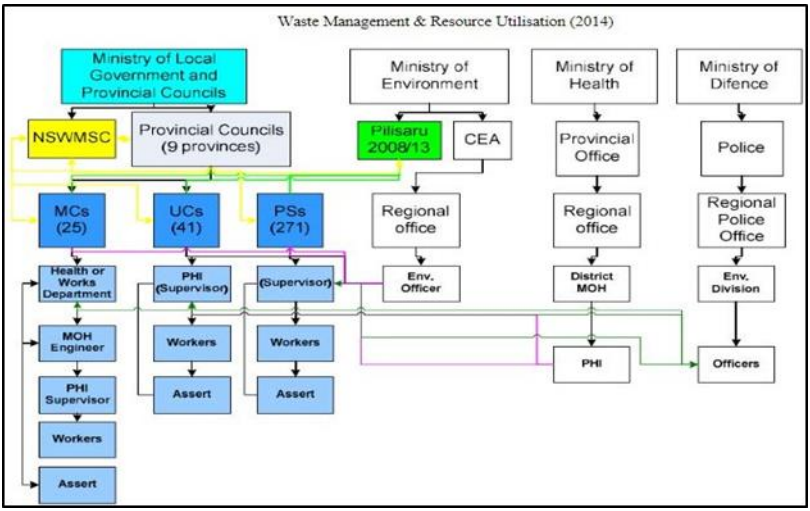
The municipal solid waste management (MSWM) system in Sri Lanka operates within a multi-tier governance framework, involving multiple levels of authority and coordination. At the national level, the Ministry of Environment, the Ministry of Local Government and Provincial Councils and Ministry of Health play crucial roles in setting policies, regulations, and standards for waste management. These ministries and their statutory institutions establish guidelines and frameworks that guide waste management

practices at lower levels of governance.

At the provincial level, Provincial Councils are responsible for implementing waste management plans and strategies within their respective regions. They coordinate with local authorities and stakeholders to ensure the effective collection, transportation, treatment, and disposal of solid waste. Provincial Councils also play a crucial role in allocating resources, providing technical support, and facilitating capacity building initiatives at the local level. Moreover, they collaborate with national agencies to align waste management practices with broader environmental objectives and sustainable development goals.

At the local level, Urban Councils, Municipal Councils, and Pradeshiya Sabhas are responsible for the day-to-day operations of waste management. These local authorities are tasked with the collection and transportation of waste, maintenance of waste disposal facilities, and public awareness campaigns.

Figure 2.3 Organization of MSWM infrastructure in Sri Lanka



Source: Kuruppuge & Karunarathna, 2014

2.6 Challenges of Decentralization in MSWM System

1. Fragmented responsibilities

One of the primary challenges in the decentralized MSWM infrastructure in Sri Lanka is the fragmentation of responsibilities among various stakeholders. The division of roles and responsibilities among local authorities, provincial councils, and central government agencies often leads to coordination challenges and a lack of clear accountability. At the local level, different municipalities are responsible for waste collection, transportation, and disposal within their respective jurisdictions. However, the absence of a centralized coordinating body often results in inconsistencies in waste management practices and a lack of standardized procedures.

Moreover, the involvement of multiple entities in waste management often leads to duplication of efforts and inefficiencies. For instance, there are overlapping responsibilities in waste disposal, resulting in redundant infrastructure and increased operational costs. Lack of coordination also hampers the sharing of best practices and the implementation of uniform waste management strategies across the country.

Furthermore, the fragmented responsibilities in decentralized MSWM infrastructure can hinder decision-making processes. Delays in obtaining approvals or consensus among different stakeholders can impede the implementation of critical waste management projects and initiatives. The lack of a streamlined decision-making structure can also slow down policy development and hinder the adoption of innovative approaches in waste management.

To address the challenges posed by fragmented responsibilities, it is crucial to establish clear lines of communication and coordination mechanisms among all stakeholders involved. Regular meetings and forums should be organized to facilitate collaboration and knowledge sharing. The establishment of a central coordinating body or inter-agency committees can help streamline decision-making processes and foster cooperation between different levels of government. Furthermore, it is important to define and allocate roles and

responsibilities clearly, ensuring that each entity understands its specific obligations within the MSWM framework. This can be achieved through the development of comprehensive guidelines and standard operating procedures that outline the responsibilities of each stakeholder. Regular monitoring and evaluation mechanisms should be implemented to ensure compliance and accountability.

Collaborative initiatives, such as joint waste management projects and resource-sharing agreements, can also be explored to optimize resources and enhance efficiency. By pooling resources and expertise, different entities can work together to address common challenges and share the costs of infrastructure development and waste management initiatives.

2. Unequal distribution of resources

Another significant challenge in MSWM in Sri Lanka is the unequal distribution of resources among different regions. The availability of resources such as infrastructure, equipment, and funding vary significantly across provinces and local authorities, leading to disparities in waste management capabilities and outcomes. In some areas, particularly urban centers and economically developed regions, there tends to be better access to resources and advanced waste management infrastructure. These areas often have well-established waste collection systems, treatment facilities, and trained personnel to handle waste management operations effectively. As a result, they are better equipped to address waste-related challenges and maintain a cleaner and healthier environment for their residents.

However, in less affluent regions and rural areas, the lack of adequate resources poses significant obstacles to effective waste management. These areas experience limited access to waste collection services, inadequate disposal facilities, and insufficient funding for waste management initiatives. Consequently, waste in these regions is more likely to be improperly disposed of, leading to environmental pollution, public health risks, and the degradation of local ecosystems.

The unequal distribution of resources also perpetuates social and economic inequalities. Disadvantaged communities, including low-income neighbourhoods and marginalized populations, often bear the brunt of inadequate waste management services. They are disproportionately affected by issues such as open dumping, unregulated waste burning, and the accumulation of waste in their surroundings, exacerbating health disparities and reducing their quality of life.

To address the challenge of unequal distribution of resources, it is crucial to prioritize and allocate resources more equitably across regions. Governments at the national and provincial levels should ensure that sufficient funding is allocated to support waste management initiatives in underserved areas. This may involve redistributing resources, providing financial assistance, and implementing targeted programmes to enhance waste management infrastructure and services in disadvantaged regions.

Furthermore, capacity-building programmes and technical assistance should be provided to empower local authorities in resource-constrained areas. This can include training programmes for waste management personnel, knowledge-sharing platforms, and access to expertise in waste management practices. By enhancing the skills and knowledge of local authorities, they can better manage waste resources and implement sustainable waste management practices within their respective jurisdictions.

Collaboration and partnerships between different stakeholders are also essential in addressing the unequal distribution of resources. Government agencies, non-governmental organizations, and private sector entities can join forces to mobilize resources, share expertise, and support initiatives aimed at improving waste management in underserved areas. Public-private partnerships can play a vital role in leveraging financial and technical resources to bridge the resource gap and enhance waste management capabilities in disadvantaged regions.

3. Lack of financial sustainability

Developing and maintaining an effective waste management system requires substantial financial resources, including investments in infrastructure,

equipment, human resources, and ongoing operational costs. However, the financial sustainability of waste management programmes is often compromised due to various factors.

Insufficient funding is a major obstacle to the development and improvement of waste management infrastructure and services. Many local authorities struggle to secure adequate financial resources to invest in waste collection, transportation, treatment, and disposal facilities. Limited budgets restrict their capacity to upgrade existing facilities, implement innovative technologies, and expand waste management coverage to underserved areas. Consequently, waste management operations may be compromised, leading to inadequate waste collection, improper disposal practices, and environmental pollution.

In addition to limited funding, the lack of a sustainable revenue generation mechanism for waste management further hampers financial sustainability. Most local authorities heavily rely on general taxation and government grants, which may not be sufficient to cover the full costs of waste management. Moreover, the revenue generated from waste management services, such as user fees or tariffs, is often insufficient to cover operational expenses and invest in necessary infrastructure upgrades. As a result, local authorities may struggle to meet the increasing demands and costs associated with effective waste management.

To ensure the financial sustainability of MSWM in Sri Lanka, it is crucial to explore alternative financing mechanisms and revenue generation models. One approach is to implement cost-recovery measures, such as user fees or pay-as-you-throw schemes, where households or businesses pay for the waste, they generate. This incentivizes waste reduction and proper waste management practices while generating revenue to support waste management operations. However, careful consideration should be given to affordability, especially for low-income households, to prevent inequitable burden sharing.

Another avenue for financial sustainability is the exploration of public-private partnerships (PPPs) and innovative financing mechanisms. Collaborations with the private sector can bring additional investment, expertise, and efficiency to waste management operations. PPPs can involve outsourcing waste collection, treatment, or disposal services to private entities, who can

then generate revenue through service fees or by utilizing waste as a resource for energy generation or recycling. However, the terms of such partnerships should be carefully negotiated to ensure transparency, accountability, and adherence to environmental and social standards.

Furthermore, tapping into potential funding sources such as international grants, climate finance mechanisms, and corporate social responsibility initiatives can provide additional financial support for waste management projects. Engaging in strategic partnerships with international organizations, development agencies, and private foundations can unlock funding opportunities and technical assistance to enhance waste management infrastructure and capacity.

To enhance financial sustainability, it is also crucial to improve cost-efficiency and resource optimization in waste management operations. This can be achieved through adopting innovative technologies, implementing waste-to-energy projects, promoting waste segregation and recycling, and exploring opportunities for value-added products derived from waste. These measures can not only reduce operational costs but also create potential revenue streams through the sale of recycled materials or energy produced from waste.

4. Centralization of MSWM due to failure of decentralization

In response to above discussed challenges there has been a tendency towards increasing central government control and decision-making authority. Accordingly, MSWM system is centralized around statutory organizations such as CEA, NSWMSC at national level and WMA-WP in the Western Province. Centralization allows the government to regain control over the fragmented responsibilities and address the lack of coordination among different levels of government. By centralizing decision-making processes, the government can establish standardized policies and regulations, ensuring consistency and uniformity in waste management practices across the country.

The increasing centralization in the MSWM system has significant implications for local autonomy and community participation. With centralized decision-making, local authorities may have limited autonomy in shaping waste management strategies that are tailored to their specific needs

and circumstances. This can hinder their ability to effectively address local waste management challenges and implement innovative solutions. Furthermore, centralization may reduce community participation and engagement in waste management processes. Local communities, which have valuable knowledge and insights into their specific waste management issues, may feel marginalized as decision-making is concentrated at the national and provincial level. The lack of local participation can lead to detachment between waste management policies and the realities on the ground, affecting the overall effectiveness and acceptance of waste management initiatives.

3. Regulation and Policies of MSWM in Sri Lanka

3.1 Introduction

Effective regulation and policies play a crucial role in ensuring sustainable waste management practices that protect the environment, public health, and promote resource efficiency. This chapter delves into the complex landscape of regulation and policies governing municipal solid waste management (MSWM) in Sri Lanka. It aims to provide a comprehensive analysis of the existing regulatory framework, policy initiatives, and institutional arrangements related to waste management. By critically examining the effectiveness and consequences of these regulations and policies, this chapter seeks to identify the challenges and opportunities in the MSWM sector and propose recommendations for a more robust and sustainable waste management system in Sri Lanka.

3.2 National level regulations

3.2.1 Nuisance Ordinance No. 62 of 1939

The Nuisance Ordinance No. 62 of 1939, enacted in Sri Lanka, plays a significant role in addressing various nuisances and regulating public health and environmental matters. This ordinance focuses on addressing activities or conditions that may cause annoyance, discomfort, or harm to individuals or the community at large. Specifically, in the context of Municipal Solid Waste Management (MSWM), section 2 of the Nuisance Ordinance imposes regulations and obligations related to waste disposal, prevention of noxious odors, and maintenance of cleanliness.

Section 2 of the Nuisance Ordinance No. 62 of 1939 in Sri Lanka outlines several offences related to maintaining a clean and healthy environment. These offences address issues that can potentially cause annoyance, discomfort, or harm to individuals and the community. Offenders of these offences may face fines not exceeding fifty rupees.

The first offence pertains to keeping a house or property in a filthy and unwholesome state, or allowing it to become overgrown with rank vegetation, which can pose a nuisance and be detrimental to public health.

"*(1) Keeping a house filthy state.*

> *Whosoever, being the owner or occupier of any house, building, or land in or near any road, street, or public thoroughfare, whether tenantable or otherwise, shall keep or suffer the same to be in a filthy and unwholesome state, or overgrown with rank and noisome vegetation, so as to be a nuisance to or injurious to the health of any person.*"
>
> (Nuisance Ordinance No. 62 of 1939)

The third offence focuses on the accumulation of dung, filth, or other offensive matter, which, if left unattended, can become a breeding ground for pests and pose health risks.

"(*3) Keeping an accumulation of dung.*

> *Whosoever, being the occupier of a house, building, or land in or near any road, street, or public thoroughfare, shall keep or allow to be kept for more than twenty-four hours, otherwise than in some proper receptacle any accumulation of dung, offal, filth, refuse, or other noxious or offensive matter, or suffer such receptacle to be in a filthy or noxious state, or neglect to employ proper means to remove the filth therefrom and to cleanse and purify the same.*" (Nuisance Ordinance No. 62 of 1939)

Lastly, the sixth offence emphasizes the importance of proper waste management, prohibiting the allowance of waste or stagnant water to remain on premises, as well as the overflowing of privies or cesspools.

"(*6) Suffering waste or stagnant water to remain.*

> *Whosoever shall suffer any waste or stagnant water or other matter to remain in any place within the premises occupied by him, or shall allow the contents of any privy or cesspool to overflow or soak therefrom."* (Nuisance Ordinance No. 62 of 1939)

3.2.2 National Environmental Act No. 47 of 1980

The National Environmental Act No. 47 of 1980 is a significant legislation that addresses environmental protection and conservation. Enacted in response to the growing concerns over environmental degradation, the Act serves as a comprehensive legal tool to regulate and manage various aspects of environmental preservation. It established the Central Environment Authority of Sri Lanka and provides it with Its provisions to act on a wide range of environmental issues, including pollution control, natural resource management, and waste management. The Act delineates the duties and responsibilities of CEA under the section 10 which includes taking action against disposing waste in a manner harmful to the environment.

"**10** *(b) to recommend to the Minister, national environmental policy and criteria for the protection of any portion of the environment with respect to the uses and values, whether tangible or intangible, to be protected, the quality to be maintained, the extent to which the discharge of wastes may be permitted without detriment to the quality of the environment and long-range development used and planning and any other factors relating to the protection and management of the environment*"

(The National Environmental Act No. 47 of 1980)

The clause (b) of section 10 of the Act includes provisions for the CEA to make recommendations to the Minister of Environment regarding enforcing national environmental policy and criteria to protect different aspects of the environment. These recommendations cover the preservation of tangible and intangible uses and values, the maintenance of environmental quality, the permissible discharge of wastes without negative impact on the environment and long-term development plans, as well as other factors related to environmental protection and management.

Clause 10(c) of the Act No. 47 of 1980 grants the CEA the authority to conduct surveys and investigations pertaining to the causes, nature, extent, and prevention of pollution. This provision allows the CEA to gather comprehensive data and knowledge about various forms of pollution, their

origins, and their potential impacts on the environment. Furthermore, it enables the CEA to collaborate and cooperate with other individuals or organizations that are engaged in similar surveys or investigations, fostering a collective approach to understanding and addressing environmental pollution

"***10*** *(c) to undertake surveys and investigations as to the causes, nature, extent and prevention of pollution and to assist and co-operate with other persons or bodies carrying out similar surveys or investigations"*

(The National Environmental Act No. 47 of 1980)

Clause 10(d) empowers the CEA to conduct, promote, and coordinate research on various aspects of environmental degradation and its prevention. This provision highlights the CEA's responsibility to generate scientific knowledge and understanding of environmental issues that pose threats to the ecosystem. By establishing these criteria, the CEA can guide policymaking, formulate effective regulations, and implement sustainable practices to safeguard the environment.

"***10*** (d) to conduct, promote and co-ordinate research in relation to any aspect of the environmental degradation or the prevention thereof, and to develop criteria for the protection and improvement of the environment"

(The National Environmental Act No. 47 of 1980)

Clause 10(e) empowers the CEA to specify standards, norms, and criteria for the protection of beneficial uses and the maintenance of environmental quality. This provision highlights the CEA's role in establishing benchmarks and guidelines to ensure that the environment is safeguarded, and its beneficial uses are protected. By specifying standards, the CEA sets clear expectations and requirements for various activities and industries that may have an impact on the environment. These standards encompass a wide range of factors, including air and water quality, waste management practices, noise pollution, and the protection of natural resources. By setting and enforcing these standards, the CEA aims to prevent environmental degradation, promote sustainable development, and safeguard the well-being of both human populations and

ecosystems.

"***10*** (e) to specify standards, norms and criteria for the protection of beneficial uses and for maintaining the quality of the environment*"*

(The National Environmental Act No. 47 of 1980)

Clause 10(f) of the National Environmental Act grants the CEA the authority to publish reports and information pertaining to various aspects of environmental protection and management. This provision highlights the CEA's responsibility to disseminate knowledge, raise awareness, and promote transparency in environmental matters. By publishing reports and information, the CEA aims to educate the public, policymakers, and stakeholders about environmental issues, trends, and initiatives. These publications may include research findings, monitoring reports, best practices, guidelines, and policy recommendations. By making this information widely accessible, the CEA contributes to the collective understanding of environmental challenges and facilitates informed decision-making.

"***10*** (f) to publish reports and information with respect to any aspects of environmental protection and management*"*

(The National Environmental Act No. 47 of 1980)

Clause 10(i) authorizes the CEA to provide information and education to the public concerning the protection and improvement of the environment. This provision recognizes the importance of public awareness and understanding in achieving effective environmental conservation. Through public outreach programmes, workshops, campaigns, and educational materials, the CEA strives to engage and inspire individuals to become active participants in environmental stewardship.

"***10*** (i) to provide information and education to the public regarding the protection and improvement of the environment"

(The National Environmental Act No. 47 of 1980)

Clause 10(k) grants the CEA the responsibility to report to the Minister on various matters pertaining to the protection and management of the environment. This provision highlights the CEA's role as an advisory body, providing expert recommendations and insights to the Minister of Environment. The CEA is entrusted with the task of examining existing legislation related to different aspects of the environment and suggesting any necessary amendments. By conducting comprehensive assessments and analysis, the CEA ensures that environmental laws and regulations remain relevant, effective, and in line with emerging environmental challenges and priorities. Additionally, the clause mandates the CEA to report on any matters referred to it by the Minister including MSWM, indicating the authority's responsiveness and readiness to address specific environmental concerns or inquiries. Through its reports, the CEA contributes to informed decision-making and policy development at the national level, enhancing the overall protection and management of the environment in Sri Lanka.

"***10*** (k) to report to the Minister upon matters concerning the protection and management of the environment and upon any amendments it thinks desirable in existing legislation concerning any portion of the environment, and upon any matters referred to it by the Minister"

(The National Environmental Act No. 47 of 1980)

Clause 12 of the Act empowers the CEA to issue directions to local authorities for the purpose of safeguarding and protecting the environment within their respective jurisdictions. With the concurrence of the Minister, the CEA can provide written directions to local authorities, either in a specific or general manner, requiring them to perform certain acts or take necessary measures such as proper management of MSW. These directions are based on the authority's assessment of what is necessary to ensure environmental preservation and sustainability.

It emphasizes the role of the CEA as a regulatory body with the power to guide and supervise local authorities in their environmental responsibilities. Importantly, the clause also mandates that local authorities must comply with the directions issued by the CEA, underscoring the importance of coordinated efforts and cooperation between the central and local levels of governance to effectively address environmental concerns and challenges. Through these provisions, the Act establishes a framework for collaboration and accountability among various authorities, contributing to the overall protection and conservation of the environment in Sri Lanka.

"*12. (1) The Authority may with the concurrence of the Minister, from time to time, give to any local authority in writing such directions whether special or general to do or cause to be done any act or thing which the Authority deems necessary for safeguarding and protecting the environment within the local limits of such local authority. Power to give directions to local authorities.*

(2) Every local authority to which a direction has been given under subsection (1) shall comply with such direction."

(The National Environmental Act No. 47 of 1980)

In conclusion, the National Environmental Act No. 47 of 1980 has been instrumental in establishing a comprehensive framework for proper municipal solid waste management (MSWM) in Sri Lanka. The Act has provided the legal basis for the creation of the Central Environmental Authority (CEA) and has outlined its roles and responsibilities in safeguarding the environment including MSWM. Furthermore, the Act empowers the CEA to give directions to local authorities, ensuring their compliance with the necessary measures for safeguarding and protecting the environment within their respective jurisdictions. This provision promotes a coordinated approach to MSWM, encouraging collaboration between the CEA and local authorities to address

the challenges and promote effective waste management practices.

3.2.2.1 Orders and Regulations on MSWM Issued by the CEA

Under the provisions delineated in the National Environment Act, CEA has issued numerous orders and regulations related to MSWM in Sri Lanka.

1. Order published under the Gazette Notification No. 1466/5 dated 10.10.2006

This Order imposes a prohibition on the manufacture, sale, and use of polythene products with a thickness of twenty (20) microns or below within the country. The purpose of this Order is to address the environmental concerns associated with the use of such polythene products. Polythene, as defined in this Order, encompasses various solid products, bags, materials, and contrivances made from polyethylene, polypropylene, polystyrene, poly vinyl chloride, polyethylene terephthalate, or similar raw materials used for carrying, packing, wrapping, or packaging.

"***Order under Section 23***

BY virtue of the powers vested in me by Section 23 W of the National Environmental Act, No. 47 of 1980 as amended from time to time, I, Maithripala Sirisena, Minister of Environment do by this Order, with effect from 1st of January 2007, prohibit-

(i) the manufacture of polythene or any polythene product of twenty (20) microns or below in thickness for in country use; and

(ii) the sale or use of polythene or any polythene product which is twenty (20) microns or below in thickness.

For the purposes of this Order "Polythene" means any solid products, bags, material or contrivances manufactured using all forms of polyethylene, polypropylene, polystyrene, poly vinyl chloride, polyethylene terephthalate or any other similar raw

material used for the purpose of carrying, packing, wrapping or packaging." (Gazette Notification No. 1466/5 dated 10.10.2006)

By prohibiting the manufacture and use of polythene products of specified thickness, this Order aims to mitigate the negative impacts of polythene waste on the environment. Polythene products of lesser thickness have been identified as major contributors to environmental pollution, including littering, clogging of drainage systems, and harm to wildlife.

This regulatory measure aligns with the objectives of the National Environmental Act, No. 47 of 1980, which seeks to protect and preserve the environment for present and future generations. It underscores the commitment of the Ministry of Environment to promote sustainable waste management practices and encourage the use of eco-friendly alternatives to polythene products.

2. Regulations published under the Gazette Notification No. 1534/18 dated 01.02.2008

Under the National Environmental (Protection and Quality) Regulations, No. 1 of 2008, the issuance of an Environmental Protection License is a compulsory requirement for the discharge, emission, or disposal of waste into the environment. This regulation prohibits any person from engaging in activities that may cause pollution or noise pollution without obtaining a license from the CEA and complying with the specified standards and criteria outlined in Schedule I of the regulation. According to the regulation, the CEA has the authority to impose more stringent standards and criteria, as deemed necessary, through directions issued under regulation 12. This ensures the protection of the receiving environment and emphasizes the CEA's commitment to safeguarding the environment from harmful pollutants and waste.

"***ISSUE OF ENVIRONMENTAL PROTECTION LICENSE FOR EMISSION OR DISPOSAL OF WASTE***

2. *No person shall, discharge, deposit or emit waste into the environment or carry on any prescribed activity determined by an Order made under Section 23A of the National Environmental Act, No. 47 of 1980 in circumstances which cause or are likely to cause pollution, or noise pollution, otherwise than;*

(a) under the Authority of a license issued by the Central Environmental Authority (hereinafter referred to as "the Authority");

and

(b)in accordance with the such standards and criteria specified in Schedule I hereto, in respect of the specified industries.

3. Notwithstanding anything contained in regulation 2, the Authority may, by a direction issued under regulation 12, impose more stringent standards and criteria than those specified in Schedule I hereto in respect of any prescribed activity, having regard to the need to protect the receiving environment."

(Gazette Notification No. 1534/18 dated 01.02.2008**)**

When an application for an environmental license is submitted for an activity not covered by the standards and criteria specified in Schedule I, the CEA assesses the application on its merits and grants the license while specifying the applicable standards and criteria. The applicant is obligated to comply with all directions issued by the CEA to ensure the protection of the environment. To apply for an environmental license, the applicant must submit a separate application for each prescribed activity and the application should be made at least thirty days prior to the commencement of the activity.

3. Order published under the Gazette Notification No. 2211/51 – 2021 of 2021.01.21

Under the Gazette Notification No. 2211/51 – 2021 of 2021.01.21 the use of Polyethylene terephthalate (PET) or polyvinyl chloride (PVC) material for packing agrochemicals in any process, trade, or industry is strictly prohibited. This measure aims to address the potential environmental and health risks associated with the use of these materials in the agricultural sector.

"(a) Polyethylene terephthalate (PET) or polyvinyl chloride (PVC) material for packing agrochemicals used for any process, trade or industry"

(Gazette Notification No. 2211/51 – 2021 of 2021.01.21)

*"**b)** any plastic item specified herein for any process, trade or industry: -*

(i) Sachets having less than or equal to a net volume of 20ml/ net weight of 20g (except for packing food and medicines).

(ii) Inflatable toys (except balloons, balls, water floating/pool toys and water sports gear).

(iii) Cotton buds with plastic stems (except plastic cotton buds used for medical/clinical treatment)"

(Gazette Notification No. 2211/51 – 2021 of 2021.01.21)

Further, the use of specific plastic items is also prohibited for any process, trade, or industry unless explicitly mentioned otherwise. These items include sachets with a net volume of 20ml or a net weight of 20g, inflatable toys, excluding balloons, balls, water floating/pool toys, and water sports gear. And cotton buds with plastic stems, except for those used in medical or clinical treatment, is also prohibited. This restriction seeks to minimize the use of single-use plastic items and encourage the adoption of more environmentally friendly alternatives.

In addition to the regulations discussed above the CEA has issued regulations and guidelines that concerns MSWM. These include:

- Order to prohibit the Manufacture of Polythene or any Polythene product, 20 microns & below - Gazette Notification 2034/33 of 2017.09.01
- Order to prohibit the Manufacture of Food Wrappers. (Lunch Sheet) etc. - Gazette Notification 2034/34 of 2017.09.01
- Order to prohibit the Manufacture of any bag of high density (Grocery Bag) - Gazette Notification 2034/35 of 2017.09.01
- Order to prohibit burning of refuse and other combustible matters inclusive of Plastic- Gazette Notification 2034/36 of 2017.09.01
- Order to prohibit the use of Polyethylene products as Decorations - Gazette Notification 2034/37 of 2017.09.01
- Order to prohibit the manufacture of food containers, plates, cups, spoons from expanded Polystyrene - Gazette Notification 2034/38 of 2017.09.01
- Regulations No. 01 of 2021, Plastic Material Identification Standards - Gazette Notification 2034/38 of 2017.09.01

The regulations on MSWM issued by the CEA in Sri Lanka, with their strong emphasis on waste reduction, represent a positive deviation from the conventional post-generation management approach. By imposing restrictions on the use of certain materials and promoting sustainable alternatives, these regulations encourage businesses, industries, and individuals to adopt practices that minimize waste generation. This approach aligns with international best practices and recognizes the need for a circular economy, where resources are conserved, waste is minimized, and materials are reused or recycled. By reducing waste generation, these regulations contribute to the conservation of natural resources, the prevention of pollution, and the protection of the environment.

3.3 Local level regulations

This section discusses the national level regulations relevant to MSWM in Sri Lanka. The regulations examined include,

- Urban Council Ordinance No. 61 of 1939
- Municipal Councils Ordinances No. 16 of 1947
- Pradeshiya Sabha Act No. 15 of 1987

These regulations provide the legal framework for MSWM practices and set forth guidelines and requirements for waste management at the national level.

3.3.1 Urban Council Ordinance No. 61 of 1939

The Urban Council Ordinance No. 61 of 1939 holds a significant place in Sri Lanka's municipal solid waste management regulation as it is the oldest regulation on MSWM. Sections 118, 119, and 120, addresses the responsibilities and obligations of the Urban Council regarding conservancy and scavenging.

As per section 118 outlines the duty of the Urban Council to take all necessary measures to ensure proper sweeping and cleansing of the streets, collection and removal of street refuse, as well as the removal and cleansing of house refuse, latrines, and cesspits. Additionally, the section emphasizes the proper disposal of all street refuse, house refuse, and night-soil.

"***118.*** *It shall be the duty of the Urban Council of each town, so far as is reasonably practicable, to take all necessary measures in every part of the town*

(a) for properly sweeping and cleansing the streets, including the footways, and for collecting and removing all street refuse;

(b) for securing the due removal at proper periods of all

house refuse, and the due cleansing and emptying at proper periods of all latrines and cesspits; and

(c) for the proper disposal of all street refuse, house refuse, and night-soil."

(Urban Council Ordinance No. 61 of 1939)

Section 119 establishes that any street refuse, house refuse, night-soil, or similar matter collected by the Urban Council becomes the property of the Council. The Council is granted full power to sell or dispose of such matter as they see fit. This provision highlights the Council's authority over the collected waste and its ability to manage its disposal effectively.

"**119.** *All street refuse, house refuse, night-soil, or other similar matter collected by any Urban Council under the provisions of this Part shall be the property of the Council, and the Council shall have full power to sell or dispose of all such matter."*

(Urban Council Ordinance No. 61 of 1939)

Furthermore, Section 120 mandates that the Urban Council must provide suitable locations for the proper disposal of street refuse, house refuse, night-soil, and similar matter. These designated places are intended to ensure the appropriate disposal of waste without causing any nuisance. The Council is also required to maintain the necessary facilities, vehicles, animals, implements, and other resources needed for waste management activities.

"120. *Every Urban Council shall, from time to time, provide places convenient for the proper disposal of all street refuse, house refuse, night soil, and similar matter removed in accordance with the provisions of this Part, and for keeping all vehicles, animals, implements, and other things required for that purpose or for any of the other purposes of this Ordinance, and shall take all such measures and precautions as may be necessary to ensure that no such refuse, night-soil, or similar matter removed in accordance with the provisions of this Part is disposed of in*

such a way as to cause a nuisance.

(Urban Council Ordinance No. 61 of 1939)"

3.3.2 Municipal Councils Ordinances No. 16 of 1947

The Municipal Councils Ordinance No. 16 of 1947 in Sri Lanka has embraced and incorporated all the relevant regulations pertaining to MSWM as outlined in the Urban Council Ordinance No. 61 of 1939 under sections 129,130 and 131 of the Ordinance.

Section 129 of the Urban Council Ordinance establishes the duty of the Municipal Council to undertake essential measures for the effective management of waste. It outlines the Council's responsibility to ensure the proper sweeping and cleansing of the streets, including the footways, and the collection and removal of all street refuse. Furthermore, it highlights the Council's obligation to facilitate the timely and appropriate removal of house refuse, as well as the regular cleansing and emptying of latrines and cesspits.

"***129.*** *It shall be the duty of the Council of each town, so far as is reasonably practicable, to take all necessary measures in every part of the Municipality*

(a) for properly sweeping and cleansing the streets, including the footways, and for collecting and removing all street refuse;

(b) for securing the due removal at proper periods of all house refuse, and the due cleansing and emptying at proper periods of all latrines and cesspits; and

(c) for the proper disposal of all street refuse, house refuse, and night-soil."

(Municipal Councils Ordinance No. 16 of 1947)

Section 130 states that once the Urban Council collects any street refuse, house refuse, night-soil, or similar matter, it becomes the property of the Council. This provision establishes the Council's ownership and control over the collected waste. With this power, the Council can make informed decisions regarding the sale or appropriate disposal of the waste in a manner that aligns with their waste management strategies and objectives.

"**130.** *All street refuse, house refuse, night-soil, or other similar matter collected by any Municipality under the provisions of this Part shall be the property of the Council, and the Council shall have full power to sell or dispose of all such matter."*

(Municipal Councils Ordinance No. 16 of 1947)

Section 131 emphasizes the Council's responsibility to establish suitable sites where street refuse, house refuse, night-soil, and similar matter can be disposed of in a proper manner. By mandating the provision of these designated places, the section seeks to ensure that waste is disposed of in a manner that minimizes any potential nuisance or harm to public health and the environment. The Council is tasked with identifying and maintaining these locations, taking into consideration factors such as accessibility, proximity to residential areas, and the capacity to handle the waste generated within their jurisdiction.

"131. *Every Urban Council shall, from time to time, provide places convenient for the proper disposal of all street refuse, house refuse, night soil, and similar matter removed in accordance with the provisions of this Part, and for keeping all vehicles, animals, implements, and other things required for that purpose or for any of the other purposes of this Ordinance, and shall take all such measures and precautions as may be necessary to ensure that no such refuse, night-soil, or similar matter removed in accordance with the provisions of this Part is disposed of in such a way as to cause a nuisance.*

(Urban Council Ordinance No. 61 of 1939)"

3.3.3 Pradeshiya Sabha Act No. 15 of 1987

The Pradeshiya Sabha Act No. 15 of 1987 in Sri Lanka has embraced and incorporated all the relevant regulations pertaining to MSWM as outlined in the Urban Council Ordinance No. 61 of 1939 under sections 93, 94 and 95 of the Act. These Sections delve into the specific provisions and responsibilities of Pradeshiya Sabhas in managing and regulating waste within their jurisdictions.

Section 93 explicitly assigns the Sabha the duty to undertake essential actions to ensure the proper cleanliness and sanitation of the streets, including footways, through regular sweeping and cleansing activities. Additionally, it emphasizes the Sabha's responsibility in the collection and prompt removal of all street refuse. Furthermore, the section underscores the Sabha's obligation to facilitate the timely and appropriate disposal of house refuse, as well as the regular cleaning and emptying of latrines and cesspits.

"***93.*** *It shall be the duty of the* Pradeshiya Sabha *of each town, so far as is reasonably practicable, to take all necessary measures in every part of the Municipality*

(a) for properly sweeping and cleansing the streets, including the footways, and for collecting and removing all street refuse;

(b) for securing the due removal at proper periods of all house refuse, and the due cleansing and emptying at proper periods of all latrines and cesspits; and

(c) for the proper disposal of all street refuse, house refuse, and night-soil." (Pradeshiya Sabha Act No. 15 of 1987)

Section 94 of the Act unequivocally asserts that once the Pradeshiya Sabha collects street refuse, house refuse, night-soil, or any similar matter, it assumes ownership of such waste. This crucial provision firmly establishes the Council's authority and control over the collected waste materials. By owning the waste, the Council possesses the necessary discretion and jurisdiction to

make well-informed decisions regarding the subsequent actions taken, whether it involves the sale or appropriate disposal of the waste.

"**94.** *All street refuse, house refuse, night-soil, or other similar matter collected by any Municipality under the provisions of this Part shall be the property of the Pradeshiya Sabha, and the Pradeshiya Sabha shall have full power to sell or dispose of all such matter."*

(Pradeshiya Sabha Act No. 15 of 1987)

Section 95 of the Urban Council Ordinance places significant emphasis on the crucial duty of the Sabha to establish appropriate sites for the disposal of street refuse, house refuse, night-soil, and other similar matter. The section underscores the Sabha's responsibility to designate specific locations that facilitate the proper and responsible disposal of waste. By doing so, the section aims to mitigate potential nuisances and safeguard public health and the environment. The Sabaha is entrusted with the task of identifying and maintaining these designated sites, taking into account factors such as accessibility, proximity to residential areas, and the capacity to effectively handle the waste generated within their jurisdiction.

"95. *Every* Pradeshiya Sabha *shall, from time to time, provide places convenient for the proper disposal of all street refuse, house refuse, night soil, and similar matter removed in accordance with the provisions of this Part, and for keeping all vehicles, animals, implements, and other things required for that purpose or for any of the other purposes of this Ordinance, and shall take all such measures and precautions as may be necessary to ensure that no such refuse, night-soil, or similar matter removed in accordance with the provisions of this Part is disposed of in such a way as to cause a nuisance.*

(Pradeshiya Sabha Act No. 15 of 1987)"

The existing ordinances and acts discussed above have played a pivotal role in regulating MSWM practices in local councils. They have established the duties and responsibilities of the council's, ensuring the proper collection,

removal, and disposal of waste. These laws have empowered local councils to manage waste-related activities within their jurisdictions, promoting cleanliness, hygiene, and public well-being. However, it is noteworthy that these laws have remained unchanged for several decades. This raise concerns as waste management dynamics have significantly evolved over the years. The rates of waste generation have increased, driven by population growth, urbanization, and changes in consumption patterns. Moreover, the types of waste generated have become more diverse and complex, including electronic waste, plastic waste, and hazardous materials. The frequency of waste generation has also intensified, necessitating more frequent collection and disposal activities. Furthermore, there has been a paradigm shift in waste management practices, with an increasing emphasis on waste reduction, recycling, and sustainable disposal methods.

Given these evolving challenges, it is imperative to reevaluate the existing laws pertaining to MSWM in local councils. The lack of revisions and updates may hinder the councils' ability to effectively address the emerging waste management issues and meet the expectations of sustainable waste management practices. Revisions should aim to incorporate new waste management strategies, technology advancements, and international best practices to ensure optimal waste management outcomes.

3.4 National policies on MSWM

1. National policy on waste management - 2020

The issuance of the National Policy on Waste Management - 2020 by the Environment Pollution Control and Chemical Management Division of the Ministry of Environment marks a significant step towards addressing the complex challenges of waste management in the country. The policy sets out to provide comprehensive guidance for managing various types of waste, encompassing solid, liquid, and gaseous waste streams.

It places a strong emphasis on the involvement of local communities in waste management processes, recognizing their vital role in ensuring accountability and responsibility. By adhering to the principle of common but differentiated

responsibility, the policy underscores the importance of collaboration and accountability in achieving sustainable waste management practices. This policy lays a foundation for a more integrated and effective approach to waste management in Sri Lanka, aiming to safeguard the environment and promote a sustainable future.

The National Waste Management Policy encompasses a wide range of waste types and addresses specific policies related to solid, liquid, and gaseous waste. It includes policies pertaining to,

1. municipal solid waste
2. packaging waste
3. Industrial waste
4. construction and demolition waste
5. healthcare waste
6. electrical and electronic waste (e-waste)
7. radio-active (solid) waste
8. marine waste, and food, agriculture, and livestock waste

(National policy on waste management, 2020)

In addition to waste-specific policies, the document includes policy statements related to knowledge management and capacity building, encompassing education and awareness creation, skills development, training, research and development, technology development, usage and transfer, and infrastructure development. It emphasizes the integration of waste management with other supporting policies and national action plans.

The policy also outlines institutional mechanisms, coordination, and communication, including the roles and responsibilities of national, provincial, and local authorities, the involvement of public and private sectors, community and non-governmental organizations, and the importance of building partnerships. Monitoring, evaluation, feedback, and reporting are integral components of the policy, covering the performance of waste

management processes/systems, institutions, and enforcement authorities. It also emphasizes the contribution and satisfaction of citizens, civil societies, community organizations, and community representatives, as well as the cleanliness and aesthetic appearance of the entire country. The policy document includes provisions for legal and enforcement mechanisms, financial mechanisms, non-financial incentives, compliance with international treaties and conventions, and outlines the way forward. Stakeholder responsibilities and relationships are further detailed in the annex of the policy document.

Overall, the National Waste Management Policy provides a comprehensive framework for addressing waste management challenges, promoting sustainable practices, and ensuring the protection of the environment and public health in Sri Lanka.

2. National Solid Waste Management Policy of Sri Lanka – 2007

The National Solid Waste Management Policy of Sri Lanka, implemented in 2007, serves as a comprehensive framework to address the growing challenges of solid waste management in the country.

The policy is designed to achieve several key objectives. Firstly, it aims to minimize the generation of solid waste by promoting waste reduction, reuse, and recycling practices. This objective reflects the policy's commitment to transitioning from a linear waste management approach to a circular economy model, where waste is considered a resource and its generation is minimized.

Secondly, the policy seeks to ensure the environmentally sound disposal of residual waste through the establishment of appropriate waste treatment and disposal facilities. This objective emphasizes the need for proper waste segregation, collection, and disposal techniques to minimize environmental pollution and health hazards associated with improper waste management practices. Thirdly, the policy focuses on promoting the concept of extended producer responsibility (EPR), placing the responsibility on manufacturers and importers to manage the entire lifecycle of their products, including their eventual disposal. By implementing EPR, the policy aims to incentivize

producers to design eco-friendly products, reduce packaging waste, and take responsibility for the proper disposal or recycling of their products.

Furthermore, the policy highlights the importance of public awareness and education in waste management. It emphasizes the need to educate and engage the public on waste reduction, segregation, and recycling practices. By promoting awareness and knowledge, the policy aims to foster a sense of responsibility among citizens and encourage their active participation in waste management initiatives. The policy also emphasizes the significance of institutional capacity building, research and development, and the integration of waste management into broader development plans. It recognizes the need for collaboration between various stakeholders, including government agencies, local authorities, private sector entities, non-governmental organizations, and the community, to effectively implement waste management strategies.

3. Technical guidelines on solid waste management in Sri Lanka

Technical Guidelines on Solid Waste Management serve as a vital resource for waste management practitioners, government agencies, and other stakeholders. These guidelines, prepared by the Hazardous Waste Management Unit of the Pollution Control Division of the Central Environmental Authority, offer a comprehensive framework for managing municipal solid waste in an environmentally responsible manner.

The guidelines primarily focus on municipal solid waste, which encompasses waste generated from households, commercial establishments, institutions, and public spaces. The guidelines provide technical guidance on various aspects of solid waste management to ensure efficient and sustainable practices. Notably, the guidelines do not encompass sewage management, hazardous waste, including medical waste, and hazardous industrial waste, as these require specific regulations and specialized approaches.

Waste collection and transfer

One of the key components addressed in the guidelines is waste collection. It emphasizes the importance of proper waste segregation at the source and the

use of suitable containers for waste storage. The guidelines provide recommendations on collection frequency, routes, and transportation methods. Waste transfer stations are also addressed, highlighting the need for proper design, location, and operational procedures to ensure efficient waste transfer and minimize environmental impacts.

Recovery of useful components

The guidelines recognize the potential for resource recovery from solid waste and emphasize the importance of promoting recycling, composting, and other recovery methods. They provide guidance on the establishment and operation of material recovery facilities, composting plants, and recycling centers. The guidelines encourage the integration of informal waste collectors and recyclers into the formal waste management system to enhance resource recovery efforts.

Waste incineration and composting

The guidelines address waste incineration and composting as alternative waste treatment methods. They outline the requirements for the design, operation, and maintenance of incineration facilities to ensure proper combustion, emission control, and ash disposal. Additionally, the guidelines provide technical guidance on composting methods, including the selection of appropriate composting technologies, waste sorting, pile construction, and compost quality control.

Biogas Generation and Landfilling

The guidelines also cover biogas generation from organic waste and landfill management. They provide technical guidance on the design and operation of biogas generation systems, highlighting the potential for energy recovery and greenhouse gas reduction. In terms of landfilling, the guidelines emphasize the need for proper site selection, design, and operation to minimize environmental contamination and ensure long-term stability and safety.

Monitoring, Compliance, and Capacity Building

To ensure the effectiveness of waste management practices, the guidelines emphasize the importance of monitoring, evaluation, and reporting. They provide guidance on waste management performance assessment, monitoring of environmental impacts, and the development of reporting systems.

4. National Action Plan on Plastic Waste Management 2021-2030.

The Ministry of Environment in Sri Lanka, in collaboration with the IGES Centre Collaborating with UNEP on Environmental Technologies (CCET) and the United Nations Environment Programme (UNEP) International Environmental Technology Centre (IETC), has developed the National Action Plan on Plastic Waste Management for the period of 2021-2030 (National Action Plan on Plastic Waste Management, 2021). The plan aims to transition from a linear economy to a circular economy, where waste from one industry becomes a valuable resource for another, creating eco-industrial zones and paving the way for a green economy (National Action Plan on Plastic Waste Management, 2021).

The National Action Plan aligns with the National Policy on Waste Management and the National Policy on Sustainable Consumption and Production Policy (National Action Plan on Plastic Waste Management, 2021).

It prioritizes the 3R approach and aims to work towards Zero Landfill. The plan emphasizes the need to collect segregated plastic waste and promote recycling as a profitable business to produce high-quality raw materials for the plastic industry.

The plan recognizes the importance of managing the plastic industry itself through the application of 3Rs and strategies such as cleaner production. While in-house recycling within the industry is well-established, there is a need to address challenges related to the unsorted and soiled nature of post-consumer plastic waste. To achieve its objectives, the plan emphasizes the importance of collaboration and networking among regional participants in the 3R conferences initiated by the United Nations Centre for Regional Development. It recognizes the potential of the plastic industry in managing plastic waste

effectively and highlights the need for cleaning and grading recycled materials to meet market demands and ensure quality. By adopting a preventative approach and promoting the 3R principles, the plan aims to transition to a circular economy, reduce plastic pollution, and create a sustainable and environmentally conscious future.

3.5 Role of Pressure Groups in Influencing MSWM in Sri Lanka

In the realm of solid waste management in Sri Lanka, pressure groups exert significant influence through their active involvement in advocating for sustainable waste management practices and shaping policies in the country. These pressure groups encompass a diverse range of organizations, associations, and community-based initiatives that strive to address environmental concerns, promote public health, and foster sustainable development.

By engaging in lobbying, advocacy campaigns, and collaborative efforts with relevant stakeholders, these groups work towards creating awareness, mobilizing public support, and influencing decision-making processes in solid waste management. Their collective efforts aim to drive positive change, enhance waste management systems, and establish a more sustainable and environmentally responsible approach to handling solid waste in Sri Lanka.

3.5.1 Academics

Academics play a crucial role as a pressure group in influencing MSWM policies and practices in Sri Lanka. As experts in their respective fields, academics possess in-depth knowledge and understanding of the environmental, social, and economic aspects of waste management. They actively engage in research, analysis, and advocacy to promote sustainable and effective MSWM strategies.

One of the key activities carried out by academics is conducting research on various aspects of waste management, including waste generation, composition, treatment technologies, and environmental impacts. Through their research findings, academics generate valuable insights and evidence-based recommendations that contribute to the development of informed

policies and practices. They analyze the challenges and opportunities within the existing MSWM framework and propose innovative solutions to address them.

Academics also play an important role in providing technical expertise and guidance to policymakers, government agencies, and local authorities involved in waste management. They participate in policy dialogues, expert committees, and advisory boards to share their knowledge and expertise. By actively engaging with decision-makers, academics have the opportunity to influence the formulation and implementation of MSWM policies. They provide recommendations and suggestions for improving waste management practices, incorporating sustainable approaches, and aligning policies with international best practices.

Furthermore, academics contribute to capacity building and knowledge dissemination in the field of waste management. They organize training programmes, workshops, and conferences to enhance the understanding and skills of waste management professionals, policymakers, and stakeholders. Through these capacity-building initiatives, academics empower individuals and organizations with the necessary knowledge and tools to implement effective waste management practices.

The influence of academics extends beyond the academic realm. They often collaborate with civil society organizations, non-governmental organizations, and community groups to raise awareness about the importance of proper waste management and advocate for sustainable practices. Through public lectures, seminars, and awareness campaigns, academics aim to educate the general public about waste-related issues and promote behavioral changes that contribute to waste reduction and recycling.

3.5.2 Religious leaders

Religious leaders, particularly Buddhist monks, have emerged as a prominent pressure group in MSWM in Sri Lanka (Jayasinghe, 2019). Given the strong influence of Buddhism in the country, Buddhist monks hold significant traditional authority and command widespread respect in society. Their involvement in protests against garbage disposal not only garners substantial

public attention but also has the potential to mobilize the masses (Dayananda, 2017).

Buddhist monks play a crucial role in organizing and leading protests against the disposal of garbage at various sites such as Aruwakkalu and Karadiyana (Jayasinghe, 2019). Their participation lends legitimacy and justification to these protests, amplifying their impact. For instance, in a protest held in August 2019 at Aruwakkalu, over 1000 demonstrators, including religious leaders such as the Chief Incumbent of the Buddhist Centre in Puttalam, Ven. Udukadana Kusaladamma Thera, Kurukkal S. Sundarama, Moulavi Abdullah Mohomad Ali, and Wanathawillu Parish Priest, Christy Perera, voiced their concerns about the inadequate waste management practices in the area. These religious leaders hold a significant sway over their followers and their involvement in the protests adds moral and ethical weight to the cause (Dayananda, 2017).

Religious leaders have expressed skepticism about government assurances regarding the implementation of sanitary landfills that adhere to international standards (Jayasinghe, 2019). Their involvement in the protests stems from the Meethotamulla crisis in 2017, which caused widespread fear and sparked a series of demonstrations in Karadiyana (Dayananda, 2017). These protests aimed to prevent future disasters and featured the active participation of Buddhist monks and other religious leaders within the local community. Through their involvement, these religious leaders successfully advocated for the cause, raising public awareness about the pressing issue of proper waste management. Their position as moral influencers allow them to emphasize the importance of environmental stewardship and responsible waste management practices, resonating with the values and beliefs of their followers (Jayasinghe, 2019).

Moreover, the involvement of religious leaders in waste management issues extends beyond protests and demonstrations. They often engage in dialogue with government authorities, policymakers, and other stakeholders to influence decision-making processes related to waste management policies and practices. Their insights, based on spiritual and ethical principles, provide valuable perspectives on sustainable waste management and the preservation

of the environment (Dayananda, 2017). Religious leaders actively participate in public forums, workshops, and conferences where they share their knowledge and experiences, advocating for more environmentally friendly approaches to waste management.

However, it is important to note that religious leaders and politicians have engaged in debates and disagreements regarding the issue of waste disposal. Former Minister of Megapolis and Western Development, Patali Champika Ranawaka, criticized religious leaders and politicians for disseminating misinformation and leveraging the issue for political gain (Hemmathagama, 2019). Such exchanges highlight the complex dynamics and diverse perspectives within the pressure group of religious leaders.

Through their traditional authority, mobilization capabilities, and public support, religious leaders have the potential to shape policies and bring about positive changes in the field of waste management. Their active engagement in waste management issues showcases the power of moral and ethical influence in driving societal change and promoting sustainable practices for the benefit of the environment and future generations.

3.5.3 Youth protesters

The youth of Sri Lanka, comprising 27% of the population, continue to make significant contributions as a pressure group in the field of Municipal Solid Waste Management (MSWM). Their involvement in protests against garbage disposal in areas such as Aruwakkalu and Karadiyana showcases their active role in advocating for better waste management practices (Jayasinghe, 2019).

In their pursuit of addressing the challenges of waste mismanagement, the youth engage in a wide range of activities. They utilize social media platforms and digital communication channels to amplify their voices, raise awareness, and mobilize support for their cause. Through the power of online platforms, they can connect with a broader audience and inspire collective action towards sustainable waste management.

Moreover, the youth establish and participate in youth-led organizations and environmental clubs, both in educational institutions and within local

communities. These groups serve as platforms for young individuals to collaborate, organize clean-up drives, recycling initiatives, and awareness campaigns. By actively involving their peers and the wider community, they cultivate a culture of environmental responsibility and educate others about the importance of proper waste disposal.

The influence of the youth as a pressure group is not limited to direct activism. They also engage in policy discussions, public consultations, and workshops focused on waste management. By participating in these forums, the youth provide valuable insights, innovative ideas, and critical perspectives. Their involvement challenges traditional approaches to waste management and fosters the adoption of more sustainable practices. The nature of the youth's influence lies in their ability to bring attention to critical environmental issues, foster dialogue, and drive change. Their passionate advocacy and persistent efforts compel policymakers, communities, and stakeholders to address the pressing concerns surrounding waste management. By raising public awareness, challenging the status quo, and promoting sustainable solutions, the youth shape the discourse and push for transformative actions.

Their engagement in protests, utilization of social media platforms, establishment of youth-led organizations, participation in policy discussions, and collaboration with diverse stakeholders demonstrate their commitment to addressing the challenges of waste mismanagement. The youth's collective efforts foster a culture of environmental consciousness, inspire positive behavioral changes, and contribute to the realization of sustainable waste management practices.

3.5.4 International and local non-governmental organizations

NGOs and International Non-Governmental Organisations (INGOs) continue to play a significant role as pressure groups in MSWM in Sri Lanka, with their influence extending beyond awareness creation and advocacy. These organizations actively engage in research, policy analysis, and monitoring to ensure the effective implementation of waste management practices. They also collaborate with local communities, educational institutions, and other stakeholders to foster behavior change and promote sustainable waste management practices.

The involvement of NGOs, INGOs, and international organizations as pressure groups in solid waste management is crucial for creating awareness, advocating for sustainable practices, and pressuring the government to prioritize effective waste management strategies. These organizations bring expertise, resources, and a collective voice to address the pressing environmental challenges associated with solid waste and work towards promoting a cleaner and more sustainable future.

Furthermore, NGOs and INGOs actively participate in policy formulation and implementation processes related to waste management. They provide technical expertise and recommendations to government bodies, contributing to the development of comprehensive waste management policies and regulations. Through their participation in stakeholder consultations, working groups, and task forces, these organizations ensure that the voices of the community and the environment are heard and integrated into decision-making processes.

NGOs and INGOs also play a crucial role in capacity building and training programmes. They organize workshops, seminars, and training sessions to enhance the knowledge and skills of individuals and communities in waste management practices. By empowering local communities, particularly youth and women, with the necessary tools and knowledge, these organizations promote community-led initiatives and sustainable waste management solutions.

In addition to research and advocacy, NGOs and INGOs implement practical initiatives to address solid waste management challenges. They establish waste management infrastructure, such as recycling centers and composting facilities, in collaboration with local communities. These initiatives create opportunities for waste reduction, segregation, and recycling, thereby contributing to the overall improvement of waste management practices at the grassroots level.

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management practices. By empowering local communities, particularly youth and women, with the necessary tools and knowledge, these organizations promote community-led initiatives and sustainable waste management solutions.

One prominent NGO in Sri Lanka is the Centre for Environmental Justice (CEJ), which has been actively involved in protesting against unsustainable MSWM practices carried out by the central government (Centre for Environmental Justice, n.d.).The CEJ has questioned the sustainability and cost-benefit ratio of the government's decision to transport solid waste collected within the Colombo Municipal Council to the Aruwakkalu Sanitary Landfill in Puttalam using rail carts (Centre for Environmental Justice, n.d.). Through their protests and advocacy efforts, the CEJ aims to highlight the potential environmental and social impacts of such practices and push for more sustainable alternatives.

Additionally, international organizations such as the United Nations and its affiliates also act as pressure groups in environmental concerns, including solid waste management. The United Nations Development Programme (UNDP) in Sri Lanka has been actively engaged in supporting waste management initiatives. In collaboration with the Kaduwela Municipal Council, the UNDP initiated a Government Co-Financed project to manage solid waste in the area and effectively generate biogas energy (UNDP, 2016).

Under the "Every Drop Matters" Project, the UNDP provided technical assistance to the Kaduwela Municipal Council to pilot the Solid Waste Management Project (UNDP, 2016). This initiative contributed to the "Pavithra Ganga Programme" of the Ministry of Environment. Through partnerships with local organizations like Janathakshan, the UNDP tested and implemented innovative treatment technologies and adapted locally designed biogas technology for waste management (UNDP, 2016).

3.5.5 Civil movements

Civil movements play a significant role as pressure groups in advocating for improved solid waste management practices. In addition to their protests and

legal actions, civil movements involved in MSWM also engage in various other activities to influence change. One such activity is community mobilization and awareness campaigns. Civil movements often organize community meetings, awareness workshops, and educational sessions to inform the public about the environmental and health impacts of improper waste management practices. By disseminating information and fostering a sense of collective responsibility, these movements empower individuals to take action and demand better waste management solutions.

Furthermore, civil movements actively collaborate with other stakeholders, including NGOs, academic institutions, and local communities, to strengthen their advocacy efforts. They form alliances, partnerships, and networks to amplify their voices and increase their influence. These collaborations allow for the exchange of knowledge, expertise, and resources, which enhances the effectiveness of their campaigns and advocacy initiatives. Civil movements also leverage social media platforms and other communication channels to raise awareness, mobilize support, and exert pressure on relevant authorities.

The nature of civil movements' influence over MSWM lies in their ability to disrupt the status quo and challenge existing practices. By bringing attention to the shortcomings of waste management systems, they create a sense of urgency and demand immediate action. Their protests and public demonstrations attract media coverage, which further amplifies their message and increases public awareness of the issue. This heightened visibility often prompts government officials and policymakers to take notice and respond to the demands of the civil movements.

Moreover, civil movements influence MSWM policies and decision-making processes through their active participation in public consultations, hearings, and stakeholder engagements. They provide valuable insights, recommendations, and alternative solutions based on their on-the-ground experiences and knowledge. Their input and expertise shape policy discussions and contribute to the development of more sustainable waste management strategies.

One notable example of civil movement is the People's Movement against the Meethotamulla, Kolonnawa Garbage Dump (PMMKGD) in Sri Lanka. The PMMKGD emerged as a civil movement in response to the unsustainable MSWM practices in the Meethotamulla area. Community members organized themselves and staged multiple protests to voice their concerns and demand better waste management solutions (Jayanetti, 2018).The PMMKGD not only engaged in protests but also utilized legal avenues to challenge the authorities responsible for the Meethotamulla landfill. They filed Fundamental Rights cases and continued to battle the authorities in court (Jayanetti, 2018). Through their legal actions and protests, the PMMKGD aimed to hold the government accountable for its inadequate waste management practices and to seek justice for the affected community. Despite the challenges, the PMMKGD persisted in their efforts to bring attention to the issue and push for change. Their actions forced the Supreme Court to intervene and order the temporary deposit of garbage in Meethotamulla while designating a specific area for this purpose (Jayanetti, 2018).

It is important to note that civil movements often face challenges and resistance from government authorities and other vested interests. They may encounter opposition, legal obstacles, or even repression in their pursuit of change. However, their persistence, determination, and resilience have the potential to bring about meaningful transformations in MSWM practices. Their collective action not only raises awareness and mobilizes communities but also holds decision-makers accountable for implementing sustainable waste management practices.

3.5.6 Mass Media

Mass media plays a significant role as a pressure group in the context of MSWM in Sri Lanka. The influence of mass media in shaping public attitudes and raising awareness about environmental issues cannot be underestimated. Several media stations in the country have taken the initiative to launch environmental programmes, demonstrating their commitment to promoting sustainable practices.

One notable example is the TV station 'Sirasa,' which initiated the 'Thuru Sirasa' mission with the objective of creating a sustainable future (Sunday

Observer, 2019). Through this programme, they aim to educate and engage the public on the importance of proper waste management and environmental conservation. Similarly, another station named 'Derana' introduced the 'Nature Force Environment Protection and Preservation Programme" under its charity arm, 'Manusath Derana'. This programme aligns with the United Nations 2030 agenda and Sri Lanka's vision of becoming an eco-friendly nation.

The mass media's influence as a pressure group lies in its ability to reach a wide audience and create awareness about solid waste management issues. Through their programmes, news articles, and campaigns, they can shape public opinion, mobilize public support, and put pressure on relevant authorities to take action. However, it is important to acknowledge that the effectiveness of mass media as a pressure group can be influenced by political and administrative setbacks. Pressure groups in Sri Lanka often face challenges due to political demotivation and administrative obstacles. Despite these hurdles, it is crucial for pressure groups to remain committed to their long-term goals and work towards ensuring environmental accountability and social responsibility from all stakeholders.

In conclusion, the role of pressure groups in solid waste management is crucial for achieving effective and sustainable waste management practices. These pressure groups, including academics, religious leaders, youth, civil movements, and mass media, play significant roles in raising awareness, advocating for change, and exerting pressure on relevant authorities. By integrating and facilitating dialogue among different pressure groups, collaboration and coordination can be fostered, leading to the development and implementation of comprehensive and sustainable waste management policies and practices. Through their collective efforts, pressure groups can contribute to a paradigm shift in waste management approaches, promoting the principles of reduce, reuse, and recycle, and working towards a cleaner and more environmentally conscious Sri Lanka.

3.6 Discussion

The MSWM landscape in Sri Lanka has undergone significant changes, driven by factors such as urbanization, population growth, changing consumption patterns, and environmental concerns. These changes have resulted in new

waste streams, increased volumes of waste, and the emergence of innovative waste management technologies. However, the existing regulations and policies have not kept pace with these transformations, leading to gaps in addressing emerging waste management challenges effectively. To address the limitations and gaps in existing MSWM regulations and policies is crucial. Firstly, there is a need for a comprehensive review and revision of existing laws to align them with the current waste management landscape. This includes incorporating provisions that address emerging waste streams, promoting sustainable waste management technologies, and ensuring the proper handling of hazardous waste.

Another critical aspect that needs to be addressed is the limited recognition of external stakeholders in MSWM regulations and policies. External stakeholders, such as non-governmental organizations (NGOs), private companies, community-based organizations (CBOs), mass media, civil movements and academia, play a crucial role in contributing to efficient waste management activities. Their expertise, resources, and community engagement efforts can significantly enhance waste management practices. Therefore, it is essential for regulations and policies to acknowledge the existence and importance of these external stakeholders and create avenues for their active participation. The potential for these stakeholders to contribute to policy development, capacity building, research, and monitoring remains largely untapped. Engaging these stakeholders as active partners in decision-making processes can bring diverse perspectives, innovative ideas, and local knowledge to the forefront, leading to more effective and context-specific waste management strategies.

4. Discourses on MSWM in Sri Lanka

4.1 Introduction

Municipal Solid Waste Management (MSWM) in Sri Lanka is a shared responsibility between the central government and local authorities. The strategies and mechanisms employed by waste management authorities reflect the official discourses on MSWM, which have evolved over time to incorporate new policies, technologies, and techniques. These official narratives shape the approach taken by the central government and local governments in managing MSW.

To examine the official discourse on MSWM, this chapter utilizes secondary data sources including ordinances, acts, and policies. A systematic review method was employed to select and analyze these secondary data sources. The analysis encompasses all relevant policy documents, acts, and ordinances issued in Sri Lanka since colonial times. In addition to secondary data, primary data was collected through in-depth interviews with 24 national and local-level experts, government officials, practitioners, and policymakers. The interviews were conducted with the participants' informed consent and were recorded for transcription using word processing software. The transcribed interviews were then subjected to discourse analysis to uncover the underlying discourses and perspectives on MSWM.

4.2 MSWM Discourse Emanating from Secondary Sources

The first section of this study focuses on the examination of MSWM discourse derived from secondary data sources, specifically ordinances, Acts, and policies issued by the Parliament of Sri Lanka and other relevant authorities.

The selected secondary data sources include:

- Nuisance Ordinance No. 62 of 1939
- National Environmental Act No. 47 of 1980
- Urban Council Ordinance No. 61 of 1939
- Municipal Councils Ordinances No. 16 of 1947
- Pradeshiya Sabha Act No. 15 of 1987

- National policy on waste management - 2020
- National Solid Waste Management Policy of Sri Lanka – 2007
- Technical guidelines on solid waste management in Sri Lanka
- National Action Plan on Plastic Waste Management 2021-2030
- Order published under the Gazette Notification No. 1466/5 dated 10.10.2006
- Regulations published under the Gazette Notification No. 1534/18 dated 01.02.2008
- Order published under the Gazette Notification No. 2211/51 – 2021 of 2021.01.21
- Order to prohibit the Manufacture of Polythene or any Polythene product, 20 microns & below - Gazette Notification 2034/33 of 2017.09.01
- Order to prohibit the Manufacture of Food Wrappers. (Lunch Sheet) etc. - Gazette Notification 2034/34 of 2017.09.01
- Order to prohibit the Manufacture of any bag of high density (Grocery Bag) - Gazette Notification 2034/35 of 2017.09.01
- Order to prohibit burning of refuse and other combustible matters inclusive of Plastic- Gazette Notification 2034/36 of 2017.09.01
- Order to prohibit the use of Polyethylene products as Decorations - Gazette Notification 2034/37 of 2017.09.01
- Order to prohibit the manufacture of food containers , plates , cups , spoons from expanded Polystyrene - Gazette Notification 2034/38 of 2017.09.01
- Regulations No. 01 of 2021, Plastic Material Identification Standards - Gazette Notification 2034/38 of 2017.09.01

By closely examining the selected ordinances, Acts, and policies, this study seeks to uncover the underlying official narratives that shape the approach

towards MSWM in Sri Lanka. This examination of official narratives provides a valuable understanding of the historical context, legal frameworks, shifts or developments in MSW*M strategies over time* and policy direction*s related* to MSWM in Sri Lanka. By delving into the language and content of these documents, the study aims to gain insights into the key themes, discourses, and conceptualizations surrounding waste management within the official sphere.

4.2.1 The Nuisance Narrative

The Urban Council Ordinance presents a narrative that places the responsibility for waste management solely on the council, without acknowledging the involvement of other significant stakeholders such as households, large-scale waste producers, or the central government in the context of MSWM.

To fully understand this narrative, it is crucial to consider the historical context of British rule in 1939, when Ceylon had limited urban centers established primarily for the benefit of the colonizers. Ordinary households were capable of managing their own waste until the treatment and disposal stages, as there was minimal overconsumption and a scarcity of non-biodegradable waste during the colonial period. However, the introduction of missionary education led to the emergence of an urban and educated upper class that adopted the consumption patterns and lifestyles of the colonizers, resulting in a gradual increase in solid waste generation in the country (Daechsel, 2004). Recognizing the growing waste management challenge, the British rulers deemed it necessary to incorporate waste management provisions into the Urban Councils Ordinance in 1939.

According to the Urban Councils Ordinance of 1939, municipal solid waste is defined as encompassing street refuse, house refuse, nightsoil, and other similar matter (Urban Councils Ordinance, 1939). The ordinance specifically categorizes waste as any material that is utilized and subsequently disposed of onto the streets by households. However, it is important to note that the ordinance fails to acknowledge the role of large-scale waste producers such as hotels and factories in the generation of solid waste.

Furthermore, the Urban Councils Ordinance outlines three fundamental components of municipal solid waste management (MSWM). Firstly, the ordinance emphasizes the importance of cleaning activities, which involve the proper sweeping and cleansing of streets, including footways. Secondly, it highlights the necessity of collection procedures, which entail the gathering and removal of all street refuse. Lastly, the ordinance underscores the significance of disposal methods, specifically emphasizing the proper disposal of street refuse, house refuse, and night-soil refuse.

Section 120 of the Urban Councils Ordinance is particularly noteworthy as it characterizes waste as a 'nuisance'. The provision stipulates that urban councils must establish suitable locations for the appropriate disposal of street refuse, house refuse, nightsoil, and similar matter, in accordance with the provisions outlined in the ordinance. Furthermore, the section mandates that the councils must take all necessary measures and precautions to ensure that the disposal of such waste does not result in the creation of a nuisance (Urban Councils Ordinance, 1939).

The classification of waste as a '*nuisance*' within the ordinance reflects a specific social narrative prevalent during the colonial period. In South Asia, this narrative is associated with the norms and values of the upper middle class and the middle class (Ghertner, 2008). The 'nuisance' approach, deeply ingrained in the Urban Councils Ordinance, views waste as something that needs to be eliminated or eradicated. In line with this perspective, waste disposal is deemed appropriate when conducted in locations that are “out of sight and out of mind”, shielded from the view of the educated middle class and the ruling British elite.

The language used in section 120 further underscores this narrative. The term '*proper disposal'* signifies that waste should be managed in a manner that conforms to societal norms and expectations. It suggests that waste should be disposed of in designated locations, situated away from urban areas. The use of the word 'proper' implies the need for appropriate waste management practices that align with the perceptions and sensibilities of the educated middle class and the ruling British authorities.

According to the Colombo Municipal Council records, till 1960 MSW collected in Colombo Municipal Council was incinerated in facilities located in Kirulapona and Kotte.Waste incineration was discontinued in 1960 due to the high operation and maintenance costs. According to the Annual Report of the Commissioner of Colombo Municipal Council (1960), the total cost of operating and maintaining the incineration facilities amounted to LKR. 333,699, which amounted to four percent of the municipal council's total budget. After discontinuing the incineration facility, the Colombo Municipal Council resorted to dumping municipal solid waste in privately owned lands in Muthurajawela, Kirulapana, and Aththidiya areas (CMC, 1962). All these places are located significantly far from the Colombo Municipal Council area.

It is important to recognize the lasting impact of this '*nuisance*' narrative on waste management practices in Sri Lanka. The selection of open dumping sites by the Municipal Councils, such as Meethotamulla, Bloemendal, and Karadiyana, reflects the continuation of the 'out of sight, out of mind' approach championed by the colonizers. These sites, typically situated in marshy lands or paddy fields outside the immediate boundaries of urban centers, have had long-term consequences on the waste management process in the country. It is worth noting that even today, this nuisance narrative persists as the accepted policy approach of local governments, as evidenced by the adoption of sections 118-120 of the Urban Councils Ordinance in subsequent legislations like the Municipal Councils Ordinance of 1947 and the Pradeshiya Saba Act of 1987. Consequently, this approach has contributed to the accumulation of massive garbage mountains in various locations throughout Sri Lanka.

4.2.2 Environmental Protection Narrative

The enactment of the National Environmental Act in the 1980s marked a significant shift from the previously dominant nuisance social narratives surrounding waste management. The act introduced a new perspective by recognizing waste as an environmental issue and establishing a dedicated unit within the Ministry of Mahaweli Development and Environment to oversee waste management, specifically focusing on hazardous waste and chemical management.

The creation of the "Hazardous Waste and Chemical Management" unit under the Ministry of Environment reflects the growing awareness and recognition of the potential environmental risks associated with waste. This development indicates a shift in the understanding of waste as not just a nuisance but also a matter of environmental concern requiring specialized attention and management. This recognition signifies a departure from the previous approach that primarily focused on waste disposal without considering the environmental implications. Further, the establishment of this unit under the Ministry of Environment highlights the integration of waste management within broader environmental governance frameworks. It demonstrates the acknowledgment that waste management is not solely a matter of local government responsibility but also requires coordination and oversight at the national level to address the environmental challenges posed by hazardous waste and chemicals.

Introduction of expert knowledge and technical methods

A key implication of the National policy on waste management – 2020, National Solid Waste Management Policy of Sri Lanka, Technical guidelines on solid waste management in Sri Lanka, National Action Plan on Plastic Waste Management 2021-2030 on the MSWM discourse is the introduction of expert knowledge and technical methods to tackle waste management challenges. These policies emphasize the importance of conducting Environmental Impact Assessments (EIAs) for various activities related to waste management, including the selection of disposal sites and the establishment of industrial sites. By incorporating expert knowledge policies promotes a scientific and evidence-based approach to decision-making in MSWM. The introduction of EIAs brought a new level of rigor and accountability to the waste management process. It ensures that potential environmental impacts of waste management activities are carefully assessed and mitigated, thus minimizing harm to eco-systems and human health. This new technical approach helped to inform decision-makers, policymakers, and relevant authorities about the environmental consequences of different waste management options. It also facilitates the identification and implementation of best practices in waste management, leading to more sustainable and environmentally friendly solutions.

Recognition of external stakeholders

Another significant implication of the policies is their recognition of external stakeholders in the MSWM discourse. They establish the Ministry of Environment as a key player in waste management and designates the Central Environmental Authority as its statutory organization responsible for overseeing environmental matters. This recognition acknowledges that waste management is not solely the responsibility of local councils but requires coordination and collaboration among various stakeholders at the national level.

This recognition also brought attention to the role of external stakeholders, such as environmental experts and professionals, in providing technical expertise and support in the formulation and implementation of waste management strategies. The inclusion of external stakeholders in the MSWM discourse enhanced the decision-making process by incorporating a broader range of perspectives and expertise. It promoted transparency, accountability, and the adoption of best practices in waste management. Furthermore, it facilitated collaboration between different levels of government, encouraging effective coordination and cooperation to address the complex and multifaceted challenges associated with waste management.

Despite the introduction of new evidence based, scientific methods and techniques for waste management activities, it is notable that the discourse surrounding waste management in Sri Lanka remained unchanged, reflecting the persistent "Out of sight, Out of Mind" approach. This continued adherence to the "Out of sight, Out of Mind" discourse is concerning as it perpetuates a narrow and unsustainable approach to waste management. By simply relocating waste to sites away from urban areas without addressing the underlying issues of waste reduction, recycling, and sustainable disposal methods, the root causes of the waste management problem are left unaddressed. This approach fails to recognize the long-term environmental and social consequences of improper waste disposal and the need for comprehensive and sustainable waste management practices.

4.2.3 Sustainability Narrative

Recognizing the negative consequences of the prevailing waste management practices and the need for long-term environmental sustainability, Sri Lanka has made significant efforts to transition towards a sustainability-based approach to MSWM. The shift from the traditional "out of sight, out of mind" approach to a sustainability-based approach in MSWM in Sri Lanka represents a significant change in discourse.

The concept of sustainability acknowledges the inter-connectedness of environmental, social, and economic factors, emphasizing the need for responsible resource management and long-term environmental stewardship. In the context of MSWM, a sustainability-based approach aims to minimize waste generation, maximize resource recovery, and reduce the overall environmental footprint of waste management activities.

To promote sustainability in MSWM, Sri Lanka has embraced various strategies and initiatives in newer regulations and policies such as National policy on waste management, National Solid Waste Management Policy of Sri Lanka, Technical guidelines on solid waste management in Sri Lanka and National Action Plan on Plastic Waste Management 2021-2030. Waste reduction at the source has emerged as a fundamental principle. By focusing on waste prevention and reduction, the aim is to minimize the amount of waste generated in the first place. This approach includes raising public awareness about responsible consumption patterns, encouraging eco-friendly packaging, and supporting initiatives such as composting and organic waste management. By addressing waste generation at its roots, Sri Lanka aims to tackle the underlying causes of waste accumulation and its associated environmental and social impacts.

Additionally, the adoption of the 3R concept (Reduce, Reuse, and Recycle) plays a pivotal role in the sustainability narrative of MSWM. The 3R concept emphasizes the efficient utilization of resources, promoting the reuse of materials, and encouraging recycling to minimize waste and conserve valuable resources. Sri Lanka's MSWM policies and regulations, developed by the Central Environmental Authority (CEA), incorporate the 3R principles by

establishing waste segregation systems, encouraging the establishment of recycling facilities, and promoting sustainable waste management practices at the community level. The implementation of effective waste segregation and recycling programmes not only reduces the amount of waste that ends up in landfills but also conserves resources and mitigates environmental degradation.

4.3 MSWM Narratives Emerging from In-depth Interviews

The researchers conducted in-depth interviews with key informants, comprising government officials and private company actors involved in Public-Private Partnerships with municipalities. By engaging with these key informants, the researchers aimed to gain a comprehensive understanding of the prevailing waste discourse and its evolution in the aftermath of the Meethotamulla disaster. The key informants consisted of seven high-ranking officers from national and provincial level agencies, including the Central Environmental Authority, the National Solid Waste Management Support Centre, the Environmental Police, the Western Province Solid Waste Management Authority, and the Urban Development Authority. Additionally, six elected members and government officers from the Dehiwala-Mt. Lavinia Municipal Council and Boralesgamuwa Urban Council, as well as four managers and owners of local private waste management companies, were included in the interviews.

As discussed in the previous section, the discourse narrative revealed by the existing policy documents suggests that waste is still regarded as a nuisance and an environmental issue that requires expert solutions. However, the interviews conducted with key informants provided a different perspective on MSWM. The interviews suggest that waste is perceived as a key responsibility of modern governance and a valuable source of income for the country. The narratives shared by the national-level and local-level officials shed light on the evolving discourse surrounding MSWM in Sri Lanka.

4.3.1 Narratives of National and Provincial Level Officers

During the interviews with officials, a recurring narrative emerged, emphasizing that waste management is a primary responsibility of the

government. The officials acknowledged that the government plays a crucial role in ensuring effective waste management practices and addressing the environmental and social challenges associated with waste.

An officer of the Central Environment Authority stated,

> "*We, at the Central Environmental Authority, understand the significance of municipal waste management. That is why we have established a dedicated center to generate policy guidelines and monitor the activities of provincial and local-level authorities and councils. It is crucial to recognize that even a single day of failure in the waste management system can cause significant disruptions to the day-to-day activities of citizens, as well as government and private sector operations."* **(KII Interviews, 2020)**

Another executive officer at the National Solid Waste Management Support Centre of the Ministry of Public Administration and Home Affairs echoed a similar narrative. They emphasized the vital role of the government in waste management, stating,

> "*We firmly believe that waste management is a primary responsibility of the government. As the National Solid Waste Management Support Centre, we work closely with local authorities to ensure effective waste management practices are implemented. Our aim is to create a sustainable and clean environment for our citizens, and we recognize the importance of efficient waste management systems in achieving this goal. We provide guidance, technical support, and capacity building to local authorities to enhance their waste management capabilities*." **(KII Interviews, 2020)**

This narrative reinforces the notion that waste management is indeed perceived as a core function of the government, highlighting its commitment to addressing the challenges posed by MSW. The recognition of waste management as a crucial responsibility signifies the government's understanding of the impact that improper waste management can have on the

environment, public health, and overall well-being of the citizens.

Another narrative that emerged from the interviews with officials revealed their perspective of waste as a resource and an income-earning opportunity. According to an executive officer of the Ministry of Megapolis and Western Province Development, waste is perceived as an opportunity for development.

> "*I believe that the time has passed where we viewed waste as a burden. In this era, we see waste as an opportunity, an asset. If waste is managed using the correct techniques, we can earn from each and every bit of waste. Bio-degradable waste can be turned into compost manure, and non-biodegradable waste can be used for recycling. If we tap into the potential of waste, our waste management system will be self-sustaining. It will also be one of the main income sources for the local councils. Our problem is that we do not manage MSW well. If we manage it properly, the opportunities are endless.*" **(KII Interviews, 2021)**

This viewpoint signifies a shift in the perception of waste from being solely seen as a burden or nuisance to recognizing its potential value. By viewing waste as a resource, officials acknowledge the presence of recoverable materials and energy that can be extracted through innovative waste management practices. This shift aligns with the principles of sustainability and the circular economy, emphasizing the importance of maximizing resource efficiency and minimizing waste generation. The narrative of waste as an opportunity for development reflects a broader perspective that encourages a shift from a linear "take-make-dispose" model to a more sustainable and resource-efficient approach. This perspective emphasizes the need for innovative solutions, technological advancements, and collaboration between the public and private sectors to harness the economic potential of waste.

An official from the Western Province Solid Waste Management Authority expressed a similar viewpoint, stating,

> *"With new technology and innovation in composting and recycling, such as one-day composting, we have come to understand that waste*

is not waste in reality. By effectively managing different types of waste, we can utilize waste to improve the lives of Sri Lankan citizens. Plastic can be recycled into new plastic materials, pavement blocks can be exported for overseas production, and organic waste can be transformed into compost. Currently, we have a highly successful composting facility at the Karadiyana Waste Resource Centre. We have reached maximum production capacity and still cannot meet the demand. Presently, we export 450 metric tons of compost to Maldives" (In-depth Interviews, 2021).

The viewpoint expressed by the official from the Western Province Solid Waste Management underscores the growing understanding and recognition of waste as a valuable resource in Sri Lanka. It reinforces the sustainability narrative present in recent waste management policies and highlights the potential for economic and environmental benefits through effective waste management practices.

Another national-level official echoed a similar sentiment, expressing the government's desire to alleviate the environmental burden caused by MSW through the promotion of at source segregation and recycling.

"The way we disposed of waste in the past is a key factor that has contributed to environmental pollution and the accumulation of mountains of garbage. The government aims to bring about a change in this practice, which is why strict waste disposal laws have been introduced in recent years. Through these measures, we anticipate that the public will adopt more environmentally friendly approaches to waste disposal by segregating waste at home and handing it over to the municipal council tractors…….The segregated waste can then be transformed into valuable resources, such as manure. Additionally, the use of compost can help reduce reliance on artificial fertilizers in farming, leading to a significant decrease in the government's expenditure on importing such products." (In-depth Interviews, 2021).

By promoting source segregation and recycling, the government aims to instill a culture of responsible waste management among the public. This approach not only reduces the environmental impact of waste but also presents economic opportunities, such as the development of recycling industries and the creation of employment in the waste management sector.

Overall, the government's commitment to reducing the burden of waste on the environment through source segregation and recycling reflects a shift towards sustainable waste management practices. By emphasizing the importance of individual actions and promoting the value of waste as a resource, the government aims to foster a more environmentally conscious society and contribute to a circular economy where waste is minimized, resources are conserved, and the well-being of both present and future generations is safeguarded.

In summary, the interviews conducted with national and provincial officials provide valuable insights into the discourse surrounding waste management in Sri Lanka. The recurring theme underscores the government's recognition of waste management as a primary responsibility. Officials acknowledge the crucial role played by the government in ensuring effective waste management practices and addressing the environmental and social challenges associated with waste. There has been a notable shift in the perception of waste from being seen as a burden to being recognized as a valuable resource and an opportunity for generating income. This shift is in line with the principles of sustainability and the circular economy, which emphasize the efficient use of resources and the minimization of waste generation. The government's commitment to promoting activities such as source segregation, recycling, and the development of innovative waste management techniques further demonstrates its dedication to reducing the environmental impact of waste and working towards a sustainable future.

4.3.2 Narratives of Local-level Officials

Similar to their national counterparts, local-level officials also emphasize the significance of waste management as a primary responsibility of local government. An official of the Boralesgamuwa Urban Council stated,

> *"Managing waste is a key responsibility of the council; after all, municipal waste is generated by the community members of each urban council. We must find ways to effectively manage it. Unlike in the past, we now recognize the potential value of waste. Therefore, we view it as an asset and prioritize providing optimal service to our community while maximizing our income from waste." (In-depth Interviews, 2021)*

Local-level officials, including elected members and government officers from local councils, demonstrate a strong commitment to addressing waste management challenges within their respective jurisdictions. They acknowledge the need for robust waste management systems that align with national policies and guidelines. By assuming responsibility for waste management, local authorities play a vital role in ensuring the well-being of their communities and the preservation of the environment.

The alignment of narratives between national and local officials highlights the collective understanding of the importance of MSWM and the recognition that waste management requires collaborative efforts at all levels of governance. This unified approach facilitates coordination and cooperation between national and local authorities, promoting the implementation of effective waste management practices across the country.

The quote also reflects a managerial narrative on MSWM, which advocates for utilizing waste as a resource to minimize operational and management costs. This cost-cutting narrative aligns with the principles of neo-liberal governance, which emphasize efficient resource allocation and reducing the financial burden on local governments. By adopting this approach, local councils aim to optimize their waste management processes and maximize their financial gains, ultimately enhancing their overall operational efficiency.

According to an executive from the Dehiwala-Mt. Lavinia Municipal Council, the narrative of waste as a resource was also evident in their approach to waste management. The executive emphasized the potential value that waste holds and the need to harness it effectively. The following quote highlights this

perspective:

> *"We recognize that waste is not simply a burden to be disposed of but a valuable resource that can be utilized. Our wards generate a large amount of waste on a daily basis. We have both a highly urbanized Dehiwala City area and the popular tourist destination - Mt. Lavinia, under our purview. As we are spending more than 10 million rupees each month, we have decided to earn as much as possible from recyclable and reusable waste in the future. Our municipality is actively exploring innovative solutions to transform waste into valuable products. For instance, we have implemented recycling programmes to extract reusable materials from waste streams. Additionally, we are exploring partnerships with private companies such as* Insee Cement *to dispose of non-recyclable waste. By adopting these initiatives, we aim to reduce the environmental impact of waste while also generating economic opportunities and promoting sustainability within our municipality."* (In-depth Interviews, 2021)

Overall, the convergence of narratives from both national and local-level officials underscores the shared commitment to prioritizing waste management as a fundamental responsibility. This unity of vision between different levels of government sets a foundation for coordinated action and paves the way for sustainable waste management practices in Sri Lanka.

4.3.3 MSW as a Nuisance to the Beautification of the City

The statements provided by local and government officials in Sri Lanka highlight the persistence of the nuisance narrative in the discourse surrounding municipal solid waste management (MSWM). Despite positive definitions given to waste and attempts to reframe it as a resource or an opportunity, the officials' emphasis on the negative impacts of improper waste management on the beautification of cities reinforces the notion that waste is still regarded as a nuisance.

According to a high-ranking elected member of the Boralesgamuwa Urban Council,

> "*We are always striving to keep the city clean. Our collection vehicles start their operations from the city center and diligently remove all the waste that has accumulated on the roadsides. It is our goal to ensure that when people head to work, the city presents a clean and beautiful appearance."*
>
> (In-depth Interviews, 2020)

The statement reflects the persistent commitment to maintaining cleanliness in the city and ensuring that it remains visually appealing. The emphasis on regular waste collection and the proactive approach of starting the cleaning process from the city center highlight the importance placed on creating a clean and beautiful environment for residents and visitors alike. However, it is important to note that while the emphasis on cleanliness and beauty is crucial, it should be complemented by a comprehensive waste management approach that goes beyond surface-level appearances. A sustainable waste management system should encompass strategies for waste reduction, recycling, and proper disposal practices to address the environmental and social impacts of waste. An officer of the Central Environmental Authority made a similar statement:

> "*Waste is not a nice thing to look at. We always instruct the councils to keep the cities clean and pleasant. The previous government invested a lot in city beautification projects. The small streams flowing through the cities of Bellanwila and Kotte were cleaned thoroughly. Previously, these locations were filled with PET bottles, beer cans, and even garbage bags thrown by community members. The Urban Development Authority created a new walking path and a bicycle track there"*
>
> **(In-depth Interviews, 2020).**

These statements suggest that the nuisance narrative is still present despite the positive definitions given to waste. Now, waste is regarded as a nuisance as it impacts the city's beauty. The government of former President Mr. Mahinda

Rajapakse invested heavily in beautification projects in the metro Colombo region as well as in suburban areas such as Kotte, Bellanwilla, and Baththaramulla. One of the critical initiatives of these beautification programmes was to get rid of waste from cities and manage them outside these territories. The former President, Mr. Gotabhaya Rajapakse (then Defense Secretary), led this movement, committing himself to make Colombo the 'Green City of Asia.' This beautification narrative introduced by the President seemed to have heavily influenced officials at all levels.

To sum up, the narrative on waste has become more positive, although the definition of waste as a nuisance is still prominent in the discourse due to the influence of beautification projects carried out by the previous central government.

4.4 Impact of the Meethotamulla Disaster

The secondary data analysis revealed vital actors of the MSWM discourse in Sri Lanka. It identified the government of Sri Lanka as the most prominent actor in shaping the official MSWM discourse. The 1939 Urban Councils Ordinance was the first instance when the central government intervened in MSWM decisions in Sri Lanka. The 1939 colonial government introduced the Urban Councils Ordinance to manage Municipal Solid Waste in Colombo, Kandy, and Galle. However, the ordinance needed to establish a specialized organization to manage municipal waste. Only in 1980 the government established the Central Environmental Authority, a specialized organization with waste management as a key responsibility.

In 1999, the Western Provincial Council established the Western Province Waste Management Authority as a specialized organization to address waste management issues in the Western Province. However, the Central Government of Sri Lanka has remained the leading actor in the MSWM discourse as provincial and municipal level organizations have no power to shape the national discourse on MSWM.

Interviews with key informants revealed that the Meethotamulla waste mountain collapse was instrumental in convincing the responsible authorities, politicians, and Sri Lankan citizens that the existing MSWM system made

waste to become a severe issue. Accordingly, the Meethotamulla disaster was a major event that changed the MSWM discourse in Sri Lanka.

A ministerial consultant stated that;

> "*MSWM in Sri Lanka is a problem only because of the inefficient and ineffective management system. Meethotamulla was one such site that lacked a proper management system. Waste was not properly segregated. Mixed waste was dumped, creating a mountain over 29 meters high. The collapse of the dump is a tragedy. But the incident created an opportunity to drum into heads of administrators, politicians, and the public that segregation is a must and new technology has to be introduced to the other open dumping sites to avoid a similar disaster from occurring*"
>
> **(In-depth Interviews, 2020).**

An officer of the Dehiwala-Mt. Lavinia Municipal Council remarked:

> *"We initiated a program called 'waste segregation at the source' a few months before the Meethotamulla disaster. However, waste segregation remained at 10% to 20%. After the disaster struck, this percentage increased to nearly 60% at once. For the first time, the majority of people, especially individuals living in urban areas, began to see how improper waste management can create serious issues*" **(In-depth Interviews, 2020).**

Another officer of the Central Environmental Authority elaborated that the Meethotamulla disaster played a crucial role in improving the waste management system in the Colombo district as follows:"

> "*Prior to the Meethotamulla disaster, the Kesbawa Urban Council managed the Karadiyana open waste dumping site. However, the site was not properly managed, and that created long-term impacts on the environment, with the Weras ganga (a river that runs through the area) being severely polluted and communities living close to the dump suffering from illnesses. However, after the Meethotamulla disaster, the Western Province Solid Waste*

Management Authority took over the site's management. The management has become better now, and only segregated waste is dumped in the area" **(In-depth Interviews, 2020).**

These statements by the key informants revealed that the Meethotamulla disaster had impacted the discourse on waste management. The tragedy has played a role in convincing the administrative officers and the public about better waste management practices. This is evident from the dramatic increase in waste segregation at source after the disaster, which is steadily increasing.

4.5 Conclusion

The findings suggest that a nuisance narrative shapes the municipal waste management discourse in Sri Lanka. The narrative has emerged out of the regulations of the Central Government of Sri Lanka. The nuisance narrative was introduced to the MSWM discourse in 1939 under British rule to manage Municipal Solid Waste generated in a few urban centers. Despite this limitation, the successive governments of Sri Lanka continued the nuisance narrative.

In 1980, with the introduction of the Environment Act, a new narrative of environmental pollution was inducted into the nuisance discourse. This new narrative justified the "out of sight- out of mind" nuisance narrative of the MSWM discourse and supported the continuation of the narrative. In the late 2000s, the Central Government of Sri Lanka introduced an "urban beautification" narrative to the MSWM discourse, which further reinforced the nuisance narrative of Municipal Solid Waste Management in Sri Lanka. In conclusion, the Municipal Solid Waste Management discourse in Sri Lanka can be defined as a nuisance discourse reinforced by contextual narratives such as environmental issues and urban beautification.

5. Collapse of the Meethotamulla Waste Dumping Site and its Impact on Solid Waste Management in Sri Lanka

5.1 Introduction

In April 2017, a devastating catastrophe unfolded in Meethotamulla, a densely populated suburb on the outskirts of Colombo, Sri Lanka. The Meethotamulla waste dumping site, which had long served as the final resting place for the capital city's municipal solid waste, collapsed under the weight of accumulated garbage and debris, triggering a catastrophic landslide. This event not only resulted in loss of life and property, but it also laid bare the glaring shortcomings of Sri Lanka's municipal solid waste management (MSWM) system. This chapter delves into the intricate history of the Meethotamulla dumping site, elucidates the multifaceted factors that led to its collapse, and examines the far-reaching consequences this disaster had on the entire landscape of solid waste management in Sri Lanka.

5.2 History of the Meethotamulla waste dumping site

The history of the Meethotamulla garbage dumping site is one that encapsulates a transformative journey from fertile farmland to an ominous mound of waste, emblematic of both environmental degradation and systemic challenges within Sri Lanka's waste management infrastructure. In its nascent years, the site was a verdant paddy field named Pothuvila, meticulously tended by the local Agrarian Services Centre and pivotal to the subsistence of Kolonnawa's villagers. The community thrived on its agricultural yield until the economic liberalization of 1977, which led to the abandonment of Pothuvila due to the inability of local farmers to compete with imported rice prices (roarmedia, 2017).

With the dawn of urbanization in the 1970s, the landscape underwent a dramatic transformation. The Colombo District witnessed an influx of economic migrants from rural areas, and the Pothuvila farm was gradually replaced by a burgeoning residential grid, housing both legal and illegal occupants (roarmedia, 2017). The subsequent years saw the emergence of a vexing challenge: the disposal of escalating amounts of waste generated within

the city. As a pragmatic response, the Kolonnawa Urban Council (KUC) began utilizing the newly available land to dump garbage collected from its jurisdiction (roarmedia, 2017).

This waste management strategy underwent a significant shift in the late 2000s. Until 2009, the Bloemendhal area in Colombo 13 had served as the primary dumping site for the Colombo Municipal Council (CMC). However, issues such as legal disputes and bureaucratic complications allowed unchecked garbage accumulation in Bloemendhal, leading to a catastrophic methane explosion in March 2009 (roarmedia,2017). This tragedy prompted the Supreme Court to halt dumping activities, setting off a chain of events that culminated in the selection of Meethotamulla as a temporary dumping zone (roarmedia,2017).

Meethotamulla, initially allocated two acres for temporary waste disposal, swiftly transformed into a colossal landfill spanning over 31 acres and reaching a towering height of nearly 50 meters. This expansion came at a cost to the local community, as contaminated water sources, disease outbreaks, and respiratory illnesses marred the lives of its residents (Wickramasinghe & Gunarathna,2019). The site's geographical vulnerability, situated near waterways connected to the Kelani River, exacerbated its woes, as periodic flooding during monsoons spread noxious sludge from the landfill across households, compounding the misery (roarmedia,2017).

Efforts to alleviate the crisis included government offers to purchase affected land, though most residents found the compensation inadequate and retained their legal claims (roarmedia,2017). Despite the mounting grievances, protests, and legal battles waged by the People's Movement Against the Meethotamulla, Kolonnawa Garbage Dump (PMMKGD), the underlying problems persisted, met with suppression and neglect from authorities (roarmedia,2017; Craig MacDonald,2019).

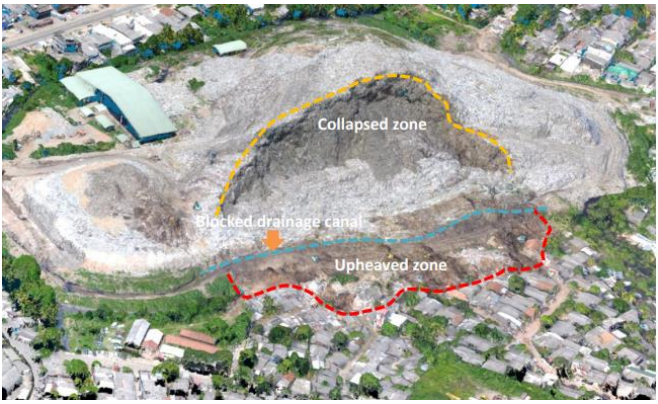
5.3 Collapse of the Meethotamulla Dumping Site

The fateful morning of April 14, 2017, witnessed the catastrophic collapse of the Meethotamulla garbage dump, situated near Colombo, Sri Lanka, in a calamitous event that claimed the lives of over 32 individuals and inflicted

injuries upon numerous others (Basha & Raviteja,2018). The ominous aftermath of this disaster revealed a distressing tableau of destruction, as a staggering 146 houses lay buried beneath the towering heaps of waste, while the neighboring dwellings bore the brunt of severe damage, impacting a total of 198 families (Basha & Raviteja,2018; Disaster Services,n.d.).

At the time of the catastrophe, Meethotamulla had emerged as the largest open dump in Colombo, accommodating an annual influx of approximately 328,500 cubic meters of solid waste (Basha & Raviteja,2018). Its sprawling expanse covered an area of 78,000 square meters, stretching 413 meters along the NW–SE direction and 189 meters in the NE–SW direction (Basha & Raviteja, 2018). The height of the landfill varied between 45 to 50 meters, featuring a steep incline ranging from 35° to 60° in the southwest direction, which would ultimately prove to be a critical factor in the ensuing disaster (Basha & Raviteja,2018).

Image 5.1 Areal view of the collapsed Meethotamulla dump site



Source: Fill, (2017)

5.4 Causes for the Collapse of the Dump Site

The failure of the Meethotamulla waste dump site stands as a stark testament to a convergence of factors that precipitated this calamitous event. A geotechnical assessment conducted following the disaster, as outlined in

"Geotechnical assessment on the failure at Meethotamulla waste fill" (2017), sheds light on the intricate web of influences that led to the collapse.

In the period leading up to the catastrophe, the waste fill exhibited a precarious balance, teetering on the edge of stability. The assessment underscores that the site was marginally stable before the onset of heavy rains, implying that the equilibrium of the waste fill was already tenuous (Fill, 2017). The deluge of rainwater that inundated the site during the fateful rain spell imposed an additional burden of weight, potentially exacerbating the site's instability. The infiltration of rainwater into the waste fill could have triggered a cascade of events, initiating a gradual weakening of the soil layers beneath and ultimately culminating in the catastrophic failure (Fill, 2017).

Further exacerbating the situation was the rise in water table levels and the consequential reduction in shear strength within the upper layers of the waste fill. Excessive moisture content, induced by the incessant rainfall, could have substantially diminished the ability of the soil to resist shear forces, leaving the waste fill vulnerable to displacement and collapse (Fill, 2017). These contributory factors, in concert, precipitated a cataclysmic failure that brought devastation to the Meethotamulla community.

However, while the scientific factors played a significant role in the collapse, it is evident that mismanagement of the dumping site and systemic inadequacies within the municipal solid waste management (MSWM) system contributed to the disaster. The tragedy served as a sobering reminder of the consequences of neglecting residents' concerns and protests. The Meethotamulla dumping site had expanded to a towering heap without effective controls, reflecting a disregard for geotechnical considerations and the vulnerability of the local environment. Furthermore, the inefficient handling of waste, insufficient maintenance, and a lack of proper containment structures aggravated the precarious state of the landfill.

The failure of the Meethotamulla dumping site, therefore, underscores the dire consequences of a flawed waste management strategy that disregarded both scientific insights and community voices. The disaster serves as a stark example of the potential consequences when essential waste management measures are not taken into account. The tragedy illuminated the need for

proactive engagement with the concerns of residents, effective waste disposal practices, and a comprehensive approach to solid waste management that encompasses scientific expertise, regulatory oversight, and community engagement. As Sri Lanka seeks to rebuild and reform its waste management system, the lessons from Meethotamulla must guide the path toward a safer and more sustainable future.

5.5 Key impacts of the collapse of Meethotamulla dump site on MSWM in Sri Lanka

The catastrophic collapse of the Meethotamulla waste dumping site sent shockwaves through the very fabric of Sri Lanka's municipal solid waste management (MSWM) sector, prompting a profound reevaluation of its various dimensions. The incident's seismic impact laid bare the vulnerabilities and inadequacies that had long persisted within the waste management landscape, compelling a multifaceted response that touched upon numerous critical aspects.

In the aftermath of this devastating event, the Sri Lankan government confronted the stark reality of the nation's waste management policies and practices. The collapse laid bare the shortcomings of existing regulations, casting a harsh spotlight on the vulnerabilities inherent in open dumping sites and the dearth of robust waste disposal infrastructure. As a direct consequence, the Ministry of Mahaweli Development and Environment spearheaded the formulation of the National Waste Management Policy (NWMP). This comprehensive policy framework emerged as a testament to the nation's resolve to rectify systemic flaws, with its conception involving a diverse array of stakeholders, including the active participation of the Environmental Foundation Guarantee Limited (EFL). This collaborative approach signified a paradigm shift, heralding a more inclusive and participatory ethos in shaping the future of waste management strategies.

The aftershocks of the Meethotamulla tragedy also reverberated through the very mindset of the public, precipitating a fundamental shift in attitudes and behaviors toward waste management practices. The catastrophe stood as a stark reminder of the dire consequences of neglecting responsible waste segregation and disposal practices. In its wake, communities and individuals

alike underwent a profound awakening, recognizing the imminent perils posed by lax waste management. This newfound awareness translated into a remarkable surge in waste segregation rates, a tangible reflection of the event's impact on the collective consciousness. Concurrently, local authorities took on a pivotal role in nurturing this evolving mindset, actively promoting waste segregation at the household level and fanning the flames of environmental consciousness. This synergy between public sentiment and official advocacy not only ushered in improved waste management practices but also underscored the potential of community engagement as a catalyst for transformative change.

Moreover, the incident set in motion a sequence of legal and regulatory interventions aimed at rectifying the systemic fissures that had contributed to the catastrophe. Public outrage and civic resistance compelled authorities to reevaluate and curtail dumping activities in ecologically sensitive zones. The obstruction of garbage disposal and ensuing legal verdicts underscored the imperative of upholding environmental safeguards and adherence to waste disposal protocols. The Meethotamulla disaster acted as an impetus for the expeditious implementation of a polythene ban, demonstrating how tragedy can galvanize swift and resolute policy responses to mitigate environmental harm.

The collapse served as a crucible for innovation, giving rise to transformative waste management initiatives, chief among them being the Aruwakkaru Waste Management Project. Unveiled in the aftermath of Meethotamulla, this visionary project epitomized a proactive stance toward establishing a sustainable and scientifically informed approach to tackling the challenge of solid waste disposal. Its inception reflected a fundamental shift in the perspectives of local government authorities, signaling a newfound recognition of the urgent imperative to grapple with the complexities of waste management head-on.

In essence, the ruinous collapse of the Meethotamulla waste dumping site resoundingly reverberated throughout Sri Lanka's municipal solid waste management sector, triggering a comprehensive and nuanced response that spanned policy overhauls, attitudinal shifts, legal reforms, and innovative interventions. The tragedy, while lamentable, galvanized a collective resolve

to rectify long-standing inadequacies, forge a more resilient waste management framework, and chart a course toward a future characterized by sustainable, responsible, and environmentally conscious waste practices.

5.6 Conclusion

In conclusion, the collapse of the Meethotamulla waste dumping site stands as a poignant reminder of the intricate interplay between environmental degradation, governance deficiencies, and the pressing need for comprehensive waste management reforms in Sri Lanka. The historical evolution of the site, from a fertile paddy field nurturing a community's livelihoods to a towering landfill of despair, mirrors the broader transformation of the nation's waste management landscape. The calamitous event of April 14, 2017, marked a turning point that catalyzed a series of responses, ranging from policy recalibration to shifts in public consciousness.

The Meethotamulla tragedy compelled Sri Lanka to confront the vulnerabilities ingrained within its waste management ecosystem, spurring the creation of the National Waste Management Policy (NWMP) as a testament to the nation's determination to rectify past shortcomings. The incident also underscored the power of public engagement, as communities awakened to the need for responsible waste segregation and disposal, fostering a groundswell of support for environmental consciousness. Legal and regulatory measures, ignited by the disaster's aftershocks, exemplified the potential for policy change to address immediate concerns, such as curbing indiscriminate dumping and plastic usage.

Importantly, the collapse did not solely unravel a disaster but also unveiled opportunities for innovation and transformation. Initiatives like the Aruwakkaru Waste Management Project emerged as beacons of hope, emphasizing the role of science, sustainability, and community involvement in shaping a new waste management paradigm. As Sri Lanka navigates its path toward a more sustainable future, the lessons drawn from the Meethotamulla tragedy must serve as a guiding compass.

6. Municipal Solid Waste Management in Dehiwala-Mt. Lavinia Municipal Council & Boralesgamuwa Urban Council

6.1. Introduction

In the realm of municipal solid waste management (MSWM), local governance entities play a pivotal role in orchestrating the complex symphony of waste generation, collection, disposal, and the myriad challenges that accompany these activities. This chapter delves into the proactive initiatives and intricate strategies employed by the Dehiwala-Mt. Lavinia Municipal Council and the Boralesgamuwa Urban Council, shedding light on their efforts to navigate the multifaceted landscape of waste management. From the generation of waste to the intricacies of collection methods, the chapter scrutinizes the mechanisms these councils have adopted, while also examining the crucial task of responsible disposal. Moreover, the chapter unveils the challenges these councils confront in their pursuit of effective and sustainable waste management practices. By dissecting the experiences of these local authorities, this chapter offers insights into the delicate balance between waste management's practical intricacies and the broader imperatives of environmental sustainability.

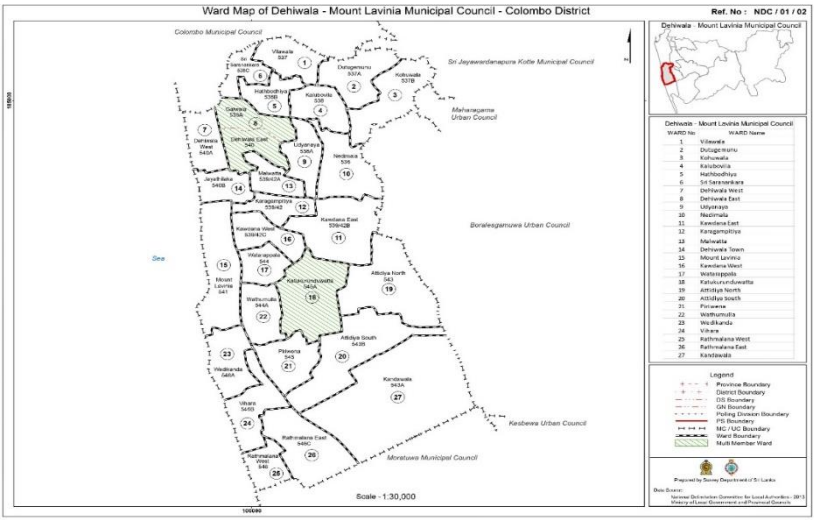
6.2 Dehiwala-Mt. Lavinia Municipal Council

The Dehiwala-Mount Lavinia Municipal Council (DMMC) area, encompassing 2109 hectares, ranks as the second largest municipality in Sri Lanka. Positioned to the south of the Colombo Municipal Council, it is divided by the Dehiwala canal, serving as DMMC's northern boundary. Borupana Road marks its southern limits, while the eastern perimeter is defined by the Weras Ganga river and its accompanying canal system, including areas like Pepiliyana, Gangodawila, and Kohuwala.

Comprising 29 wards, the DMMC exhibits varying sizes, ranging from 29 hectares in Mt. Lavinia, the smallest, to 305.6 hectares in Kandawala, the largest. Dehiwala has emerged as an appealing destination for both business travelers and vacationers due to its strategic proximity to Colombo and the scenic Mount Lavinia beach. However, unregulated growth and traffic

congestion have led to significant pollution challenges in the town. In contrast, Mount Lavinia, situated in the southern part of the city, is a residential suburb offering beachside resorts and a variety of restaurants. This popular tourist hub boasts a laid-back nightlife scene.

Map 6.1: Dehiwala-Mt. Lavinia Municipality map



Source: Survey Department of Sri Lanka, 2013

6.3 Current Status of Waste Management

6.3.1 Waste collection

As per a municipal council report from 2019, the Dehiwala-Mount Lavinia Municipal Council (DMMC) area witnesses a daily generation of approximately 200 metric tons of waste, out of which the DMMC collects around 150 to 160 metric tons. The DMMC operates a door-to-door waste collection service with specific schedules for biodegradable and non-biodegradable waste. At present, household waste is sorted into two categories: degradable and non-degradable. Among the collected waste, 60% consists of non-degradable materials such as polythene, plastic, and PET bottles. Biodegradable waste, including kitchen waste, leaves, and branches, is picked up on Mondays, Wednesdays, or Fridays, while non-biodegradable waste is collected on Saturdays, Tuesdays, or Thursdays.

In terms of waste storage and disposal, some areas within the Dehiwala-Mount Lavinia MC implemented a separate collection system in late October 2015. However, containers for segregating organic waste haven't been distributed to individual households. As a result, residents have been instructed to use distinct plastic bags for separating organic and other waste. Since the MC offers a door-to-door collection setup, residents place their waste by the roadside on the designated collection mornings. The community members are responsible for segregating the waste into organic and inorganic categories. The organic waste, comprising food waste, plants, and branches, is collected on Tuesdays and Thursdays.

The Municipal Solid Waste Management (MSWM) compactors conduct door-to-door collection across all 29 wards, subsequently transporting the collected waste to the Karadiyana open dumping site. Wednesdays and Saturdays are designated for the collection of inorganic waste. Following collection, MSWM workers sort valuable items and vend them to private vendors. With oversight from the Public Health Inspector (PHI) and Sanitary Vetter (SV), a team of 52 collection drivers and 443 collection workers, including road sweepers, handle waste collection.

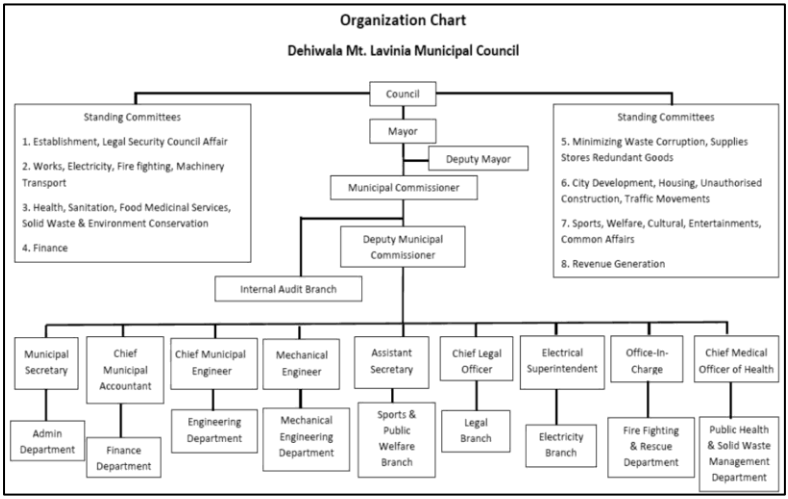
Within the collection area, waste is categorized into organic and other waste streams. Starting from late October 2015, a trial-based separate collection system was piloted in Wards #16 to 29 of Rathmalana and eventually expanded to encompass all other wards, including Wards #1 to 15 of Dehiwala, within two months.

Collected waste from the Dehiwala-Mount Lavinia MC is transported to the Karadiyana dumping site, where a truck scale records a daily collection volume of 170 tons. Notably, the MC does not impose a waste collection fee on households. Instead, they levy charges based on the type of waste for larger waste generators, those producing more than 500 kg/day. As of 2015, approximately 900 large waste generators were subject to collection fees.

The Dehiwala-Mount Lavinia MC operates a Solid Waste Management & Environment Protection Standing Committee, supported by the Solid Waste

Management Department (SWMD) led by the Deputy Commissioner. The SWMD encompasses the Refuse Collection & Disposal Division, headed by the Chief Public Health Inspector (CPHI), PHI, and Health Supervisor. These individuals oversee cleaning services, waste collection, and transportation within each ward. The Health Education Officer conducts waste segregation awareness programmes, while Environment Assistants implement various environmental protection initiatives. Although the Transport & Engineering Division's Mechanical Engineers handle maintenance, repair, and inspection of collection vehicles like tractors and trailers, this role doesn't exist in the Dehiwela-Mount Lavinia MC. The presence of two Medical Officers of Health (MOHs) exists, but their involvement in Solid Waste Management (SWM) activities is limited. Refer to Figure 5 for an illustration of the DMMC's organizational structure.

Figure 6.1: Structure of the Dehiwala - Mt. Lavinia MC



Source: DMMC, 2019

The Municipal Council (MC) has not developed a comprehensive master plan or action plan concerning Solid Waste Management (SWM). The current "Solid Waste Management Policy" of the Dehiwala Mt. Lavinia MC was created over 15 years ago and is now outdated. It is imperative to initiate a

policy revision and enhance the SWM master plan in alignment with this updated policy.

6.3.2 Intermediate treatment

Following the enforcement of mandatory waste segregation, the MC operates small-scale biogas facilities alongside two recycling centers dedicated to the sorting and storage of recyclable materials. Recent findings have brought to light that collection workers appropriate valuable materials during the collection process, subsequently selling them to intermediary shops en-route to the designated site (DS). These valuable materials, sorted by category, are then sold to recycling entities, and the proceeds from these transactions are distributed among the collecting workers.

In the wake of the compulsory waste segregation initiative, additional waste, including valuable materials, is conveyed and sorted within the recycling facilities. This includes waste collected by the MC and waste contributed by neighboring residents. However, due to limitations in facility capacity, not all miscellaneous waste can be accommodated at these centers. The primary emphasis is placed on the surrounding regions of the facility, particularly targeting Ward 15 (Kawdana-east) and Ward 20 (Katukrunda watte). Subsequently, the scope of targeted areas expanded to encompass Ward 21 (Attidiya-north) and Ward 25 (Attidiya-south).

6.3.4 Challenges

When managing municipal solid waste (MSW), the Dehiwala-Mount Lavinia Municipal Council faces numerous challenges, including insufficient funds, the emergence of new types of waste, and the absence of a dedicated waste collection center. An official from the DMMC highlighted the critical issue of inadequate funds, explaining,

> *"The DMMC allocates more than LKR 6 million to the Karadiyana Waste Management Center, with monthly salaries for waste workers alone amounting to four million rupees. Our monthly waste management expenses total at least LKR 10 million. However, we do not impose a waste tax or fee on residents. I have repeatedly proposed implementing an annual tax*

to support waste collection, but the council is hesitant due to concerns about losing votes. Given that the chairman of the standing committee is also an elected member, obtaining approval for these beneficial measures at the Standing Committee is sometimes challenging." ***(In-depth Interviews, 2021).***

Due to demographic shifts, the prevalence of new types of non-recyclable and harmful waste has increased. Adult diapers are a notable example of such waste. The growing elderly population has led to a rise in discarded adult diapers. An executive officer of the DMMC emphasized,

"These diapers cannot be recycled and pose significant harm to the environment. We lack proper storage facilities for these items. The Karadiyana Waste Center has informed us that they will cease accepting adult diapers starting next year. If this occurs, we will encounter a significant problem."

(In-depth Interview, 2021).

Electronic waste presents another complex issue. An official from the DMMC pointed out,

"Electronic items are also problematic. Informal waste traders purchase electronic waste and resort to burning them to extract valuable metals like gold and copper. The resulting burnt residue is then discarded in abandoned areas without appropriate safety measures, posing high cancer risks." ***(In-depth Interview, 2022)***

Inconsistency in the attendance of waste workers further compounds the challenges. An official from the DMMC explained,

"Due to exposure to harmful substances, workers frequently fall ill. Although we have provided gloves, masks, and boots for waste collection, these safety measures often go unused. As a result, workers develop skin rashes, lesions, and infections. Moreover, many waste traders are elderly and suffer from non-communicable diseases like hypertension, diabetes, and high cholesterol. Their improper medication usage, combined with daily alcohol and drug consumption, exacerbates the staffing

shortage." ***(In-depth Interview, 2021).***

The absence of a dedicated collection center presents yet another significant challenge for the DMMC. According to an official from the DMMC,

> *"We possess only two baling machines, and if these malfunction, we lack a suitable backup. We cannot request residents to retain waste at their homes. A proper operational setup is essential for daily functioning. While we want to halt waste disposal to Karadiyana, our capacity does not allow for it. We need to establish a recycling center in Rathmalana. Further,by exporting directly without intermediaries, we can generate substantial income."* **(In-depth Interview,2022).**

6.4 Boralesgamuwa Urban Council

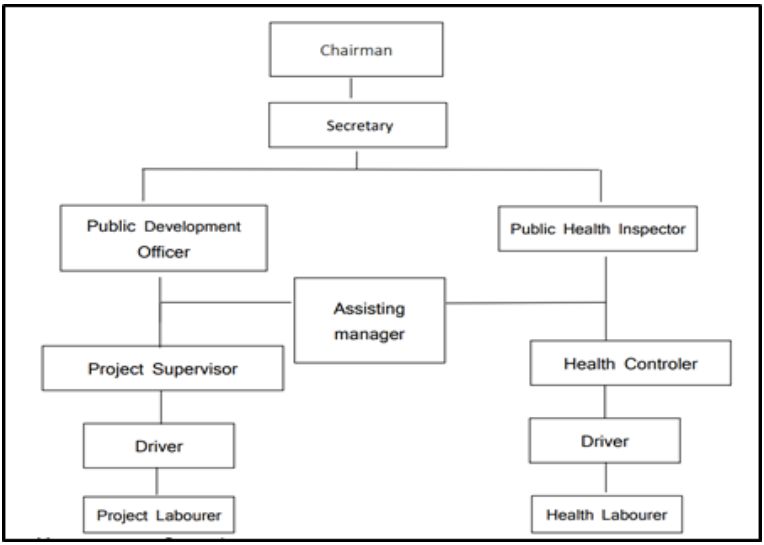
The Boralesgamuwa Urban Council (UC) is a relatively new urban council that originally used to be a part of the Kesbewa municipal council. The council expands across 13.5 square kilometers and is made up of 18 Grama Niladhari (GN) divisions. According to the 2011 Census report, the Boralesgamuwa Urban Council area has 37,260 permanent residents.

Map 6.2: Boralesgamuwa Urban Council area map

Source: Survey Department of Sri Lanka, 2013

The Boralesgamuwa Urban Council operates a dedicated Solid Waste Management & Environment Protection Standing Committee (SWMEPSC), with its chairman leading the SWMD (refer to Figure 6.2). The SWMEPSC holds the crucial responsibilities of waste collection, transportation services, public health initiatives (including Dengue awareness programmes), road sweeping, and fostering public awareness about waste segregation. Furthermore, within the SWMD, the Refuse Collection & Disposal Division is responsible for tasks overseen by the Chief Public Health Inspector (CPHI), Public Health Inspectors (PHI), and Health Supervisor.

Figure 6.2: Structure of the SWMEPSC of Boralesgamuwa Urban Council



Source: Boralesgamuwa MSW Strategic Plan Presentation, 2019

The committee is responsible for cleaning services, waste collection, and transportation of waste from each ward. The Health Education Officer conducts public awareness programmes for waste segregation. Mechanical Engineers from the Transport & Engineering Division oversee the maintenance, repair, and inspection of collection vehicles.

The Boralesgamuwa Urban Council has implemented a separate collection system for waste storage and disposal in all wards. Residents have been instructed to place separated organic waste and other waste into a single storage bag without further segregation. The MC provides a door-to-door collection service, and households place waste by the roadside on the designated collection day mornings.

Regarding Collection and Transportation, the Boralesgamuwa Urban Council directly gathers and transports waste from households. Under the supervision of PHIs, ten collection drivers and forty collection workers (including road sweepers) are responsible for waste collection. The waste collected by the Boralesgamuwa Urban Council is then transported to the Karadiyana dumping site.

According to the truck scale installed at the Karadiyana dumping site, the daily collection volume records at 34 tons. The Boralesgamuwa Urban Council does not impose a waste collection fee on households. Instead, they levy charges by the truckload on large waste generators (those generating more than 500 kg/day) based on the waste type. The Health Education Officer conducts activities to raise public awareness about waste segregation. Mechanical Engineers from the Transport & Engineering Division are responsible for maintaining, repairing, and inspecting collection vehicles.

The waste workers of the BUC conduct the collection of bio-degradable waste on Mondays and Tuesdays, and non-biodegradable waste on Wednesdays and Saturdays each week. Furthermore, the BUC undertakes daily waste collection from the Boralesgamuwa market area between 5.30 a.m. and 6.00 a.m. The BUC actively encourages traders and vendors to segregate their waste and place it by the roadsides for pickup. However, an official from the Urban Council noted,

> *"Despite our appeals for waste segregation, compliance is lacking. The understanding seems to be that the city must be cleaned regardless. While we withhold waste collection from households not practicing segregation, enforcing this within the town proves challenging. We need the city clean by 6.00 a.m. before the influx of commuters. Furthermore, some individuals persist in disposing of*

mixed waste within town limits, capitalizing on our obligation to collect such waste here as well." ***(Key Informant interviews, 2022)***

Apart from household waste, the BUC handles approximately 15 tons of industrial waste monthly, originating from local supermarkets (Food City/Keels Super) and garment factories within the town vicinity. These companies are charged LKR**.** 2000***.00*** per ton for waste collection by the BUC. Additionally, waste management responsibilities extend to two prominent Buddhist temples, the Bellanwila Raja Maha Vihara and the Pillawa Purana Vihara. Both temples are revered Buddhist shrines in the Colombo district, drawing a multitude of pilgrims daily. Most waste generated on the temple grounds consists of bio-degradable waste from various types of flowers and food, alongside discarded cardboard and polythene packaging. The BUC does not maintain precise records on the waste volume from these locations. An officer from the BUC commented,

"Overseeing waste produced at these temples poses challenges. Nearly 95% of the waste is bio-degradable. Despite urging temple authorities to implement proper waste segregation, such efforts have fallen short. Consequently, we collect mixed waste and transport it to the Karadiyana Waste Management Center, incurring a fee of LKR 5000 per truckload. If effective waste segregation is practiced, our expense would reduce to LKR 2500 per truckload." ***(Key Informant interviews, 2021)***

6.4.1 Waste Management Initiatives

The Boralesgamuwa Urban Council has established a waste collection and recycling center known as “Sampath Piyasa” (Resource Center), aimed at gathering economically valuable waste such as metal, glass, plastics, and polythene. The Western Province Solid Waste Management Authority funded the project and provided a small waste collection unit constructed from tin sheets. Situated within the premises of the Boralesgamuwa Urban Council, this center facilitates residents in handing over economically viable waste. The BUC has plans to expand the waste collection unit and has allocated LKR. 700,000 to construct a larger facility.

Another waste management initiative introduced by the BUC is the “Kasala Pola” (Waste Fair). This innovative concept entails a mobile garbage market where residents can deliver economically valuable waste to the BUC. Conceived as a private-public partnership in collaboration with the Central Environmental Authority, the program involves informal solid waste traders operating in Boralesgamuwa who collect economically valuable waste on behalf of the BUC. These traders are associated with independent informal waste workers who carry out garbage collection within the UC area.

The BUC orchestrates the "Kasala Pola" event typically in a local playground or near a Buddhist shrine. Promotional posters and banners are exhibited in proximity to the venue, while the BUC’s media unit spreads awareness of the event and location through a vehicle equipped with loudspeakers. Residents who contribute waste to the informal traders do not receive monetary compensation; instead, they are presented with tree saplings such as banana, guava, lemon, jackfruit, and teakwood for cultivation in their gardens. The BUC conducts a garbage market every two months within one of the ten wards of the Urban Council.

An executive officer from the BUC remarked,

> *“The success of ‘Kasala Pola’ is evident. We have also introduced a compost manure stall in the market, allowing residents to purchase manure for their trees. People enthusiastically participate in the ‘Kasala Pola’ due to its unique nature. Additionally, we distribute leaflets and pamphlets covering topics such as solid waste management, environmental conservation, and home gardening.” **(Key Informant Interviews, 2021).***

6.4.2 Workforce

The waste management labour force at the Boralesgamuwa Urban Council (BUC) consists of a dedicated team of individuals who play a crucial role in ensuring the cleanliness and sanitation of the urban area. Comprising ten truck/tractor drivers and forty waste collection workers, this team is responsible for the vital task of waste collection and disposal. Notably, all the

drivers are male, while only three of the waste workers are females. The BUC's Secretary emphasized the council's unwillingness to hire female waste workers, stating that the challenge arises when they seek permanent positions due to discomfort in working on the roads. As a result, the BUC often reallocates them to different departments and recruits male workers to replace them in the waste collection team, as revealed in the 2019 Key Informant Interviews.

> *"We are more than willing to hire female waste workers. However, an issue arises when they are made permanent, as they often request transfers to different departments due to feeling uncomfortable working on the roads. Consequently, we have to reassign them to another department and recruit male workers to replace them in the waste collection team."*
>
> ***(Key Informant Interviews, 2022)***

Recognizing the importance of their work and the challenges they face, the BUC extends various benefits and support to the waste workers. The laborers receive essential healthcare services, including complimentary health checkups, free spectacles, dental care, and worm treatment. Employed under the classification of laborers, they are entitled to a basic monthly salary of LKR 34,000, along with two days of monthly leave and compensation for overtime hours. However, the nature of their work exposes them to a range of health risks. An officer from the BUC highlighted the struggles waste workers endure, such as bacterial infections, worm infections, and even the risk of contracting diseases like Dengue. These challenges are further exacerbated by their tasks, which include handling waste materials that may include unsanitary items like feces, urine, and unclean sanitary napkins.

> *"Waste workers face numerous challenges. They frequently suffer from bacterial infections, worm infections, and Dengue. The tasks they undertake involve stepping on feces, urine, and even unclean sanitary napkins, which they handle with their bare hands." (Key Informant Interviews, 2021)*

The waste workers of the BUC, while dedicated to their roles, work under

demanding circumstances. The Mayor of the BUC shed light on the multifaceted challenges they confront daily. Their responsibilities involve managing waste while contending with issues like flies, unpleasant odors, and resident complaints. Moreover, a concerning aspect highlighted by the Mayor is the prevalence of addiction among a significant number of waste workers. Some struggle with alcohol and other drug dependencies, which impact not only their well-being but also the stability of their families. To address these concerns, the BUC takes proactive measures to ensure the financial well-being of the workers' families.

> *"They handle waste and endure a multitude of difficulties, including flies, odors, and complaints from residents. They work multiple shifts each day. Additionally, a significant number of our waste workers struggle with addiction, involving alcohol, Ice, and other drugs. We are deeply concerned about their health and the well-being of their families.....Therefore, upon receiving their salaries, we inquire with their spouses if any money has been allocated to the family. If we discover that their earnings are spent on drugs and acquaintances, we withhold salary advances. Furthermore, we've initiated the establishment of bank accounts for their children, deducting a designated amount for deposit into their children's savings accounts."*
>
> ***(Key Informant Interviews, 2022).***

6.4.3 Challenges

The management of solid waste poses significant challenges for the Boralesgamuwa Urban Council (BUC), as revealed through key informant interviews with officials involved in waste management services.

A central issue they confront is the persistent lack of funds, stemming from the BUC's status as one of the least financially endowed Urban Councils in the Colombo district. Consequently, the council's limited income proves insufficient to adequately support waste management initiatives, with a notable disparity compared to more well-funded counterparts like the DMMC.

This financial constraint has far-reaching consequences, impacting the BUC's ability to operate and maintain essential waste management equipment.

Among the specific hurdles faced by the BUC, the condition and operation of their waste collection machinery stand out as a prominent challenge. The council possesses three compactor machines, seven tractors, and relies on a workforce of 50 waste workers. However, it was observed that these tractors are considerably aged and prone to malfunction. An official from the BUC stated,

> *"We have very limited funds; we always use lease facilities to buy new vehicles, and often we don't have enough money to maintain them. Because of this situation, almost every day, one of our vehicles breaks down and disrupts the waste collection process."* ***(Key Informant Interviews, 2021).***

The scarcity of resources forces the council to rely on innovative strategies, such as asking workers to work in double shifts for waste collection, to make the most of their available workforce. Despite these challenges, the BUC remains dedicated to fulfilling their responsibilities to the best of their abilities.

Another significant obstacle faced by the BUC is the high cost associated with waste management. The procurement and maintenance of waste management equipment, including lorries, trucks, and tractors, constitute a considerable financial burden. Moreover, the council incurs a substantial monthly expense of eight hundred thousand rupees for waste disposal at the Karadiyana waste management site. An executive officer of the BUC explained,

> *"We only dispose of 1/3rd of their amounts. Last year I wrote a letter to the Western Province Waste Management Authority (WPSWMA) citing these issues and requested they reduce the payment we have to bear."* ***(Key Informant Interviews, 2021).***

Though the WPSWMA demonstrated some flexibility by reducing the bill by 20%, the overall cost remains high and weighs heavily on the BUC's limited resources.

An additional challenge that intensifies the BUC's waste management efforts is the negative influence of local politicians in waste management activities. The officials revealed that local politicians exert influence to prevent legal actions against waste management offenders, complicating the enforcement of regulations. A waste management officer stated,

> *"Because of these unnecessary interventions, it is difficult for officials to implement good laws and regulations."*
>
> ***(Key Informant Interviews, 2022).***

This interference hampers the BUC's ability to establish effective waste management policies and practices, highlighting the complexities inherent in maintaining a coherent waste management framework amidst external pressures.

In summary, the Boralesgamuwa Urban Council faces a multitude of challenges in its endeavor to effectively manage solid waste. The lack of adequate funds, aged machinery, high operational costs, and political interference all contribute to the complexities of waste management in the region. Despite these obstacles, the council remains committed to its mission, continually seeking innovative solutions to navigate these challenges and provide essential waste management services to the community.

6.5 Informal Waste Management Sector

The informal waste management sector plays a significant role in both the Boralesgamuwa Urban Council (BUC) and the Dehiwala-Mt. Lavinia Municipal Council (DMMC), contributing to the intricate waste management landscape in these areas.

In the informal waste chain, various actors are involved, each playing a distinct role. Small-scale, informal waste workers constitute the first link, working for small-scale waste traders. Equipped with carts or trolleys, these workers collect valuable waste items and are compensated based on the value of their collections. This practice fosters a grassroots approach to waste collection. Further along the chain, small-scale independent waste traders or middlemen

employ a few informal waste workers to gather economically viable waste. These traders accumulate the collected waste in small warehouses before selling it to larger-scale recyclers. Their role is pivotal in bridging the gap between individual collectors and larger recycling operations, with a modest profit margin of 2-3%.

At the top of the informal waste chain are the large-scale recyclers who purchase the accumulated economically viable waste from the smaller traders. These recyclers undertake the purification of waste and transform it into metal billets, which are subsequently exported to countries like India and China. This final stage brings about a significant profit margin of 15% to 20% as the processed waste is repurposed as raw material.

The informal waste traders predominantly focus on collecting recyclable or reusable materials such as various metals, glass bottles, PET bottles, e-waste, and reusable paper. Prices for these materials vary depending on local and regional market demands. Notably, the informal waste traders primarily target economically valuable waste, and residents do not rely on their services for overall waste management needs.

Among the key figures within this sector, an interviewee owning a large-scale solid waste management facility holds a prominent position. His operations span across multiple municipal and urban councils, including the DMMC and BUC. He shared,

> *"I started off with one compactor and two drivers. Today I own three compactors, a few tipper trucks, a few small tractors, and thirty full-time contract workers. I own a large-scale composting yard in the Dampe area. The site has 6 acres, and we compost kitchen waste that we get from our clients. I used to collect recyclable non-biodegradable waste, but now I don't do it as the profit is less due to much competition."*
>
> ***(Key Informant Interview, 2019)***

Another participant, a proprietor of a small-scale, informal recycling business in the BUC area, provides insights into the practical aspects of this sector. He elucidated his journey, explaining,

> *"I started collecting waste when I was a teenager. There were few waste traders back then, so I helped one such informal trader. I collected beer cans and beer bottles from my neighbourhood. Then I started my own collection center with one worker. Now ten workers work for me, and I collect recyclable waste items such as glass bottles, iron, copper, aluminum, plastic items, repairable electronic items, etc. From 2016 this business has become less profitable; the prices of recyclable items have decreased as China and India have decreased their imports."* ***(Key Informant Interview, 2019)***

His experiences shed light on the evolution of the informal waste management sector over the years, emphasizing the challenges posed by changing market conditions, such as reduced prices due to shifts in global recycling patterns.

The informal waste management sector has carved out a unique niche within the Boralesgamuwa Urban Council and Dehiwala-Mt. Lavinia Municipal Council, offering a diverse array of services that cater to the distinct needs of local communities. These informal waste traders operate strategically within specific neighbourhoods, carefully selecting areas with a higher concentration of government and private sector employees. One of the traders elaborated on this approach, saying,

> *"Our operational focus on areas like Papiliyana, Raththanapitiya, 10th Mile Post, and Kohuwala allows us to tap into a stream of valuable resources. Residents in these regions often dispose of items like bottles, old computers, machines, bicycles, and plastic items. By targeting such localities, we can efficiently collect and process these materials for recycling and reuse."* ***(Key Informant Interview, 2021).***

Beyond their waste collection role, these informal waste traders provide a range of services that respond to the needs of the community. One trader outlined the comprehensive nature of their offerings, detailing,

> *"Our engagement with the community extends beyond waste collection. We purchase recyclable or reusable items from residents, offering fair rates for different materials. For example, we compensate LKR 10 per kilogram for paper and newspapers, LKR 20 for iron, LKR 150 for copper, LKR 100 for aluminum, and LKR 10 for clear glass bottles or a kilogram of coconut shells. Furthermore, we respond to requests for property clean-ups, whether it's clearing old houses, stores, or land. Our cleaning service, priced at LKR 100, not only ensures tidiness but also presents an opportunity to recover any recyclable items. These salvaged materials find their way to our warehouse, where they're sorted and preserved for eventual sale."* ***(Key Informant Interview, 2021)***

The presence of the informal waste management sector not only aids in minimizing waste accumulation but also plays a vital role in addressing specific community requirements. As these traders navigate their targeted areas and provide an array of services, they contribute to both local waste reduction efforts and the overall well-being of the residents.

6.6 Relations between informal waste traders and local councils

The interactions between the informal waste management sector and the local councils present a diverse range of perspectives. A prevailing challenge is the perception of stigma associated with informal waste workers and traders, often labeling them as thieves or involved in illicit activities. An officer from the Boralesgamuwa Urban Council highlighted concerns about the practices of informal waste workers, stating,

> *"The informal waste workers have their own agenda. They will do anything to make a profit. Sometimes, informal waste workers charge LKR 100 – 200 and collect mixed waste from households. They then dump the mixed waste bags in the town area since they*

know that we have to collect any type of waste to clean the town area. This is a huge issue for us as we have to pay LKR 5000 to the Karadiyana Dumping site to dump a truck full of mixed waste."
(Key Informant Interview, 2020)

Additionally, there are concerns about safety and environmental impacts. An executive officer from the Dehiwala-Mt. Lavinia Municipal Council raised issues related to improper storage and handling of waste by informal traders,

"They do more harm than good. They do not properly store collected waste items. Especially they do not properly store metal items, acids, expired batteries, etc. We have seen many cases where these items have exploded, injuring people and children. Leakage from acid batteries has polluted canals, rivers, and waterways. Also, when incorrectly stored, recyclable items react with other items and produce toxic gases and chemicals. We get at least one complaint weekly about informal waste traders."

(Key Informant Interview, 2020)

Conversely, a more positive outlook was evident among some officials who acknowledged the valuable contributions of the informal waste sector. An executive official of the Dehiwala-Mt. Lavinia Municipal Council expressed appreciation for their services, highlighting how these informal workers effectively manage recyclable waste, thus alleviating the burden on the council's resources.

"The Dehiwala-Mt. Lavinia Municipal Council is appreciative of the services that are provided by informal solid waste workers to our residents and also to our council. According to our records, there are 34 informal solid waste traders in the DMMC wards. They manage most of the recyclable waste generated in the DMMC, if not for them, the DMMC would have to spend additional funds to manage recyclable waste. When we think about the salaries, vehicle maintenance, and fuel costs, they are actually saving millions for us each month."

(Key Informant Interview, 2022)

This sentiment was echoed by an elected member of the same council who emphasized the extensive reach and efficiency of the informal sector, emphasizing their pivotal role in preventing waste management challenges.

> *"As a committee, we recognize and greatly value the invaluable contributions provided by the informal workers. They effectively manage nearly all of the recyclable waste, a feat that, frankly, we would struggle to replicate. Their scope of services is extensive, boasting an expansive network and a well-maintained fleet of vehicles for waste collection. Notably, they facilitate payments to residents for their waste and actively purchase recyclables from them…. Their adaptability is commendable. If their waste collection operations were to cease, it would undoubtedly trigger an immense predicament, not solely for the Dehiwala-Mt. Lavinia Municipal Council, but for all councils at large. Given our current absence of comprehensive recycling facilities, we would be compelled to allocate substantial resources towards utilizing disposal sites such as Karadi Yana and other dumping areas."*
>
> ***(Key Informant Interview, 2022.)***

The authors acknowledge that there is a certain degree of validity to the allegations against informal waste traders, as instances of inadequate waste storage practices, including the improper handling of hazardous materials were observed while collecting data. Residents in proximity to waste traders also raised concerns about unhygienic conditions in recycling centers. In a separate interview, an owner of a large-scale waste and recycling company active in the Dehiwala-Mt. Lavinia Municipal Council area was found to have a dual role as a prominent drug dealer, potentially tainting the sector's reputation.

Despite the largely negative outlook towards informal sector, both the Dehiwala-Mt. Lavinia Municipal Council and the Boralesgamuwa Urban Council recognize the pivotal role played by informal waste workers. Efforts to foster positive relations are evident, with steps taken to register and allocate wards to informal waste collectors, aiming to enhance collaboration in waste management. The Boralesgamuwa Urban Council's "Kasala Pola" programme

serves as an example of this engagement. However, mixed sentiments among informal waste traders about formalization and collaboration with councils underscore the complexities of this relationship.

6.7 Challenges Experienced by Informal Waste Workers

The informal waste management sector in both the Boralesgamuwa Urban Council and Dehiwala-Mt. Lavinia Municipal Council faces a myriad of challenges that significantly impact their operations and sustainability. These challenges encompass market dynamics, social perception, inadequate support from local councils, and even illicit demands from officials.

The volatility of the market for recycled materials constitutes a prominent hurdle for informal waste workers. The demand for recycled metals like iron, copper, and aluminum has dwindled due to governmental decisions, causing a decrease in profitability. An informal waste and recycling business owner in Ratmalana lamented the situation, stating,

> *"The market value has now diminished to the extent that I can scarcely meet payroll. The downturn extends not only to metals but to plastics as well, with China discontinuing purchases of polythene and plastics since 2018. It is imperative that the government considers our contributions before making decisions regarding the import of metals and plastics, given the significant financial contributions we make to the country."* ***(Key Informant Interview, 2019)***.

Another waste collector, operating his own small business within the Boralesgamuwa Urban Council area stated,

> *"Implementing a standardized pricing structure for each item by the government would be a substantial aid to us. Currently, prices for the items we collect are determined by large-scale recyclers such as K.S. Enterprises and RAM Brothers. Although we operate on a slender profit margin, typically ranging from LKR 2 to 5 per kilogram, it's widely understood that large-scale recyclers extract approximately LKR 300 per kilogram, specifically from paper waste alone. This discrepancy is emblematic of a concerning situation that demands*

attention." ***(Key Informant Interview, 2020)***.

This predicament echoes the broader struggles faced by these workers, impacting their income and stability.

Further exacerbating their challenges is the social stigma associated with their profession. Informal waste traders are often labeled negatively as "junkies" and "thieves," resulting in verbal and even physical abuse from residents, police, and municipal employees. This stigma hinders their ability to operate effectively and contributes to a hostile work environment. One small-scale trader conveyed this sentiment, saying,

> *"You must have noticed that all my workers are really old... they do not like to be known as a 'Bothal-Paththarakaraya' - one who collects bottles and newspapers for a living."* ***(Key Informant Interview, 2020)***

Another informal waste trader stated the following,

> *"In general, waste workers are disparagingly referred to by this title. If we could recruit younger individuals, we would be better equipped to provide a more efficient service. Waste collection is a labour-intensive endeavor, involving hours of cart-pushing across distances of ten to twenty kilometers. Consequently, by the end of the day, waste workers often resort to alcohol consumption. Unfortunately, society tends to cast all waste collectors as either drug addicts or alcoholics."* ***(Key Informant Interview, 2020)***

He further emphasized,

> *"I am confident that all my waste workers encounter verbal abuse at least once per month. Certain individuals even resort to threats of physical violence if waste workers venture into their neighbourhoods. In the event of theft within an area we service, law enforcement consistently summons my workers for statements. Despite the fact that our role benefits society, a nuanced understanding of our contributions is conspicuously absent."*
>
> ***(Key Informant Interview, 2020)***

Furthermore, the relationship between informal waste workers and local councils is complex. While some officials recognize and appreciate their services, others hold a less favourable view. Some officials consider informal waste traders as a crucial component, acknowledging that they substantially manage recyclable waste and contribute to cost savings. However, there are instances of negative perceptions.

Additionally, the informal waste management sector encounters obstacles due to the lack of proper guidance and involvement from local councils and the central government. There are instances where waste management experts have offered their expertise and technology to councils, but their offers have gone unheeded. An owner of an informal waste management company expressed frustration, stating,

> *"Municipal councils continue to overlook the potential of our services as a resource. I have offered my technology and services to municipal councils, but their officials and politicians have shown little enthusiasm in engaging with me. My expertise lies in industrial compost production, and I possess the infrastructure to convert kitchen waste into compost within a day. I even proposed to install and operate this technology free of charge on government-owned land, generating daily compost. Regrettably, my appeals to allocate 600 m2 of land and facilitate a three-phase connection have fallen on deaf ears within the council."* ***(Key Informant Interview, 2020).***

This lack of recognition inhibits the sector's growth and its potential contributions to waste management efforts. In conclusion, the informal waste management sector faces a multitude of challenges, ranging from market fluctuations and social stigma to inadequate support. Despite these obstacles, there is a growing recognition of the pivotal role that informal waste workers play in managing municipal solid waste. The collaboration between local councils, the central government, and the informal sector can lead to more effective waste management strategies and contribute to a cleaner and more sustainable environment.

6.8 Conclusion

In essence, this chapter delved comprehensively into the intricate domain of municipal solid waste management, shedding light on the operational intricacies and challenges encountered by the Dehiwala-Mount Lavinia Municipal Council (DMMC) and the Boralesgamuwa Urban Council (BUC). A meticulous examination of the existing waste management landscape unveiled a complex fabric woven from a diverse range of elements, encompassing waste collection, intermediary treatment, and the dynamic involvement of the informal waste sector.

Ultimately, this chapter presented an exposition of challenges and endeavors within the realm of municipal solid waste management, employing the DMMC and BUC as paradigmatic case studies. Spanning from formalized systems to the vibrant informal sector, the panorama depicted a sophisticated orchestration of actions, perceptions, and evolving circumstances. Effectively addressing these challenges and harnessing the inherent potential embedded within both formal and informal domains will undeniably play a pivotal role in shaping comprehensive and sustainable waste management strategies for the times ahead.

7. Conclusion

The intricate tapestry of municipal solid waste management (MSWM) in Sri Lanka weaves together both decentralized and centralized elements, resulting in a nuanced system that reflects a careful balance of national and local coordination. While the facade suggests decentralization, a closer inspection unveils the vital role played by central institutions at the national level, such as ministries and authorities. These entities wield authority over policy formulation, funding allocation, and oversight. By establishing a cohesive policy framework, they lay the foundation for waste management practices across the nation, setting the tone for efficient and sustainable management.

At the provincial level, the responsibility for waste management lies in the hands of Provincial Councils and their affiliated bodies. These entities shoulder the task of supervising waste management activities within their respective regions. Their purview encompasses funding allocation, tailored regulation formulation, and targeted interventions to address the unique challenges and demands of each province. By working in tandem with national bodies, they ensure a harmonious alignment of efforts, translating overarching policies into effective on-ground actions.

Moving further down the hierarchy, local councils emerge as the bedrock of practical implementation. Municipal councils and urban councils bear the mantle of direct authority over the collection, treatment, and disposal of municipal solid waste within their jurisdictions. They orchestrate the establishment of waste collection systems, the development of treatment facilities, the promotion of waste segregation at the source, and the enforcement of proper disposal practices. While collaborating with provincial and national institutions, these councils embody the day-to-day management and operational aspect of waste management, effectively bridging the gap between policy and action.

In this symphony of coordination, the municipal solid waste management architecture of Sri Lanka emerges as a finely tuned ensemble, with each level of governance playing a distinct yet interconnected role. This hierarchical model showcases the interdependence between the national, provincial, and local tiers.

The narrative underpinning municipal waste management in Sri Lanka follows a winding path that has evolved over decades. Central to this narrative is the concept of "nuisance," which was initially introduced during British colonial rule in 1939 to manage waste in urban centers. Despite its origin as a pragmatic solution, successive governments have perpetuated this narrative, resulting in an entrenched perspective that influenced waste management policies and practices. Over time, the narrative expanded to encompass environmental pollution, adding new dimensions to the discourse.

In 1980, the Environment Act injected a fresh narrative of environmental degradation into the existing "nuisance" discourse. This narrative justified the perpetuation of the "out of sight, out of mind" approach to waste management, further reinforcing the status quo. In the late 2000s, a new facet emerged with the introduction of an "urban beautification" narrative. This addition strengthened the existing "nuisance" narrative, linking waste management with the aesthetic enhancement of urban spaces. Collectively, these contextual narratives have shaped and perpetuated the waste management discourse in Sri Lanka, molding its trajectory and influencing decision-making processes.

The collapse of the Meethotamulla waste dumping site in 2017 stands as a poignant turning point, spotlighting the consequences of an entrenched narrative and highlighting the urgency of comprehensive reform. This catastrophic event exposed the vulnerabilities within Sri Lanka's waste management ecosystem, spurring the formulation of the National Waste Management Policy (NWMP) as a decisive step towards rectifying systemic deficiencies. Communities in the selected local councils recognized the significance of responsible waste segregation and proper disposal methods, prompting a groundswell of support for sustainable waste management practices. This surge in awareness, coupled with legal and regulatory changes prompted by the disaster, emphasized the capacity of policy adjustments to address immediate concerns, such as curbing unregulated dumping and reducing plastic consumption.

Findings, also revealed the significant role informal waste management sector in the selector local councils. The informal waste management sector contributes heavily to the recycling and reuse of waste produced within the local councils. Moreover, it significantly reduces the burden on formal waste

management activities carried out by the local council. Despite active role played by the informal sector to the MSWM, they encounter a range of challenges while engaging in waste management.

By drawing from the lessons of the past, embracing innovation, collaboration between formal and informal sectors and fostering a sense of shared responsibility, Sri Lanka can chart a course towards a future defined by efficient, environmentally conscious, and community-driven waste management strategies.

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