



Multilevel Solid Waste Governance

An Analysis of Governmentalities and their Expression in Solid Waste Practices in Sri Lanka

MSc. Thesis by Alya Serena de Bie

March 2017

Cover Picture: Waste Pile at the Negombo Waste Management Centre (own work)

Title page

Multilevel Solid Waste Governance

An Analysis of Governmentalities and their expression in Solid Waste Practices

Master's thesis

March 12th, 2017

As partial fulfilment of the MSc 'Sustainable Development'

Faculty of Geoscience, Utrecht University

Alya Serena de Bie

alya.debie@gmail.com

a.s.debie@students.uu.nl

Supervised by:

Dr. Kei Otsuki

Assistant Professor, Faculty of Geosciences

Utrecht University, The Netherlands

k.otsuki@uu.nl

Dr. Sudarshana Fernando

Resource Recovery and Reuse Expert

International Water Management Institute HQ, Sri Lanka

S.C.Fernando@cgiar.org

Dr. Pay Drechsel

Theme leader, Resource Recovery, Water Quality and Health

International Water Management Institute HQ, Sri Lanka

P.Drechsel@cgiar.org

Second Reader:

Dr. Sebastiaan Soeters

Researcher, Faculty of Geosciences

Utrecht University, The Netherlands

S.R.Soeters@uu.nl



Universiteit Utrecht

Faculty of Geosciences



CGIAR



Executive Summary

Improper urban solid waste management is one of the most urgent problems currently faced by humanity. Exposure to solid waste cause a variety of health issues for inhabitants of cities and beyond. The topic has gained a lot of international attention over the past few years. Recently, 171 countries signed the Paris Agreement (2016), which identifies the concept of '*Zero Waste*' as a top priority. Under the previous decentralized and privatized system concerning the solid waste governance the desired results were not achieved. The Sri Lankan national government centralized its policy concerning solid waste governance after signing the Paris Agreement. This shift towards centralization makes Sri Lanka a very interesting case study to investigate solid waste governance.

To analyse solid waste challenges in Sri Lanka, the concept of multilevel governance is discussed. In order to understand the effects of power within governance, the concept of governmentality is introduced. With the help of these concepts, and the practice theory, the practice of solid waste segregation is placed at the centre of analysis. The data collected for this thesis is based on three months of empirical research in two case study sites in Sri Lanka. Household surveys, which included (n=) 140 respondents, have been held. These surveys revealed baseline household data, household awareness levels, their segregation practices, and their overall mentality towards waste segregation. In addition to the quantitative data collection, other methods have been used. In-depth interviews, informal conversations and conversations with households, key-informants, researchers and experts, as well as observations, lie at the basis of the qualitative data collection.

Results show that due to the large differences in local governance within the municipal councils, and the large differences between collection services, the household practices in both case studies are quite different. Results also show that the local governance is very important and greatly impacts the practices of the waste chain actors and the households. Local governmentalities are an important factor in deciding policy, but centralized policy by the national government has little influence on either local governmentalities or practices. A more hybrid governance structure is suggested to improve the solid waste situation in Sri Lanka.

Acknowledgements

First of all, I would like to thank the International Water Management Institute in Sri Lanka for hosting me for three months and facilitating my research. All staff and researchers whom I approached for help were more than willing to sit down with me and discuss my research plans. During various discussions, meetings and my final presentation, I gained new insights and I was challenged to achieve the best possible results in my thesis.

Through IWMI I also gained a lot of contacts, which made it possible for me to interview people from the National Solid Waste Management Support Centre, Ministry of Local Government and Provincial Councils, the Deputy Manager of Planning and implementation, Central Environmental Authority, Community Development Officer and Deputy Community Development Officers and the Public Health Inspectors and solid waste management program head in municipal council office. I am also grateful to all of my respondents, who were patiently willing to answer all my questions and let me “observe” their waste practices inside their homes. A special note of gratitude to my colleague and friend Christina who joined me at all my meetings and translated hours of interviews for me. I couldn’t have done it without you.

This thesis would not have been the same without my supervisor Kei Otsuki. Thank you so much for supporting and advising me along the way, and standing by me through the various struggles I faced during this research.

I would also like to thank my host family in Sri Lanka whom I stayed with for three months. Thank you Gini and Malika for opening your home to me, and being my family away from home.

Last but not least my gratitude goes out to my always loving and supportive parents.

Table of Contents

Executive Summary	II
Acknowledgements	III
Table of Contents	IV
List of Figures	VI
List of Tables	VI
List of Information Boxes	VI
List of Appendices	VII
List of Abbreviations	VII
Conversion Factors	VII
Chapter 1: Introduction	1
Chapter 2: Theoretical Framework	4
2.1 Solid Waste Governance	4
2.2 Governmentality	7
2.3 Solid Waste Practices.....	8
2.4 Objective and Research Questions.....	12
Chapter 3: Contextual Framework	13
3.1 Solid Waste Policy in Sri Lanka.....	14
3.1.1 Historical Overview of Solid Waste Governance	14
3.1.2 Current Governmental Solid Waste Policy: Centralization.....	14
Chapter 4: Research Methods	16
4.1 Stratification.....	18
4.2 Quantitative Data Collection: Household Survey.....	22
4.3 Qualitative Data Collection	23
4.4 Limitations to the Study and Study Bias	25
Chapter 5: Governmentalities and Centralization	26
5.1 Central Government	26
5.2 Western Provincial Council	30

5.3 Kaduwela Municipal Council	32
5.4 Negombo Municipal Council	33
5.5 Summary “Governmentalities and Centralization”	35
Chapter 6: Household Practices	36
6.1 Kaduwela Municipal Council	37
6.2 Negombo Municipal Council	40
6.3 Practices: Comparison in Numbers	45
6.3.2 Governmentalities and Practices	49
6.4 Summary – Household Practices	51
Chapter 7: Results on Practices from ‘Collection to Dumping Grounds’	53
7.1 Kaduwela Municipal Council	54
7.2 Negombo Municipal Council	57
7.3 Summary – ‘From Collection to Dumping Sites’	61
Chapter 8: Discussion	63
Chapter 9: Conclusion.....	67
Bibliography	70
Appendices	75

List of Figures

FIGURE 1 MAP OF SELECTED CASE STUDIES.....	13
FIGURE 2 NEWSPAPER CLIPPING	15
FIGURE 3 OVERVIEW OF THE RESPONDENTS AND THEORETICAL FRAMEWORK.....	17
FIGURE 4 EXAMPLES OF STRATA AREAS IN BOTH CASE STUDIES.....	19
FIGURE 5 WARD MAP OF KADUWELA	20
FIGURE 6 WARD MAP OF NEGOMBO	21
FIGURE 7 GUIDELINES FOR HOUSEHOLD WASTE MANAGEMENT	28
FIGURE 8 GAZETTE BY WESTERN PROVINCE PROVINCIAL COUNCIL.....	30
FIGURE 9 OVERVIEW OF CHAPTERS	36
FIGURE 10 ORGANIC STORAGE BIN (LEFT) AND COMPOST BIN (RIGHT), SEEN IN KADUWELA MC ...	37
FIGURE 11 LEAFLETS DISTRIBUTED IN NEGOMBO MC.....	43
FIGURE 12 ROAMING WASTE (LEFT) AND INTERVIEW ON THE NEGOMBO BEACH (RIGHT).....	44
FIGURE 13 PRACTICES PER STRATA.....	45
FIGURE 14 INORGANIC WASTE PRACTICES	45
FIGURE 15 ORGANIC WASTE PRACTICES	45
FIGURE 16 PRACTICES PER COUNCIL.....	45
FIGURE 17 INDICATED REASONS FOR WASTE SEGREGATION	47
FIGURE 18 OVERVIEW WASTE CHAIN KADUWELA	54
FIGURE 19 OVERVIEW WASTE CHAIN NEGOMBO	57
FIGURE 20 COMPOST YARD, NEGOMBO.....	59
FIGURE 21 GRADING CENTRE, NEGOMBO	60
FIGURE 22 WASTE COLLECTION - NEGOMBO AND KADUWELA	61

List of Tables

TABLE 1 OVERVIEW CASE STUDIES	16
TABLE 2 STRATIFIED SAMPLE SIZE	18
TABLE 3 SAMPLING IN EACH MUNICIPAL COUNCIL.....	22
TABLE 4 COMPARISON CASE STUDIES.....	49
TABLE 5 FROM COLLECTION TO DUMPING SITES - COMPARISON BETWEEN CASE STUDIES	62

List of Information Boxes

BOX 1 VIGNETTE 1: ILLUSTRATION OF THE CENTRAL GOVERNMENT'S INTEREST IN WASTE.....	26
BOX 2 GAZETTE OF THE DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA - WESTERN PROVINCE PROVINCIAL COUNCIL	31
BOX 3 5-YEAR PLAN IMPLEMENTED IN KADUWELA	34
BOX 4 VIGNETTE 2: INTERVIEW WITH KADUWELA'S LOCAL AUTHORITY.....	34
BOX 5 VIGNETTE 3: INTERVIEW WITH A SOCIETAL ACTOR, REPRESENTATIVE OF THE MAJORITY OF STRATA B'S INHABITANTS	39

List of Appendices

APPENDIX 1 GOVERNMENT STRUCTURE AND RELEVANT ACTORS	75
APPENDIX 2 DAILY MIRROR NEWSPAPER CLIPPINGS	79
APPENDIX 3 NEWSPAPER CLIPPING	80
APPENDIX 4 DAILY NEWS NEWSPAPER CLIPPING	81
APPENDIX 5 LIKERT SCALE	82
APPENDIX 6 LIKERT SCALE VARIABLES AND THEMES	83
APPENDIX 7 SURVEY	84
APPENDIX 8 RECYCABLES COST OVERVIEW	102
APPENDIX 9 COMPARISON BETWEEN STRATA AREAS IN PERCENTAGES	102

List of Abbreviations

CEA	Central Environmental Authority
GDP	Grosse Domestic Product
GoSL	Government of Sri Lanka
ISWM	Integrated Sustainable Waste Management
LA	Local Authority
LF	Landfill
MC	Municipal Council
MSW	Municipal Solid Waste
NGO	Non-Governmental Organization
SDG	Sustainable Development Goal
SWM	Solid Waste Management
UC	Urban Council
UNEP	United Nations Environment Program
UNOPS	United Nations Office for Project Services
WHO	World Health Organization
WPC	Western Provincial Council

Conversion Factors

1 Sri Lankan Rupee	=	0.0063 Euro	=	0.0066 US dollar
158.53 Sri Lankan Rupees	=	1 Euro	=	1.05 US dollar
1 Acre	=	160 Perches	=	4000 m ² (Sqm.)
1 Perch	=	25.29 m ² (Sqm.)	=	0.0063 Acres

Chapter 1: Introduction

The increasing quantities and toxicity levels¹ of urban waste are one of the most urgent problems currently faced by humanity. Due to rapid urbanization, industrialization, a GDP rise, and an increase in consumerism in combination with the disability of some developing countries to conquer the challenges posed by these trends, the harmful waste and pollution levels are expected to increase (Un-habitat, 2008).

In Asia this rapid economic growth is very evident, and goes hand in hand with uncontrolled and unmonitored urbanization. These proceedings, along with insufficient institutional facilities, governmental policies, legislations concerning solid waste disposal, and a lack of public awareness of and commitment to sustainable waste disposal have led to grave implications (Vidanaarachchi, Yuen, & Pilapitiya, 2006; Visvanathan & Trankler, 2001). Insufficient financial resources, technical expertise and areas suitable as disposal sites are additionally noted as causes for lacking waste management services (Vidanaarachchi et al., 2006).

The uncollected solid waste² is often is dumped in the streets, which can increase the occurrence of flooding and the cultivation of insect and rodent hubs. Other environmental impacts include surface and ground water contamination, soil contamination, air pollution caused by waste burning, and uncontrolled methane gas emission caused by anaerobic waste decomposition (Zurbrügg, 2003). At household and community level, the lack of proper solid waste management increases the likelihood of people contracting diseases and of people suffering from malnourishment (Un-habitat, 2008). People living in urban areas can suffer from Salmonella, typhoid fever and diarrhoea as a result from waste accumulation (Dubbeling, Bucatariu, Santini, Vogt, & Eisenbeiß, 2016) Solid waste management is thus of paramount importance in order to ensure a safe natural and human environment (Visvanathan & Trankler, 2001).

Internationally, the topic of sound solid waste management has gained a lot of attention over the past few years. In the Johannesburg Declaration on Sustainable Development, signed in 2002 and adopted at the World Summit on Sustainable Development, solid waste was one of the focus points. Priority was given to solid waste prevention and minimization, reuse and recycling. The importance of waste was further recognized in the Rio+20 outcomes, as well as in the 2006 Dubai Declaration and the Conferences of the Parties to the Basel, Rotterdam and Stockholm conventions in Geneva in May 2013. In 2014, the issue of solid waste management and hazardous waste management was determined to be very important to achieve global sustainable development (Arora, 2015; Global Alliance on Health and Pollution, 2015; United Nations Department of Economic and Social Affairs, 2016).

¹ Poor waste management is affecting ecosystem services and environmental health. Currently, the majority of mixed waste is dumped in open landfills. Landfills emit 'greenhouse' gasses (Carbon and Methane), which are negatively impacting global warming and climate change (Aprilia et al., 2012).

² Solid waste is a non-liquid material which has lost their value to the first user. It can be made of organic or inorganic materials. Residential solid waste refers to solid waste from households

The topics of pollutions, chemicals and waste have been targeted by the Sustainable Development Goals (SDG) "Transforming our world: the 2030 Agenda for Sustainable Development" under the respective goals of Health, Water & Sanitation, Sustainable Consumption and Production and Marine Conservation (Arora, 2015; Global Alliance on Health and Pollution, 2015; United Nations Department of Economic and Social Affairs, 2016). The Paris Agreement (2016) further identifies the concept of 'Zero Waste' as a top priority, and aims to increase recycling, composting and to minimize waste. The real solutions now lie in the hands of national governments to "establish national goals for waste reduction and resource recovery" (Lombardi, 2017).

One of the 171 countries that signed the Paris Agreement on Climate Change is Sri Lanka (Ceylon Today, 2016). On the national level, the general trend in solid waste management has **shifted** from a focus on **privatization** and **decentralization** to **centralization**, as it became clear that a decentralized system depending on local authorities was not generating sustainable results³.

"Waste collection and disposal have become a serious concern in Sri Lanka with the expansion of urban population and rapid changes of the consumption pattern. Local Authorities (LAs) are responsible for municipal solid waste management in Sri Lanka, however the capacity of LAs in general is not sufficient to manage all the waste generated in the limit of LAs. Only 40% of the waste is regularly collected and only limited LAs run sanitary land filling practices at present" (UNFCCC, 2016)

As a result of the failing decentralized and privatized system of solid waste management, combined with the act of Sri Lanka signing the Paris Agreement, Sri Lanka is currently pursuing a shift towards centralization in governmental policy and legislation regarding solid waste governance. Due to this shift in waste management organization, and the new emerging trends revolved around solid waste governance, Sri Lanka is an interesting and relevant country to study the problem of solid waste governance. When exploring this shift seen in Sri Lanka, it is very important to understand the role of all actors within the waste system, and the attitudes and waste segregation practices of households (Aprilia, Tezuka, & Spaargaren, 2012). With my thesis, I aim to understand the extent to which a shift in governance, combined with a changing interaction between actors⁴ can influence household waste segregation practices⁵, waste collection services and the sustainability of waste dumping sites.

The theories and concepts of **multileveled governance**, **governmentality**, and the **practice theory** will be applied in this thesis to create a better understanding regarding the centralized solid waste governance in Sri Lanka, the involved governmentalities and their expressions on solid waste segregation practices. The

³ Please find a detailed historical overview of the shift in waste governance in Paragraph 3.1.1

⁴ Actors are understood in this thesis as human agents which stand central in social analysis. Here the actor is purposeful, know, reasoning, aware and conscious. Actions are carried out by these actors in and through the practices they enact (Giddens, 1986)

⁵ This thesis follows Giddens (1984) in the ambition to study practices as unit of focus, and thus steering away from individuals and citizens

central question⁶ that will be answered in this thesis is: *“What are the effects of the recently introduced centralized policy on solid waste governance on governmentalities and practices in Sri Lanka?”*.

Understanding the governance shift towards centralization is complex. The municipalities within Sri Lanka have been exposed to different levels of local governance interventions under the decentralized governance structure. Therefore, centralization may have varying effects on different local spheres, with each sphere involving various actors with dissimilar perspectives and waste related challenges (Loorbach, 2010).

As there is no pre-defined clear-cut solution to the long term and persistent waste management problems faced by the peoples of Sri Lanka, this research will aim to explore governmentalities and practices regarding solid waste within Sri Lanka. In this thesis, the effects of centralization as a new governance policy will be explored in two different case studies which have different levels of prior exposure to waste management interventions. Whereas the first case study (Negombo municipal council) has low levels of public awareness and no prior pro-waste segregation interventions; the second case (Kaduwela municipal council) has been exposed to waste segregation incentives and awareness interventions. As the two case studies have different initial societal structures and local governance patterns, it is expected that the initial governmentalities of authorities, service providers and households vary between the case study sites. As it is likely that there are different degrees of public awareness to the idea of household waste segregation, it is expected that the actors inhabiting Negombo will portray less sustainable waste segregation practices than those living in Kaduwela. Therefore, the multilevel waste governance structure is expected to have a direct impact on governmentalities and practices within each level of governance.

I have introduced several concepts and terminologies in this introduction, including governmentality, governance and waste segregation practices. These will be discussed in further detail in Chapter 2 (Theoretical Framework). The objective, research questions and research gap will be discussed in Chapter 2 as well. Chapter 3 will provide the contextual framework, in which the solid waste policy in Sri Lanka will be discussed. Chapter 4 will discuss the research methods used for this thesis. The following chapters will provide the results - first the results on governmentalities and centralization will be discussed (Chapter 5), then the results on household practices (Chapter 6) and lastly the results on the practices of the waste collectors and workers of the compost yards and waste grading centres will be discussed (Chapter 7). Chapters 8 and 9 will provide a conclusion and discussion of the results.

⁶ Please find a more detailed discussion of the research question in Subchapter 2.4

Chapter 2: Theoretical Framework

2.1 Solid Waste Governance

Within the niche of development studies, governance has become quite a buzzword which can be interpreted in different ways: as a weakened state-centric view of power, as civil society actors participating in policy making and thus moving away as subjects of the government, and as self-regulation by individual and collective actors (Torfing & Sorensen, 2014). Interactions between various actors and within created networks take place in these governance systems. These actors may have different objectives (N. Rose, O'Malley, & Valverde, 2006). Here the state as central government is not almighty but needs other actors, and therefore is not solely governing. Their practices are referred to as governance. Governance can thus be understood as a regulatory practice to solve societal problems, and environmental governance is a cognate concept used when speaking of governance in the niche of environmental issues. One of these societal environmental current issues is improper solid waste management.

Environmental governance aims to influence environmental actions and behaviours by a set of regulatory actions undertaken by a variety of actors. It can be seen as the changing "reproduction of practices, systems and networks towards greater sustainability" (P. 815, Spaargaren, 2011). Environmental governance can also be understood as being "*synonymous with interventions aiming at changes in environment-related incentives, knowledge, institutions, decision making, and behaviours*" (p. 298, Lemos & Agrawal, 2006). The most relevant and current trends seen in current environmental governance are decentralized governance, market based governance, governance across scales and governance across boundaries expressed through globalization. This globalization is associated with neoliberal policy reforms, which can be seen in shifting power, decentralization and privatization (Lemos & Agrawal, 2006).

When we zoom in on solid waste governance as an aspect of environmental governance, similar trends can be seen. About a decade ago, neoliberal policy reforms were commonly believed to improve solid waste governance. The importance of community based management, environmental policy decentralization and self-governance is emphasized by quite a number of scholars researching common property and political ecology (Lemos & Agrawal, 2006), as well as the value of non-state actor partnership within solid waste governance (Louise Bjerkli, 2013) and the relevance of the often neglected informal sector (Nzeadibe & Anyadike, 2010).

Although decentralization and privatization were very popular trends within waste governance in developing countries, the legal sphere in which private partnerships were supposed to take place, were often not strong enough and lacked strong regulations, transparency and accountability. The coping capacity of private sectors also lacked the ability to regulate and monitor the performance of the solid waste service delivery (M. P. van Dijk & Oduro-Kwarteng, 2007). The level of society (demographic growth, consumerism), the levels of problems facing society (increased waste, pollution), and the levels of dealing with these problems (governance) have all

become more complex over time (Loorbach, 2010). The public sector has not been doing much better; within cities in developing countries, municipalities are faced with grave challenges to provide an efficient and effective system to manage their inhabitants' waste, and their lack of financial resources and organization is not helping the situation (Guerrero, Maas, & Hogland, 2013). This caused the overall service delivery in most developing countries to fail, and diverted the focus towards a chain approach, which involved communities and highlighted the need to segregate and treat waste at the source (M. P. van Dijk & Oduro-Kwarteng, 2007). As will be explained in Paragraph 3.1 in further detail, solid waste governance within the area of interest, namely Sri Lanka, is now following a centralized approach. This is in line with several environmental sustainability and international development scholars who state that localized governance and decision making is not per necessarily the solution to achieve social justice and environmental sustainability (Purcell, 2006 and Purcell & Brown, 2005 in Owens and Zimmerman, 2013). Landstrom (2006) who has research coastal governance in Sri Lanka, found that "*the degree to which coastal communities have gained any degree of influence with respect to the management of coastal land and resources remains questionable*" (p. 2, Landstrom 2006 in Owens and Zimmerman, 2013). A number of scholars agree about the need for a more involved central government, or the need for centralization (Owens & Zimmerman, 2013).

Centralization could facilitate the mobilization of action, and permits simple central problem solving (Rijke, Farrelly, Brown, & Zevenbergen, 2013). A centralized governance structure usually applies the control and command mode of governance, which is known as an *administrative rationality* form of governance with delegated rationalities via supranational institutions⁷ or as an *economic rationality* working with economic incentives. Decentralized governance, on the other hand, is often involved with voluntary and/or market-based modes in which people are stimulated by community based awareness enhancing programs, broadened knowledge and networks of participating citizens. This is also known as *deliberative rationality* (Backstrand, 2010).

Enabling Hybrid Multilevel Governance

Although a need for power in the form of centralization is very obvious, the incorporation of that real power into governance is not always addressed by research scholars (Owens & Zimmerman, 2013). Even when a scale of power is researched, the trend in environmental governance and environmental politics research sees the local separately from other scales in analysis. Thus the levels within governance are often studied independently (Bulkeley & Betsill, 2005). An alternative approach is followed in this thesis; multiple levels of governance will be studied in the sphere of solid waste governance. To do this, a multilevel governance perspective will be followed.

A multilevel governance perspective, involves multiple spheres of governance, in which environmental issues are constantly being constructed and contested. According to Hooghe and Marks (2001), two main types of multilevel governance can be identified:

⁷ Such as signing the Paris Agreement (2016)

hierarchical and polycentric. Hierarchical multilevel governance involves multiple vertical levels of government, while multilevel governance based on a polycentric model includes multiple horizontal spheres of authority that are overlapping and are involved with governance (Hooghe & Marks, 2001, *in* Bulkeley & Betsill, 2005). Multilevel governance can be seen as a mixture and interaction between formal institutions and informal networks (Rijke et al., 2013).

Rijke et al. (2013) present various research findings regarding hybrid multilevel governance approaches, that both study adaptive and transitional environmental governance. Their main finding is that governance should be a 'fit-for-purpose framework' procedure. The context and purpose of governance is of utmost importance when a certain governance approach is followed. A centralized governance structure seems to be effective when laggards need to be motivated to catch-up with their practices (Rijke et al., 2013). A hybrid governance approach could also be useful in certain situations. This approach could ensure a better collaboration between the central government and municipal councils (Otsuki, 2013). A "*formal policy decision would catalyse and/or coordinate activities, and informal and decentralized learning would further test innovations and/or distribute knowledge and capacity building*" (p. 70, Rijke et al., 2013). This collaboration would build capacity at the local level, in the form of, for example, local climate protection or proper waste management guidelines. This is a form of enabling or provisional governance, and the funding of environmentally sustainable activities and actions could, and often should be, included. For example, the Dutch '*Klimaatconvenant*' is a multilevel governance arrangement between the local government, provincial councils and national government. Local authorities and cities decide their own activity level and will receive funding for their activities, depending on the number of inhabitants or municipal area (Kern & Alber, 2006). The hybrid multilevel governance approaches find the middle course between centralized hierarchical control and a decentralized governance structure (Rijke et al., 2013). Critics state that multilevel environmental governance structures could also have negative effects on policy capacity. The hybrid modes indicate that the central government is not the only, and/or not the most important, actor in the governance structure. Critics indicate that these hybrid modes will not be able to accomplish much and that the central government needs a bigger role, especially in redistributive policy making (Lemos & Agrawal, 2006).

Thus, different scholarly articles present contradicting results on the effectiveness of a centralized government, a decentralized governance structure or a more hybrid environmental governance form. This research will provide more clarity about the functioning of a multilevel governance structure moving towards a more centralized approach. The quote taken from Bjerkli (2013), confirms the need (current research gap) to understand and analyse governance policies:

"There is a need to look into the reasons behind the normative use of governance and to critically analyse its implementation and use on the ground in

order to gain a better understanding of the outcome of governance policies and the underlying reasons for them" (P. 1276) (Bjerkli, 2013).

Besides studying the governance structure, the actors and their interactions on several levels will be studied, to understand the degree of hybridity. The interaction between multiple actors does not happen between all the actors at the same time with the same intensity; it rather takes place in separate spheres of governance. The grid of relations and power in which the governing practices take place can be seen as governmentality (Zimmer, 2012). These relations can be understood as being a result of a co-production caused by an interaction of practices (Spaargaren, 2003 *in* Shove 2010).

Governance and governmentality are both terms revolving around the questions of steering, regulating and conducting and are both concerned with the state. Though many characteristics of the two terms are quite similar, there are major divergences between the theories as well. Where governance revolves more around instruments, modes, policies (technical issues), governmentality is more subjective (Amos, 2010).

The discussion of the concept of governmentality allows for the exploration to what extent the central government has control over society, or to what extent the societal actors have their own agency. This societal agency then will be discussed by introducing the practice theory in Paragraph 2.3.

2.2 Governmentality

Governmentality is a fluid concept, and allows actors and bodies of knowledge to evolve over time. Governmentality addresses governing and mentality as modes of thought. The concept enables the *conduct of conduct* used to steer society in a certain direction. This steering is not only done by the use of top-down power, but by influencing the minds with the aid of awareness incentives and norms and values of the people who are governed (Amos, 2010; N. Rose et al., 2006; H. van Dijk, 2016). Governmentality can also be understood as a way in which a population or society can be regulated (Salskov-Iversen, Hansen, & Bislev, 2000). Governmentality was initially described by Foucault himself as:

"The ensemble formed by institutions, procedures, analyses and reflections, calculations and tactics" that allow exercising a governmental type of power; 2) a tendency "towards the pre-eminence over all other types of power (...) of the type of power that we can call 'government'"; and 3) "the result of the process by which the state (...) was gradually 'governmentalized'" (ibid.: 108 in Zimmer 2012).

Here the policy regulates social life, and gives a rationality to governing or so called regime of truth. Citizens are not *controlled* by repression and control, rather a *productive* power is used (Mosse, 2004; Zimmer, 2012). According to Edwards (2010), governmentality has been used by Foucault (1991) in two main ways;

- 1) "One is as a framing within which to analyse the practices through which governing in general takes place" (P. 356, Edwards 2010)
- 2) "The second sense of governmentality is specific to the practices within advanced liberal democratic states" (P. 356, Dean 1999 in Edwards 2010).

Both of these statements are in line with the notion of *productive* power; governing is about enabling the capacities of the population (Edwards, 2010). This notion of *governing the self* is on the other side of the spectrum from *governing others* (top-down power); both these notions can be described in Foucault's definition "*the conduct of conduct*" (Lemke, 2002).

Salskov-Iversen et al. (2000) define governmentality in terms of two main dimensions as well, which are quite similar to those of Edwards (2010). The first dimension focusses on political rationalities and thoughts regarding problems and interventions of the authorities. The second dimension is revolved around the so-called *technologies of government*, which include methods, administration, enforcement, schooling, trainings et cetera. This first notion thus focuses more on the reality of the authorities, who create the law based on their rationalities – this is related to Edwards (2010) notion of the frame through which governing in general takes place. The second dimension described by Salskov-Iversen et al. (2000) is focused on the domain of reality, and thus is related to Edwards' (2010) notion of actual practices taking place in the state (Edwards, 2010; Salskov-Iversen et al., 2000).

Simply stated, governmentality covers both the mentality of the governing actors as well as those of the governed society. It also discusses how people are influenced and constituted by specific practices and discourses. Governmentalities become a reality through practices (Zimmer, 2012). The following paragraph will discuss solid waste practices.

2.3 Solid Waste Practices

"Following a Foucauldian approach, practices have to be the starting point of any analysis, as it is from them that broader patterns of governing as well as fault-lines in these patterns become visible" (Veyne 1992 in P. 31, Zimmer, 2012).

Where governmentality focusses more on the shaping of people's mentality and thus their behaviour within governance, the practice theory studies the agency of societal actors while moving away from individuals and studying the environmental behaviours of a people as a whole. Agents, or actors with agency, reproduce a series of practices as a "*shared behavioural routine*" (Spaargaren, 2011). "*Practice theories go beyond individuals but emphasize the fact that human subjectivity [and human agency] is at the heart of processes of structuration, reproduction, and (also environmental) change*" (Spaargaren & Oosterveer, 2010 in Spaargaren, 2011).

There are several schools of thought following different definitions of, and ascribing different meanings to the '*practice theory*'. Main important influences and sociological

works have been created by Pierre Bourdieu, Anthony Giddens and Theodore Schatzki. Despite the different practice-based approaches, all schools agree on the importance of practices, routines, activity and performance – the world is seen as a “*seamless assemblage, nexus, or confederation of practices*” (Nicolini, 2012, P. 3). Some *main* contemporary interpretations of a practice-based view are identified and described by Nicolini (2012) in his book ‘*Practice Theory, Work & Organisation*’. As stated by Nicolini (2012), practice theory shows that human’s effort and work (practice, process) stands behind the ‘*material, durable world*’, which in return has an effect on social structures. One interpretation of the practice theory dictates that practices require *tools* and material *things*; *things* within *technological* infrastructures also carry meaning and steer agency – *things* as well as people within a society can influence practices (Reckwitz, 2002; Shove, Watson, Hand, & Ingram, 2007).

The importance of the *human*, defined by Nicolini as the ‘*homo practicus*’, or carrier of practices, is recognized by several practice-based scholars. “*Social practices provide a precise space for agent and agency accepting ‘all three sides of the triangle: that society is a system; that the system is powerfully constraining, and yet that the system can be made and unmade through human action and interaction’*” (Ortner in Nicolini, 2012, P. 5). The ability of a human to involve itself in human action and interaction is expressed in *knowledge*. Through these interactions, activities and practices, humans gain and reproduce the *knowledge* of correctness, norms, values, and even the sense of difference and inequality – thus knowledge does not belong to individuals but to networks within practices (Nicolini, 2012). A similar practice theory lens is used by Heidegger; individuals are dependent on a web of social practices (Nicolini, 2012). Heidegger studies the concept of ‘*being*⁸’, and argues that *being* is a temporal and temporary concept. People *are* existent in a world of *limited possibilities* and are always *alongside* or *with* others (Krell et al., 1993). Anthony Giddens (1984, in Nicolini 2012) argues that people, as ‘*agents*’, and structure are mutually dependent and generative. Practices as argued by Giddens (1984), “*have to be regarded as the point of articulation between actors and structure*” (Nicolini, 2012, P. 45). In Giddens’ structuration theory; human agency and structure are mutually dependent. Though human agents do have an individual transformative capacity, or like Giddens stated: a “*capacity to make a difference*” (p. 14, Giddens 1984 in Rose & Scheepers 2001), this capacity may be quite minimal in practice (J. Rose & Scheepers, 2001).

In the practice theory, as described by Bloor (1976) in Nicolini (2012), a distinction can be made between weak and strong programs. Whereas the weak program follows a descriptive approach, the strong program asks the ‘*why?*’ question. Why people portray certain waste management behaviour is discussed analytically and explained within the strong program. In order to understand the ‘*why*’ part of practice, the context of history behind the activity needs to be studied. Goal-directed actions, e.g. recycling, throwing garbage out on the street, are “*composed of simple operations. [...] actions depend on larger, historically situated activities to acquire meaning [...] actions acquire meaning in the context of the historically situated activity, a culturally situated,*

⁸ “*Dasein*”: *Human existence*

complex, mediated, meaningful, and usually strongly gendered effort" (Nicolini, 2012, P. 108/109). Thus, to understand the motivation for certain actions, collective efforts as a 'social practice' need to be understood. It is important to keep in mind that the activities performed by people could transform over time.

"An organized set of activities is seen as a coordinated entity when it is recognizable across time and space [...] individuals reproduce and transform the entities over time. Individuals thus act as 'carriers' of practices" (P. 2491, Røpke, 2009).

Simply stated, social systems shape practices, and practices existent in certain systems enable and constrain people living in these social systems (Nicolini, 2012). This can also be described as if the effects of practices on social structures, can be understood as social life *consisting* out of a range of practices; and social order, institutions and structures being created by these practices (Røpke, 2009).

Discussing Practices as Routinized Behaviour

"Practice" or "Praxis" = the routinized activity of the body. Practices form identities, create meanings, and produce activities of order (Nicolini, 2012)

"Actors are carriers of practices" (Røpke, 2009)

The line of thought interpreting the practice theory in terms of routinized behaviour within societies, is very relevant within the topic of waste practices as manifestations of action. These practices depend and can be influenced by instructions to perform specific actions given by a hierarchical structure, which can be seen in a centralized governance structure. The practice theory makes it possible to study 'environmental behaviours' while moving away from focusing on an individual.

"A practice (Praxis) is a routinized type of behaviour" (Reckwitz, 2002)

Practices are not the same as ordinary behaviours. For example, we can understand *practices* as *"More durable organized corpuses of activity"* (Nicolini, 2012, P.10). According to Theodore Schatzki, these activities are not *reduced* to individuals – despite the fact that they are *undertaken* by individuals, rather collective entities and practices should be studied through the interaction and mutual adjustment among people (R.Schatzki, Knorr, & Savigny, 2001). These interactions and mutual adjustments can also be understood as creating *rules*. We now can interpret *"social life as a series of recursive practices reproduced by knowledgeable and capable agents who are drawing upon sets of virtual rules and resources which are connected to situated social practices"* (P. 815, Spaargaren 2011). Practices are not just observable behaviours (bodily performances), but also include the thought behind behaviours (mental and emotional activities) (Reckwitz, 2002; Røpke, 2009).

Practice Theory within Networks

People are not *individuals* with *individual perceptions, attitudes and ideas*; communication flows create linkages because information is shared within the network (communication structure) (Rogers, 1986). This way of thinking in interconnected *networks* within a society is related to the *practice theory*. Thus waste segregation practices are also not independent actions, but co-exist (and are mutually connected) in a field of practice and in a network of people (Nicolini, 2012).

Practices are performed by actors (actors as carriers of practices) – and are conditioned by the material world, infrastructures, society, governance and within networks

This network of people does not necessarily include *all* people; there may be a variance depending on one's gender, age, educational level etc. The totality of social system interactions, can be on neighbourhood, city or country level. There are many different communities and sub-communities within the same spaces (Cutter et al., 2008). The group of people sharing the same practices, can also be understood as people with 'shared behavioural routines. The focus here is not on individual behaviour, but on communal practices (Spaargaren, 2011). As mentioned previously, these communal practices are influenced by external factors, including technological, institutional and infrastructural contexts (Røpke, 2009).

A recently published article discussing waste management policies, based on data from 28 European countries, found that women who are well-educated, have a good job, and live in rural areas, are more likely to be a fair consumer than men and women living in a large urban area. They also found that people with low education levels, trust governmental policies with waste handling and management (Triguero, Alvarez-Aledo, & Cuerva, 2016). Something to keep in mind, is that while socio-economic and other characteristics of households may influence their waste segregation practices, people are heavily influenced by their external environment and fellow citizens. "*People do not develop ideas and ways of doing 'from within' by themselves. Their thinking and doing are shaped by fellow citizens and by the objects and situational factors which form an integral part of the contexts of their behaviours*" (P. 814, Spaargaren, 2011).

2.4 Objective and Research Questions

This chapter discussed governance, governmentalities and practices. The aim of this study is to investigate how existing governmentalities and experiences of practices initially have influenced the shift towards a centralized governance within a multilevel structure, and to what extent practices and governmentalities interact and influence the governance structures.

By doing this, this study will contribute to the current research gap in several ways. Current literature on solid waste management is often focused on the individual drivers for waste segregation, individual segregation behaviour, options for different types of waste management, or technical aspects revolved around waste management (Triguero et al., 2016). Literature also often highlights the importance and need to create public awareness regarding proper solid waste management, a topic high up on the international developmental agenda. Several donor and developmental aid organizations are aiming to improve solid waste management in lesser developed countries, by a broad spectrum of interventions, including awareness projects (Dubbeling et al., 2016; Visvanathan & Trankler, 2001). A research gap that presents itself here is focused on the understanding to the degree to which interventions create behavioural change, in regard to public awareness enhancing projects and/or obligation levels in public policy. This thesis will contribute to the understanding to which extent a governmental policy intervention and local awareness interventions have altered the waste segregation *practices*. To understand how to design future waste management policies, it is essential to understand the interactions between society (households) and regulators of governance, to which this thesis will contribute.

Based on the theoretical framework which is discussed in this chapter, this thesis explores the following main question:

“What are the effects of the recently introduced centralized policy on solid waste governance on governmentalities and practices in Sri Lanka?”

To answer this main question, the following two sub questions are posed:

1. What are the waste related practices of relevant actors, and how did the practices of these relevant actors change?
How do the practices of the different local governance actors impact on the waste segregation practices of households, and in return, how do these (non-) changed household practices effect the governmentalities of the governance actors?

To answer the research questions, Sri Lanka is taken as a focal point. Despite governance reforms occurring in the past decades, the solid waste situation in this country remains far from solved. We can now see a trend in supranational climate talks to tackle the unsustainable solid waste situation head on, which has led to a new governmental policy implemented in Sri Lanka in November 2016. This new governmental policy, and Sri Lanka’s shifting governance form towards centralization, makes this country an interesting case study. The following chapter will discuss the contextual framework and give a short historical overview of Sri Lanka’s solid waste governance

Chapter 3: Contextual Framework

Sri Lanka is an Island located south of India and covers an area of 65,610 km². The population of Sri Lanka is 20.5 million, and about 30% of the population lives below the poverty line (GDP Sri Lanka is US\$2,400). The main ethnic/religious groups in Sri Lanka can be defined as 1) Singhalese, 2) Tamils, 3) Muslims and 4) Burgher. Sri Lanka has a tropical monsoon climate in which there are two main monsoon seasons; from May to September (south-west monsoon) and from December to February (north-east monsoon). There are three main climatic zones (dry, intermediate, wet) in Sri Lanka. These zones are based on ecological parameters including rainfall and soil type (Esham & Garforth, 2016). The dry zone is effected most harshly due to climate change variabilities (Reddy, 2015). In Sri Lanka, the income and consumption gaps (and thus the economic divide) has narrowed in the past decade; between 1990 and 2006 the Gini coefficient⁹ has dropped 11,3% (annual decline of 0,7%). This number corresponds with the nationwide economic growth of 4,9% seen in Sri Lanka. Despite this economic growth, the consumption inequality in Sri Lanka is quite high (0.43) (Un-habitat, 2008). Usually, in Sri Lanka, Local Authorities (LA, also a geographical area) are responsible for the total waste collection and transportation. However, in most LA's, the budget for waste collection and transportation is not sufficient. In practice, solid waste in Sri Lanka is generally disposed in open dumps, though a certain percentage of waste is disposed by the means of composting (the biodegradable

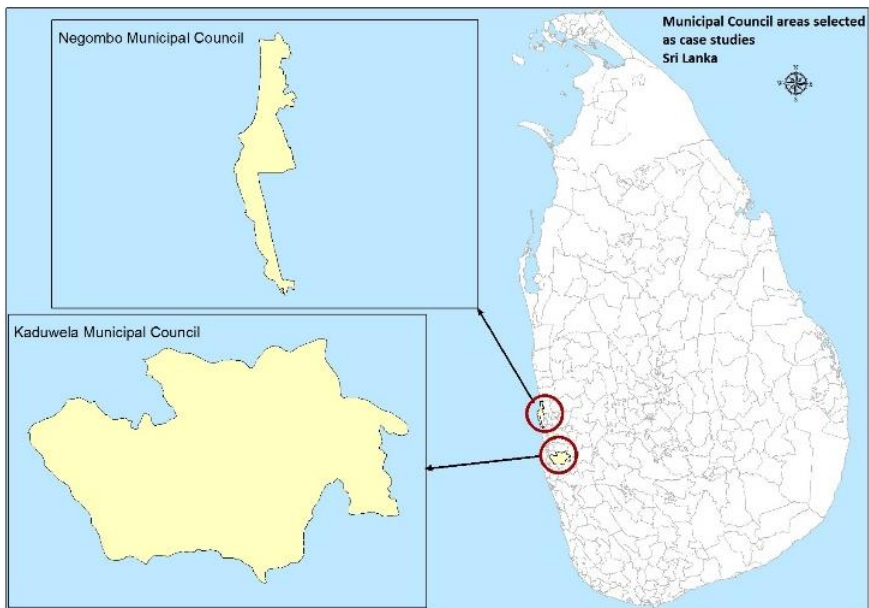


Figure 1 Map of selected case studies

portion), open landfill (waste is dumped on open land) or operated or sanitary landfills (waste is dumped at a designated site and/or is treated). The most common disposal method in Sri Lanka is open landfill; 65% of all solid waste is thrown in random areas – this is a hazardous and unsanitary method of waste disposal (Visvanathan & Trankler, 2001). The open dumps cause dangers to the environment and to people.

Unfortunately, due to financial and institutional constraints, this is still seen as the only achievable option for waste dumping (Zurbrügg, 2003). Sri Lanka is divided in municipal councils (23 MC's), Urban Councils (41 UC's) and divisional councils (271 DC's, also called Pradeshiya Sabha or Pradesha Sabhai). Two of the 'MC's' have been selected as case studies, see Figure 1.

⁹ The Gini Coefficient is measured in terms of income and consumption

3.1 Solid Waste Policy in Sri Lanka

3.1.1 Historical Overview of Solid Waste Governance

The necessity of municipal solid waste management, which includes communities, has been recognized in Sri Lanka over time. In Maharagama¹⁰, the Ministry of Forestry and Environment (MoFE) has aimed to increase public awareness regarding solid waste, and asked 2,300 households to segregate their personal waste. With this project, MoFE reduced the disposable quantity of waste, and sent recovered materials to industries which could then recycle and use them (Visvanathan & Trankler, 2001). A second example of a project in Sri Lanka focuses on prevention; the Environmental Pioneer Brigade Program creates environmental awareness among children, while teaching them proper waste management behaviour (Zurbrügg, 2003). On a national level, the Central Environmental Authority of Sri Lanka is currently working on a project called Pilisaru, which launched in 2008. The Pilisaru project aims to implement a national policy and legal framework regarding solid waste management, provide trainings (education and awareness), and supply waste management facilities and provision sites. In 2014, the Pilisaru project implemented over 130 compost sites throughout the country, of which over 95 compost sites are in operation (CEA, 2014).

Still, in terms of waste collection and waste disposal, grave problems surrounding solid waste management remain. Despite the above mentioned developments, and the vast sums of money invested in waste management studies, the actual improvements remained limited in Sri Lanka (Vidanaarachchi et al., 2006). Household and community participation projects did not produce proper waste management on national level. Sri Lanka has been dependent on municipal solid waste management (MSWM) for the past decades; the local governments are responsible for providing proposer solid waste management services. Studies show that the MSWM procedure in Sri Lanka cannot manage the whole bulk of waste created by its citizens (Eheliyagoda & Prematilake, 2016). Now a new effort through a change in governmental policy and legislation is being pursued. On the first of November, 2016, Sri Lanka's government decided upon a different approach: **centralization**.

3.1.2 Current Governmental Solid Waste Policy: Centralization

As of November 1st, 2016, a new governmental policy has been introduced in Sri Lanka. The data collection period for this thesis was from mid-October 2016 until mid-January 2017, and therefore captures the initial response of waste segregation practices due to the governance change. The exact bearings of the governmental policy, however, are quite unclear. Some sources mention a new implemented *hard law* which is enforced with fines – other sources speak of non-collection of non-segregated waste. The reported segregation categories also vary depending on sources. "Newsfirst", a Sri Lankan newspaper, reports that the Minister of Provincial Councils and Local Government (central government of Sri Lanka, also referred to as GoSL), has instructed waste collectors to collect waste segregated into two categories. These two categories are degradable and non-degradable waste. This newspaper speaks of a national classified garbage collection program (Dias, 2016).

¹⁰ Maharagama is a city close to the capital Colombo, in Sri Lanka

Other newspapers report three category waste segregation. Adaderana, another Sri Lankan newspaper, reports that all municipal councils within Sri Lanka have decided to refrain from collecting non-segregated garbage. This decision has been made after discussions between the central government (Ministry of Local Government and Provincial Councils), the Secretary of the Ministry, and municipal council commissioners and officials. This newspaper states that waste must be segregated in organic (biodegradable) waste, inorganic (non-biodegradable waste) and recyclable waste (Adaderana, 2016). The Colombo Gazette, an urban newspaper, similarly reports that residential waste needs to be segregated in the three categories in order for it to be collected; non-segregated waste will be ignored by the collectors (Colombo Gazette, 2016).



Figure 2 Newspaper clipping

The implementation of the governmental policy was triggered by the signing of the Paris Agreement (2016). This agreement is part of a global action plan to limit global warming and climate change, and as a signatory, Sri Lanka's national Government was asked to submit an 'Intended Nationally Determined Contribution Plan' – which included the national waste management strategy (new governmental policy) (Wijayapala, 2016). The decision-making capacity is changed and moves to higher international levels of governance.

The new policy is only implemented in some Local Government Authorities; namely the Municipal Councils in Sri Lanka¹¹. The Urban Council and Divisional Councils are not yet included in the new governmental policy. Whether the waste is supposed to be segregated in two or three tiers is quite unclear. The timeline for the policy is also not clear. The pictures displayed in Figure 2 suggest that the policy will be enforced by the police in the case of non-segregated waste. Posters, billboards or banners, and the distribution of leaflets are supposed to make city dwellers aware of the new policy (MPCLG, 2016).

However, according to several key informants, the awareness in various municipal councils is quite low. The aimed distribution and increased awareness programs as discussed by the central government, were often not implemented. Interviews with key informants, discussions with governmental actors and with the actual waste collectors will be provided and discussed in Chapters 5 and 7. In the following chapter the research methods will be described.

¹¹ Please see Appendix 1 for an overview of Sri Lanka's governmental structure and relevant actors

Chapter 4: Research Methods

The research for this thesis consisted of three main phases: 1) preparation; 2) field data collection; and 3) data analysis and write-up. The data collection for this thesis took place from October 2016 till January 2017 (three-month period). The field data collection took place in two districts. Table 1 displays some details regarding the two case studies. As mentioned in Table 1, Kaduwela has a higher total land area and population, compared to Negombo.

Table 1 Overview case studies

	Kaduwela Municipal Council	Negombo Municipal Council
Location	Inland. Next to the Kelani Ganga river	Coastal. Next to the Indian Ocean, the Maha Oya river and the Negombo Lagoon
District	Colombo District	Gampaha District
Province	Western Province	Western Province
Total land area	87,8 km ²	30.8 km ²
Awareness levels*	High	Low
Incentives*	Strong	Weak
Characteristics	Highly urbanized, home to several government offices	Fisher's town, large income inequalities
Population (in 2012)	252.041 people	142.449 people
Council	Municipal Council	Municipal Council
Town/Ward studied within council area	Battaramulla South, Udumulla, Diyawanna gardens	Wellaweediya South, Angurukaramulla, Pitipana North,
Number of surveys conducted	70 surveys	70 surveys
Total surveys conducted (n)= 140		

Process: choosing the case studies

When I first started working with the *Resource Recovery, Water Quality and Health* team of IWMI, it became clear to me that the team has a lot of data and resources concerning the technical and physiological aspects of waste management. IWMI is currently involved with experiments regarding the pelletizing and co-composting of faecal sludge and organic household waste as a form of agricultural input. However, the knowledge of waste segregation practices within *households*, and the *governance structure* around waste management is limited. For the IWMI team, this thesis helps to understand how the households perceive segregation and what their practices are, which could help in the further development of the co-composting product. As several areas in Sri Lanka are already being used as research sites for IWMI, a number of options for case studies were presented to me. At the start of this thesis, it was decided upon to choose case studies dependent on the governance structures within

the respective cases. As can be seen in Table 1, the initial awareness levels and incentives in both case studies are assumed to be quite different. These assumptions have been made by and through discussions with experts and IWMI staff working with solid waste in Sri Lanka. After a few optional case study sites were selected, members of the team made phone calls to governmental officials to confirm the assumptions on the varying local governance structures. When they were confirmed, Kaduwela and Negombo were selected as they are the respective “best” and “worst” cases in terms of awareness levels and prior incentives. These case studies are expected to display a high variance in household practices as varying levels of governmentalities are expected to be in place.

This chapter will discuss all data collection methods. Within each municipal council selected as case study, local authorities, households, waste collectors, waste grading centres and compost yards are present. Standing ‘above’ these selected actors in both case studies, stands the central authority or central government. An overview can be found Figure 3, which also portrays the theoretical concepts proposed in this thesis.

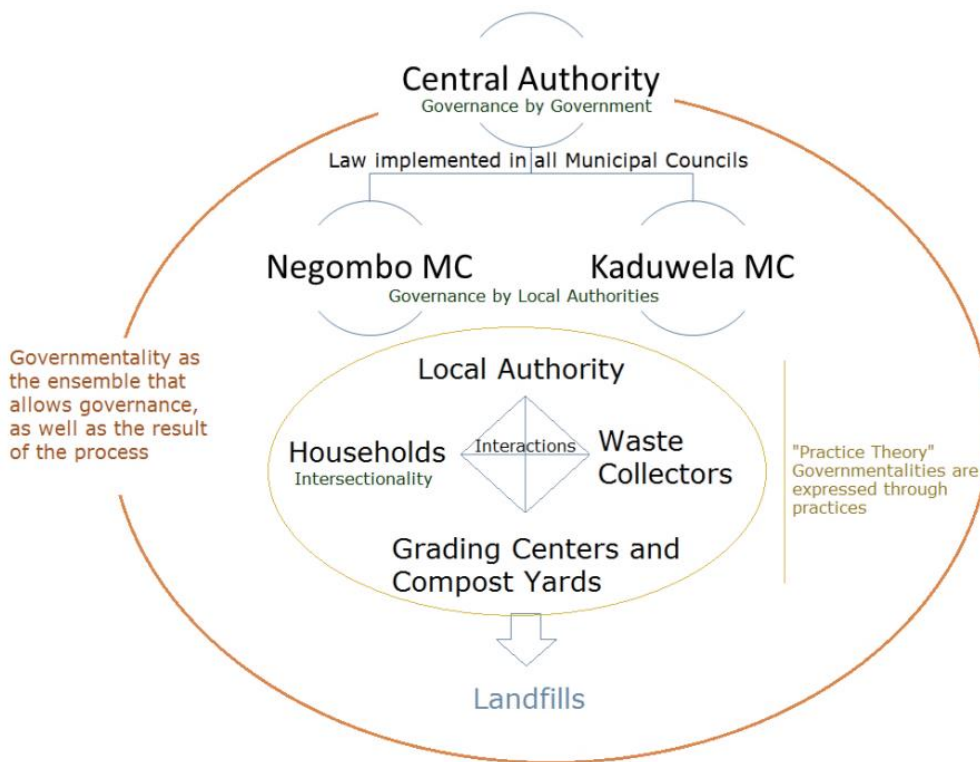


Figure 3 Overview of the respondents and theoretical framework

4.1 Stratification

Within each case study I have stratified subpopulation in terms of density and income areas. I aimed to stratify the population of each council into a) high density, low income areas; b) low density, high income; c) middle income, mixed density areas.

This has been done because people living in certain stratified areas are likely to be geographically divided in terms of regional inequalities and socio-economic characteristics. People with certain income, employment and education are likely to cluster together; these characteristics combined with the population density of a certain area, impact waste generation and segregation practices within households. Also, densely populated and poor areas are likely to enjoy different waste collection services than areas with lower density and higher income (Chen, 2010). By including three stratified levels of society, with different income and density levels, varying waste practices can be measured. This variation in practices is relevant to study, as it builds to the understanding towards the effects of the centralized policy on governmentalities and practices across different strata areas in society.

The aim of stratifying between the three units is not to have the exact same units in each of the case studies, but to give the best possible representation of the population living within the council areas. Stratification also ensures flexibility, convenience, and representation of subpopulations. It also ensures the right balance between cost and time restriction faced by the researcher and the corresponding loss in precision associated with clustering (United Nations Department of Economic and Social Affairs, 2005).

As there is no official census data available for household income per area (in this case: wards within a council), and it was not possible due to time constraints to conduct a baseline survey prior to undertaking the surveys, I based the density and income areas (strata areas) on readily available data and information. This included census data, Google earth imagery and other maps of the area and by consulting experts and key-informants who are familiar with the council areas. Table 2 displays the surveys held in each strata group.

Table 2 Stratified sample size

	(n) of surveys	High income / low density area	Middle or mixed income/density area	Low income / high density area
		<i>Strata A</i>	<i>Strata B</i>	<i>Strata C</i>
Kaduwela MC	70	20 surveys	20 surveys	30 surveys
Negombo MC	70	24 surveys	22 surveys	24 surveys

Besides this quantitative data collection method, qualitative data has also been collected within each Strata area. The method I am using here, does not have the same stratified population samples (as there is high variance between case studies). Therefore, I am using a method called *implicit stratification*. Household samples within explicit strata are "sorted to one or more variables that are deemed to have a high

correlation with the variable of interest” clustering (United Nations Department of Economic and Social Affairs, 2005). In the case of waste management, density levels and income areas are deemed to have a high correlation with waste segregation practices and corresponding waste collection services – depending on the infrastructures (broad roads with frequent waste collection, dust roads with infrequent service). Implicit stratification would guarantee that the sample of households is spread across the categories of variables. The income/density areas as an indicator also makes it visible for the enumerators when selecting respondents.

Figure 4, below, illustrate the stratified groups by providing pictures of the houses of actual respondents used for this thesis. Figures 5 and 6 illustrate the location of these stratified areas as wards on the MC maps.



Strata A, Kaduwela



Strata A, Negombo



Strata B, Kaduwela



Strata B, Negombo



Strata C, Kaduwela



Strata C, Negombo

Figure 4 Examples of Strata areas in both case studies

Ward Map of Kaduwela Municipal Council - Colombo District

Ref. No : NDC / 01 / 04

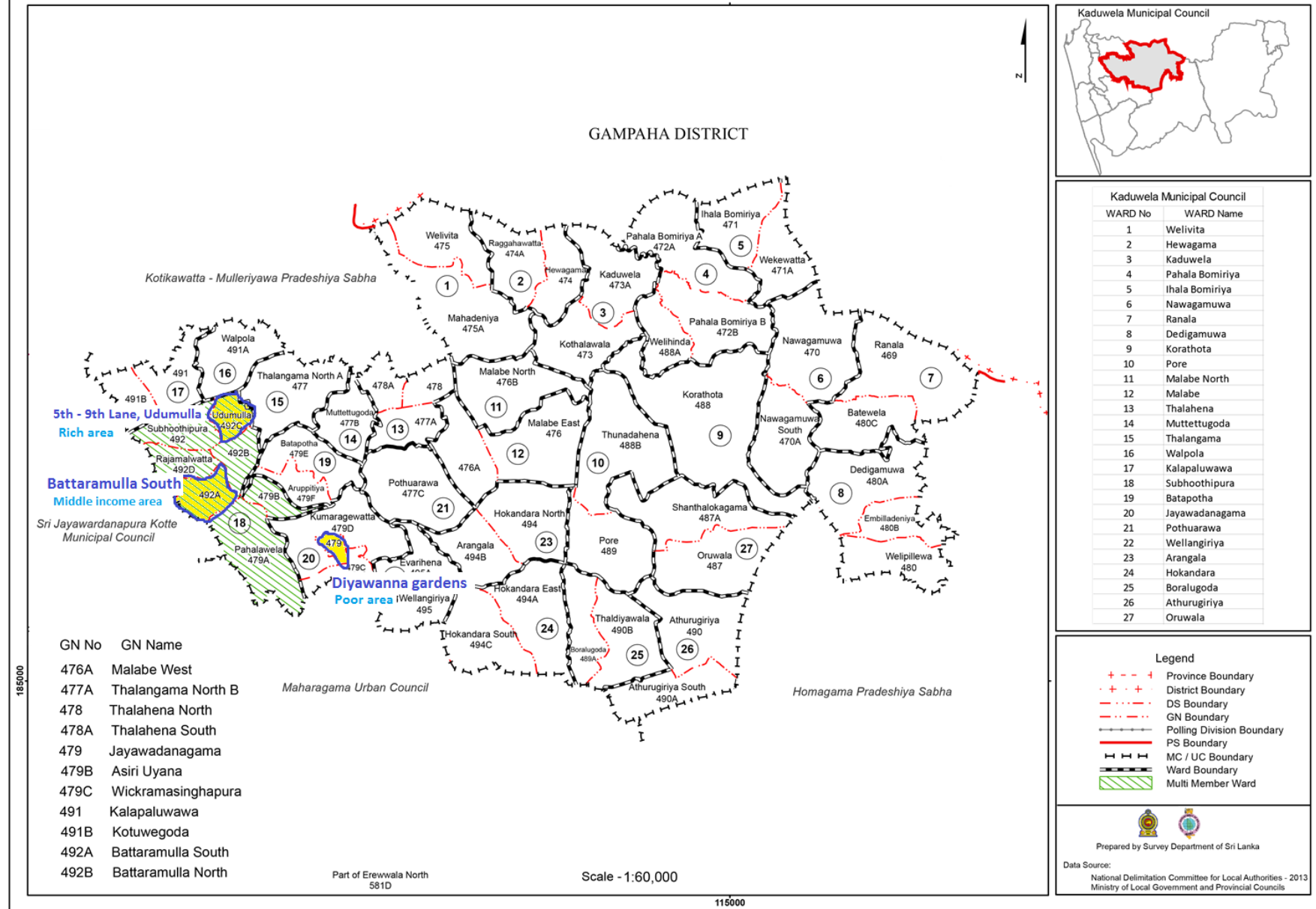


Figure 5 Ward map of Kaduwela

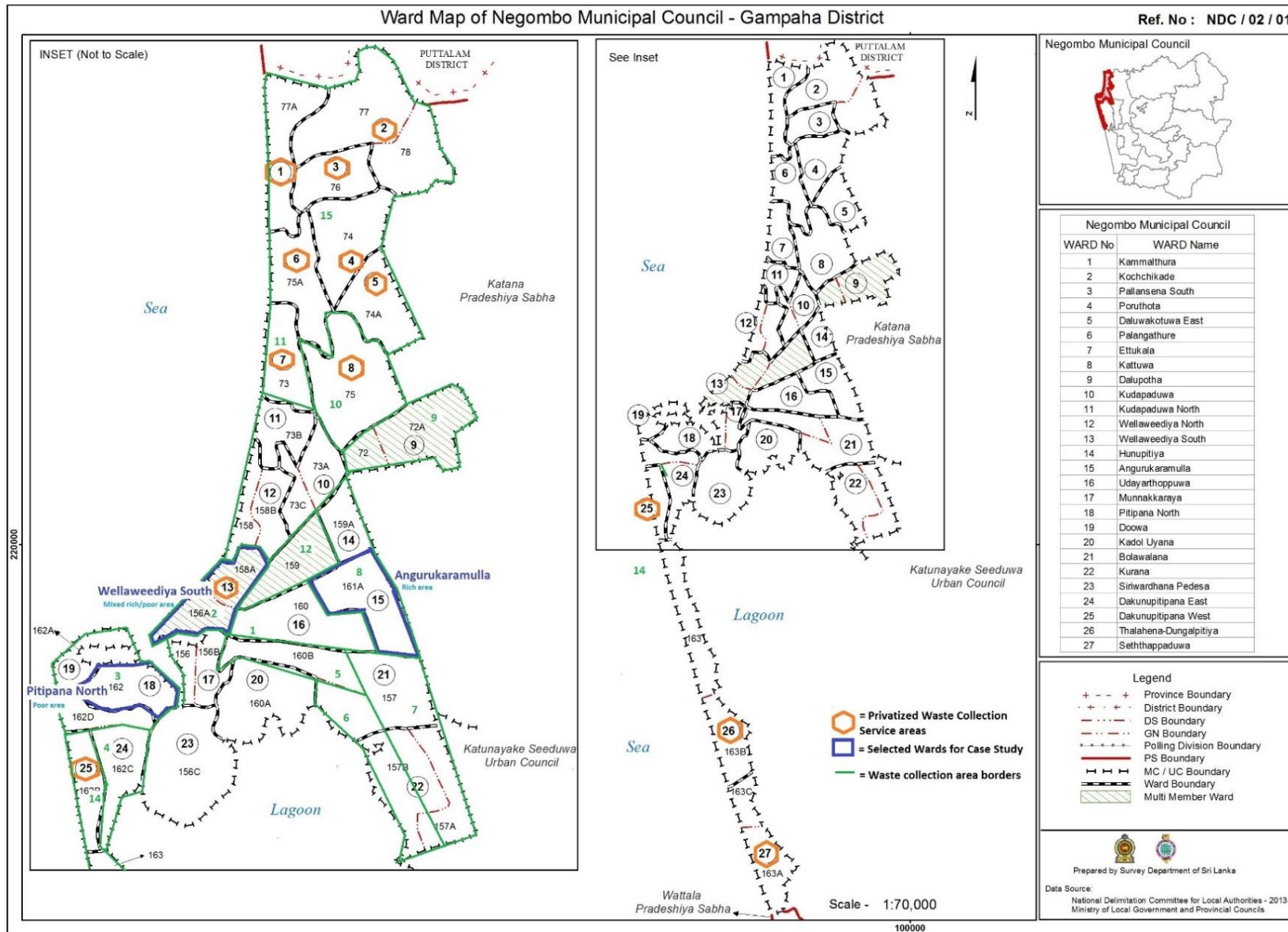


Figure 6 Ward map of Negombo

4.2 Quantitative Data Collection: Household Survey

The main quantitative method used in this thesis is a household survey. The survey questionnaires have been drafted, checked and adjusted several times. I have consulted several experts with different backgrounds throughout the process. The surveys have been field tested; they have been tried out on a small number of households to check for problems in the questionnaire design. Several errors have been filtered out after the field testing. The surveys have seven modules¹² which discuss a variety of topics. The respondents participating in the surveys are men and women living in households within the six selected wards portrayed in the maps on the previous pages. The surveys sampling is based on convenience sampling within the wards; research assistants were asked to conduct a certain number of surveys within the selected wards.

Between the two case studies, some differences were found. These differences are also portrayed in Figure 4. Negombo as a council area does not have the same high income levels seen in Kaduwela, where many households were in possession of, for example, a swimming pool.

Table 3 Sampling in each Municipal Council

Municipal Council	Strata	Ward Name	Surveys (n)	Private/Public ¹³ waste collection	Old/New ¹⁴ waste separation facility
Kaduwela	A	5 th -9 th lane, Udumulla	20 surveys	Public, all wards of Kaduwela	Old, all wards of Kaduwela
	B	Battaramulla South	20 surveys		
	C	Diyawanna Gardens	30 surveys		
Negombo	A	Angurukaramulla	24 surveys	Public	New
	B	Wellaweediya South	22 surveys	Private	New
	C	Pitipana North	24 surveys	Public	Old

More surveys have been collected in Strata C in Kaduwela, see Table 3, because the gap between 'high' and 'middle' income is quite minimal whereas the gap between 'high/middle' (Strata A) and 'low' (Strata C) income very large. To give a good representation of 'rich' and 'not rich/poor', I have decided to include more surveys for

¹² Please find the surveys in Appendix 7

¹³ In Negombo, the waste collection was done by both public and private collection service providers. Please find details in Subchapter 5.4. In Kaduwela, the waste collection service was purely done by public waste collection service, see Subchapter 5.3

¹⁴ The 'new' facilities were implemented due to the new governmental policy. All waste separation facilities in Kaduwela were already in place before the policy. Details can be found in Chapters 5 and 7.

the 'low income area'. As can be seen in Table 3, equal amounts of surveys have been taken in the 'rich' and 'poor' area, and a slightly less amount of surveys in Strata B. Negombo council area portrays higher income variances than Kaduwela. Instead of having a 'middle income' ward, the selected ward (Wallaweediya South) has a mixture of rich and poor households. The selection of these wards gives a good representation of the citizens of Negombo MC, and was made on the basis of an interview with the Negombo local authority (LA).

4.3 Qualitative Data Collection

Qualitative methods provided in-depth information which added to the information gained from the quantitative methods applied for this study. Qualitative methods are used to enrich the data, and to create a deeper understanding of the waste related practices in social environments (Stewart-Withers, Banks, McGregor, & Meo-Sewabu, 2014).

A mixture of qualitative methods is used for this thesis. **In-depth interviews** have been held with purposefully selected respondents and will include further questioning on practices and behaviour. The practice theory studies every day practices, here a combination of in-depth interviews and observations reveal the (material) culture and practices regarding waste segregation in society (Shove et al., 2007). Interviews with researchers, experts and key-informants have also been held.

Qualitative research focusses on building theory and works in an inductive way; from the specific to the general. The methods used here include **informal conversations** and **conversations with purpose**. The qualitative research is conducive to describe and explain the social phenomena; what is happening and why is this happening? Another important method used for this thesis is observation. **Observations** give a good impression of the field, and help to analyse the behaviour of the respondents. Observations are also important to provide information by using a "*show, don't tell*" method to observe the practices taking place in households. These observations will help to clarify and interpret the quantitative data, and will make it possible to understand their practices.

Sampling

For the in-depth interviews and conversations, data has been gathered until a clear overview was formed and a saturation point was reached. The respondents for these interviews are selected by 1) purposeful sampling; experts, waste collectors and workers at dumping sites were purposefully selected on the basis of their occupation, also people working in the central government, local authority, and compost and grading centres were purposely selected, 2) convenience sampling; mainly used for in-depth interviews for households. Though the aim is to include people from different strata groups, and have an to equal gender representation, the data collection was dependent on the availability and willingness to respond of the respondents. The third sampling method for interviews and conversations which has been used is 3) snowball sampling; in general, the respondents were very keen to bring me in contact with their acquaintances, and by recommendations of my respondents it was convenient to include people referred to me in my sample group.

Selected Respondents

In-depth interviews with all following governance actors:

- Central Government; Ministry of Provincial Councils and Regional Development
- Central Environmental Authority
- Provincial Council
- Community Development Officer, LA
- Deputy Community Development Officer, LA
- Public Health Inspector, LA
- Solid Waste Management Program head, in the Municipal Council office.

In-depth interviews and conversations with purpose at the compost yards¹⁵ and grading centres:

- The heads of both compost yards, and five workers found in the yards
- Private contractor who bought recyclable items
- Informal conversations with several workers, this was quite a challenge as they spoke minimal English. I did spend quite some time observing their work at the grading centre, and interacted with the workers by simple verbal and signing exchange.

In-depth interviews and conversations with purpose with waste collectors:

- Waste collection workers in Kaduwela were interviewed on separate days: one day the interviews took place at the waste dumping site, and another day the interview took place on the street as the collectors were collection the waste. As can be expected, on the second day the interviews were shorter as the collectors had to continue working
- As Negombo MC has private and public waste collectors; I aimed to talk to both groups. The private service (seven hills) I interviewed through the phone, with the help of a translator. They were not willing to meet up in person. The public waste collection service workers were interviewed at the compost yard, and also on a separate day while they were collecting the waste

Households:

- In-depth interviews in all wards, nine per council area and thus eighteen total
- Many informal conversations in which I aimed to talk to as many people as possible
- Observations: to really study people's practices, it is not sufficient to ask people about their practices: indicated behaviour may be different from actual behaviour and actual practices. To make the "expected favourable answers" bias as small as possible, I asked my respondents (semi-structured) interviews and informal conversations to show me their waste bins. I also collected data to illustrate people's actual practices by walking through the street (observations) on collection days and peeking in people's waste bags which they put out for curb side collection.

¹⁵ In Negombo MC, the compost yard is in a different location than the grading centre and in Kaduwela MC they are both located at the same site. See Chapter 7 for details

4.4 Limitations to the Study and Study Bias

Using quantitative methods has a lot of value to research, however they do contain pitfalls. The most mentioned limitation of quantitative methods is the issue of *representation*. Most social research, especially in rural areas of developing countries, is subject to biases. Qualitative data collection has the risk that the researcher's own position may influence the study, and steer the respondent in a certain way. This phenomenon is called positionality, where personal attributes of the researcher (age, gender, background) may influence the collected material and the answers given by respondents. It is important to reflect on my position (reflexivity) in order to prevent this becoming a weakness in the research (Stewart-Withers et al., 2014).

Limitations Regarding Sampling Size

Larger sample sizes are always more representative to the population, increase reliability and minimize sampling error (United Nations Department of Economic and Social Affairs, 2005). However, there are budget and time constraints to the data collection. There were two sample size methods which are useful to my data collection; *a)* collecting the same amount of surveys in each council area; and *b)* adjusting the sample size to the households present in each council area. If the second method would have been applied, a certain percentage of the number of people in the council area would have been used to determine the sample size. With, for example a percentage of 9 and a half (9.5%), would give me a sample size (in *n*) of 70 in Kaduwela MC and 113 in Negombo MC. However, due to constraints, the sample size needs to be kept to a reasonable limit which is efficient in terms of both time and money. I have opted for an equal sample size over the case studies; *n*=70 surveys. This method ensures that I am including a minimum percentage of 5.9% of the total households per km² in each area up to a maximum percentage of 9.5%.

Language Barriers

As there is a language barrier between the researcher and the participants, local research assistants were needed. These assistants have been trained by me at the IWMI headquarters. A part of the questionnaire questions will be framed as 'closed questions' in order to make the data applicable for statistical analysis (Stewart-Withers et al., 2014). Each research assistant was required to conduct a certain amount surveys per day, and they were paid a daily salary to do so.

Chapter 5: Governmentalities and Centralization

5.1 Central Government

In December 2016, I visited the Central Environmental Authority (CEA), where I spoke to the Deputy Manager of Planning and Implementation for a national waste project called Pilisaru. In April 2016, the Pilisaru project and a national plastic and polythene project in Sri Lanka merged together and formed the so called “*Integrated Solid Waste Management*”. The CEA provides technical assistance and financial support to these programs. The National Solid Waste Management Support Centre, as initiative of the Ministry of Local Government and Provincial Councils, was visited in the beginning of January. An interview with the Assistant Director was held.

Interest of Central Government in Waste

In January 2015, a new government was installed in Sri Lanka. According to both a key informant (IWMI staff) and the spokesperson of the local authority of Kaduwela MC, this new government had different perceptions and opinions on which environmental issues deserve priority. Before 2015, the old government had given quite some power to the environmental police. The environmental police could be seen all over the streets of Sri Lanka in their florescent green vests, aiming to catch people who dumped their waste on the streets, in riverbeds or in nature areas. The new government still has an environmental division which directs the environmental police, but this police force is less involved with waste dumping and more with other issues like dengue reduction.

Vignette 1 – Government’s Interest in Dengue: Perceived by a Citizen

“We have heard about the waste policy but we didn’t see anybody checking it as yet. Maybe it will happen in the future. They do come very often to check for dengue. Whenever somebody gets dengue in the street they come to check if we are breeding dengue mosquitos. All of the places with (stagnant) water are checked, our water well, the place behind the fridge and our water bowls with lotus plants. We have to keep fish in our lotus bowls, the fish then eat up the eggs of the mosquitos. If we don’t have fish they will charge us 25000 rupees. At least once a month they check” (Respondent in Negombo)



Pictures: Bowl with lotus plant and fish (left), and waste placed outside; seen in the area. The picture on the right shows waste being burnt outside.

Box 1 Vignette 1: Illustration of the central government’s interest in waste

The vignette portrayed on the prior page, shows a quote from a female respondent in Strata A of Negombo. This vignette illustrates that the priority of the central government in dengue management instead of in solid waste management is also noticed by society. The new government doesn't only give much less power to the environmental policy in terms of solid waste; the old government also used to play ads on national television which warned people for the fines and other punishments which would follow when people were caught illegally dumping waste. These activities have ended under the new governments regime.

Not only did the IWMI key-informant, and the respondent in Negombo highlight the low levels of interest of the central government towards waste issues, local governmental actors similarly stated the following:

"The government doesn't care about the waste problem. There is no national platform for waste management. We as a municipal council have to do self-management" (Community Development Officer, LA of Kaduwela MC. Interview December 2016).

Though these respondents all indicated that the central government is not as interested in waste as in, for example, dengue, a Sri Lankan newspaper reports something else. This newspaper ("*The Sunday Times*") reports that sufficient money is spent on waste management by the central government. This newspaper however is government owned, which creates a bias to positive reporting on governmental interest and interaction. The following quote is taken from the same newspaper:

"Millions of Sri Lankan Rupees are spent every year to manage waste. The Ministry of Provincial Councils and Local Government said it spent Rs 600 million on garbage management programs so far this year. The ministry spent Rs 405 million for 70 hand carts, 14 polythene compactors, 14 bobcat loaders and 28 compactors [...] An administrative official of the ministry conceded that they face issues with space for disposal, waste segregation plants, compost and recycling plants. He also admitted that each of the 23 municipalities has its own issue in garbage collection and meetings are held to find solutions. 'We only provide guidelines to the municipal councils. Garbage collection is done by the councils' he said" Reported in *The Sunday Times*. (Warakapitiya, 2016).

As can be seen, this newspaper also reports that the municipalities are responsible for their own garbage collection – thus removing the accountability from the central government.

The central government was visited and interviewed in the beginning of 2017. The reportedly low interests in waste management were presented and questioned. The central government itself reported that they do, in fact, have a high interest in solid waste management. They did admit that the prior government may have shown more interest in solid waste management, but now the issue of dengue is indeed more pressing as many people are dying from the disease in Sri Lanka. To strengthen their

small anyway. We can't do anything without the government telling the police to enforce" (Community Development Officer, LA of Kaduwela MC. Interview December 2016).

The local authority here states that it needs the help of the police to change the practices of householders, and in to comply with the new governmental policy to segregate waste. The central government was confronted with this quote during an interview, their comment was as follows:

"Yes there is no fine for not separating. We do have plans to do that in the future. The PHI will probably be sent to collect the fines, because he has the authority to do so. There are plans to change policies and strengthen them, so then the environmental police can be more active. There are discussions at the parliament level now. There are also discussions to ban polythene and plastics and limit water bottles" (National Solid Waste Management Support Centre, interview January 2017).

In this quote, the central government states that they do have plans for the future to empower the police or public health inspector as enforcement aids. However, as of the moment, it seems that the central government feels that it has to do something about solid waste as it signed the Paris Agreement. In this agreement is written that the signing countries must improve their solid waste situation. After signing, the central government felt pressured to implement a governmental policy, which it did. The government even released guidelines for Sri Lanka's household waste management, after which it stated that it is, in fact, trying its best to change the situation. By implementing the policy, it shifted accountability to the provincial council and local authorities and took its hands of the issue themselves. Not only does it not consider itself to be accountable, the central government also has very limited interaction with other actors within the multilevel governance structure. The interaction that does exist, presents itself as follows: the local authorities need to file a request, which will go to the provincial council. Then there is a slim chance that this request will be forwarded to the central government. There is no possibility for the local authorities to speak with the CG, or request anything from the CG directly. When the CG was asked about interventions, it mainly spoke about planning for the future. The government is planning to purchase proper waste collection vehicles, new compactors, create dumpsites, and provide compost bins. An illustrating quote:

"Previous interventions were tried but they failed. Still lacks recycling opportunities. More partnerships are planned for 2017. Limited effects are now happening because we need people's attitude to change" (National Solid Waste Management Support Centre, interview January 2017).

When the CG was asked how and when this all will happen, the issue of limited funds was presented as an obstacle. Due to these limited funds, all these plans seem to remain to be plans, and limited actual action is expected.

5.2 Western Provincial Council

In early January, I visited the Waste Management Authority of the Western Provincial Council (WPC). Of the 7500 tonnes of waste generated per day in Sri Lanka, the Western Province generates 60%. Of the total waste generated by the Western Province, only 2100 tonnes are collected. The tasks of the WPC are to “provide technical assistance and funding to the local authorities in the Western Province”. Their self-proclaimed role in the new governmental policy is to increase awareness by implementing school programs and stimulating other community awareness projects.

“The law made it convenient to manage the compost plants. Because now we hope to get more separated waste and then it doesn’t have to be separated in the compost plant. Clinical medicinal waste was also mixed, now it will be separated. That is better” (Waste Management Authority of WPC, Interview January 2017).

The WPC has financially invested in helping local authorities build a compost yard. Both Kaduwela MC and Negombo MC were partially funded by the WPC to build and expand a compost yard.

Extensive plans - no implementation

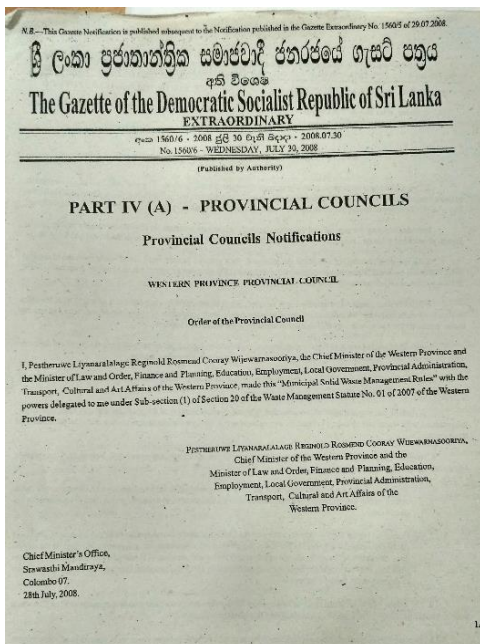


Figure 8 Gazette by Western Province Provincial Council

The WPC launched a “Gazette of the Democratic Socialist Republic of Sri Lanka, Western Province Provincial Council” on the 30th of July, 2008. This Gazette provides a number of rules regarding municipal solid waste management, a few of which are described in Box 1. These so called ‘rules’, however, are not being implemented. As the WPC explains:

“We came up with these rules to improve solid waste management in the Western Province. It is up to the local authorities to actually implement them. We cannot force them to implement. It is also difficult for the local authorities to implement because they do not have enough money and no proper vehicles and facilities. We also cannot provide them with funds because we have limited funds ourselves”

The WPC still hopes that these rules will one day be implemented. It also stated that it hopes the new policy will motivate the local authorities to find a way to improve the municipal solid waste management.

Information Box

Gazette of the Democratic Socialist Republic of Sri Lanka, Western Province Provincial Council.

A few selected 'rules' are described here

Chapter 1 – Separation of MSW at Source

- Every Local Authority shall make the general public aware of the process of segregation, abatement, reusing and recycling of solid waste at the source
- No person shall dispose of waste in any public or private space, other than in closed-type bins or other receptacles especially set apart for that purpose
- No person shall burn or cause to be burned any waste in the open air

Chapter 2 – Proper collection of MSW from Sources of Generation

- Every LA shall arrange for door to door collection of non-biodegradable waste specified in schedule. At least once in two weeks and time and the manner of collection shall be notified to each chief occupant
- Every chief occupant of a premises shall be liable to pay a 'user fee' in addition to the taxed payable to the respective LA, to cover the expenses of door to door waste collection
- No LA or any authorized person shall mix different categories of waste which are collected or accepted separately in accordance with the preceding provisions
- Every LA shall conduct awareness program on segregation of waste and shall promote recycling and reusing of segregated materials
- For the purposes of these rules, regular programs at frequent intervals shall be conducted by LA with representatives of local community based organizations and non-governmental organizations. Details of such programs shall be forwarded in advance to the Waste Management Authority.

Chapter 3 – Cleaning of roads and public places

- Every LA shall provide and maintain a sufficient number of separate closed-type waste bins or receptacles for biodegradable and non-biodegradable waste on both sides of all categories of roads and all public places

Chapter 4 – Abolishing of Open waste storage receptacles

- Every LA shall be responsible for providing separate receptacles to accommodate volume for biodegradable and non-biodegradable waste and shall maintain those receptacles in clean and usable condition
- Every LA shall be responsible for providing receptacles based on the population density and quality of waste generated in that area. Such receptacles shall be easily accessible to user and shall be easy to handle, transfer and transport.

Chapter 5 – Improving the system for mass transportation of MSW

- During the transportation, waste shall be covered and shall not be visible to general public

Chapter 6 – treating the collected MSW as a resource

- Every LA shall promote marketing of recovered resources from waste

Chapter 7 – Introducing an improved facility for the final disposal MSW

- No LA, company or person shall dispose their final waste except to a final disposal facility
- Final disposing site shall be operated in accordance with the guidelines of the Central Environmental Authority of Sri Lanka

Box 2 Gazette of the Democratic Socialist Republic of Sri Lanka - Western Province Provincial Council

5.3 Kaduwela Municipal Council

"The Kaduwela Municipal Council Community development official Lalith Nanayakara said more than 100 tonnes of garbage is collected every day. Of this, more than 45 tonnes is biodegradable and is used to create compost. Plastic and other materials are sorted and sold to recyclers. Another two tonnes of garbage is used to generate electricity for the recycling centre" (Warakapitiya, 2016).

Kaduwela MC has a five-year plan in place, in which efforts to reduce and reuse waste are discussed. This plan was implemented on Kaduwela's initiative, there was no external pressure, for instance by the central government.

"Since more than a decade there has been talk about better waste management, but there is no implementation. We want to implement and show the benefits to society. We want to be an example. Not much changed due to the law. Since 2012 our municipality has been source separating. We were already segregating waste here. The only change that happened is that we have been able to reach 100% of the people now. There were still some people who still didn't separate and discarded their waste, but now the police can catch them because of the new law" (Community Development Officer, LA of Kaduwela MC. Interview December 2016).

Four years ago, a municipal awareness program was launched in Kaduwela MC. This program facilitated community meetings, school programs and school awareness programs, community waste awareness projects, and leaflet distribution. Because of this program, large banners were placed upon waste collection trucks which shortly explained the benefits of waste segregation for people. In 2007, the LA started providing home composting bins. Each year about 1000 bins are distributed to households, so as of 2017 about 10.000 bins have been distributed. Households are also being encouraged to sell recyclables. All of these interventions aim to reduce household waste.

"We need to tell them: the situation is bad. Bad waste management gives an environmental hazard. We explain the environmental impact and health consequences to them. We also explain environmental degradation and its effects on society" (Community Development Officer, LA of Kaduwela MC. Interview December 2016).

At the start of the awareness and action based interventions four years ago, community based interventions were also launched. The idea of these community based interventions is to include the people living in the MC to find solutions. Every evening from 4pm and sometimes up to 11pm and during the weekends, people are called together in halls, temples or empty schools. When I expressed my surprise that people are willing to come (*"But what is their incentive?"*), it was explained to me that the Sri Lankan culture is such, that when people are asked to attend meetings they usually comply without force or financial incentives. Community leaders of community

organizations were first contacted, and they were asked to gather people. Messages were also being sent through school teachers, people working in temples and waste collectors. At the meetings, people can express their grievances and discuss solutions. Sometimes, the solution proposed by the people will be implemented. This happened for home composting bins and for domestic biogas unit provision. The thought behind this is described by the Community Development Officer, LA of Kaduwela MC as: *"If we give ownership to the people, they will take care of the projects"*.

Before implementing this program, 120 tonnes/day of waste was produced by the peoples of Kaduwela MC. This has now been reduced to 90-100 tonnes/day. Kaduwela MC wants to invest more in source separation, and reduce the waste even further. It is of the utmost importance to reduce the produced waste, as Kaduwela MC does not have a proper way of discarding the 'trash'¹⁶. Waste collection is also a serious issue as there are not enough waste collection vehicles. It would be ideal to use large trucks with built-in departments which would make organic and inorganic waste separation easier. However, the collectors still use outdated tractors which break quite often, and there are not enough tractors to replace the broken ones. The local authority is aiming to solve the problem of vehicles, but does not have enough money and does not get any financial support from higher governing institutions. A lack of suitable workers is also a problem in terms of waste collection, as the collectors state:

"Our vehicles are not suitable for collection, tractors break down and maintenance costs are high. People willing to work as waste collectors are also difficult to find. The pay we give them is very little, but we cannot afford to pay more. Also education levels are going up. Nobody wants to work this job"

5.4 Negombo Municipal Council

The local authority of Negombo MC outsourced the solid waste collection in some of the municipal areas to private collectors, due to lacking man power and labourers. This private collection service is called Seven Hills. In other areas within Negombo, public waste collectors are active. Table 3 in Sub-chapter 4.2 provides an overview of the selected ward with respective public or private waste collection service.

People working at both Seven Hills and in the public waste sectors indicated that there were political reasons behind the outsourcing, and Seven Hills is run by a friends of the local authority. The LA has a budget of four million rupees per month, out of which both the private and public waste collection service is funded, as well as the workers in the landfills, grading centres and compost plants. Other health related projects are also funded by the LA from this budget, such as HIV prevention projects. Six lacks (six hundred thousand rupees) per month is spent on the solid waste collection. The solid waste governance in Negombo MC is quite different from that in Kaduwela MC. Negombo does not have a five-year plan, or any plan for that matter. This municipal council was not actively involved in municipal waste management prior to the implementation of the new governmental policy.

¹⁶ *Trash is waste which is not organic and not recyclable*

Vignette 2

Community Development Officer,
LA of Kaduwela MC. Interview
December 2016

"Colombo district is too late, they are highly urbanized and still don't have a proper waste management system. As soon as we started becoming urbanized a few years ago, we started implementing plans and programs, so we never got into the bad situation that Colombo is in. We are very active with our five-year plan. We are planning to expand biogas (biogas won by waste) from five KW/day to ten KW/day. Two tonnes of waste can produce five KW. Even after starting the five-year program, there were some people who didn't engage in the program. Out of 80.000 households living in Kaduwela MC, about 1000 didn't comply. The law did give us more power to tell them that they must comply, because now it is the law and not just us telling them. It is difficult to catch them, because the police don't really catch them. Before, offenders had strict punishments. Now not so strict. I think that a law amendment should be there. We still use 1940/1950 laws; the fine is very low. The government needs to pay attention to this. Also, the custody period needs to be increased. Now nobody cares about breaking the waste law. We see it as our responsibility to make the society and environment a clean and nice place. We want to management waste properly, though the landfill problem is still a large issue.

5-year plan, currently being implemented by Kaduwela MC's local authority

Challenges regarding waste management

1. Attitudes of the public and their reluctance to support the waste management programs.
2. The reluctance of junior staff to collect source separated waste
3. No proper systems to manage segregated waste
4. No proper final disposal
5. Violation of an agreement the MC had with a private organization called "burns" by them and no compensation received. MC had lost a lot of money because of that
6. Public protests waste management
7. Littering in public places
8. No proper system to fine those who violate rules (littering public places)
9. Lack of regulations and financial resources for proper waste management
10. Insufficient land space
11. No support from institutes that generate waste (government and private)
12. Delay in implementation of proposed waste to power projects
13. No private organizations that are qualified to outsource certain waste management components.

Objective and sub objectives

Between 2015-2019 to improve the waste management of the MC and reduce the inorganic component to 10%.

1. Build a restroom for the employees at the compost plant
2. Build a bio gas plant to convert 4 tons of organic waste to bio gas in 2015. In 2016 to increase it to 10 tons.
3. Distribute 45000 bins to households for source segregation
4. Find 10 acres of land for final disposal (landfill)
5. Change the attitude of the public regarding waste management.

Required human resources

1. 10 new labourers
2. 1 tractor driver
3. 1 to drive the "bobcat"

Action plan

1. Get approval for the plan
2. Expand the compost plant
3. Project to produce electricity using waste
4. Buy 4 compactor machines
5. Buy weighing scales to weigh produced compost
6. Buy a conveyor belt for separation of waste
7. Obtain the land for final disposal

Box 4 Vignette 2: interview with
Kaduwela's Local Authority

Box 3 5-year plan implemented in Kaduwela

5.5 Summary “Governmentalities and Centralization”

Three levels of waste governance actors have been discussed in this chapter: the central government (CG), the western provincial council (WPC) and the local authorities (LA's) in both case studies. The main finding in this chapter is that each level of governance portrays varying governmentalities, which impact the governance on all levels. The new centralized governmental policy currently does not have the desired effects, and is not likely to achieve them either due to the following reasons:

Governmentalities CG

Low interest of CG in solid waste. The main reason for implementation of the new solid waste governmental policy seems to be the binding ratification of the Paris Agreement. The levels of interaction between the CG and other governance actors is very low to non-existent. The CG places the responsibility and accountability on the WPC and LA's by providing policies and guidelines, and by failing to provide resources. The CG encourages the LA's to get appropriate vehicles in its guidelines – although they do not financially assist and the LA's do not have money to comply. Benefit of the centralized policy is mentioned by the WPC: increased convenience in managing compost plants and separation

Governmentalities WPC

The WPC claims to have plans: they launched a *gazette* in 2008. The WPC does not consider itself responsible for the implementation of this *gazette*, thus it is still just a plan. The WPC does financially support the LA's in building a compost yard.

Governmentalities LA's

LA's both indicated they were trying to comply, and presented a variety of plans. As 'lowest' actor in the multilevel governance structure, the LA's have to deal with policies, rules, gazettes and other plans. They are considered to be able to comply by the WPC and the CG. However, the LA's do not have the means to comply. The LA's do not have appropriate waste collection vehicles which makes the proper collection and transportation of segregated waste near to impossible. The LA of Kaduwela has a five-year plan to reduce and reuse waste, awareness programs and community based interventions and is currently working on waste reduction and source separation. However, the LA lacks financial resources and space for a landfill. The LA of Negombo has no awareness and community interventions, or plans to comply with the governmental policy. Both LA's have their own struggles to deal with, and are both having a hard time with complying with the policy.

In summary: none of the governance actors (CG, WPC, LA) seems to have financial or human resources to assist or comply with the policy. No actor seems to be working on implementation and law enforcement. Corruption and *plans not taking off* seem to be the main restrictions. The CG is aiming to conduct other governance and societal actors by implementing the governmental policy, this is their governmentality. This chapter, however, told us that the multilevel governance structure has its own way of operating. This is what likely effects the practices of people (Chapter 6 will discuss this), and in turn the people's practices are likely to affect the governmentality.

Chapter 6: Household Practices

Figure 9, below, provides a visualization of the link between the previous and following chapters. Here, the governance actors discussed in Chapter 5, portray certain governmentalities and have certain governance strategies. This all has an impact on the households in each MC area in terms of waste generation and segregation practices; these are portrayed in the blue box in Figure 9 and will be discussed in this chapter. The household waste which is not processed by the households themselves, is gathered by the waste collectors. The orange box in Figure 9 shows the practices of the waste collectors, which will be further discussed in Chapter 7.

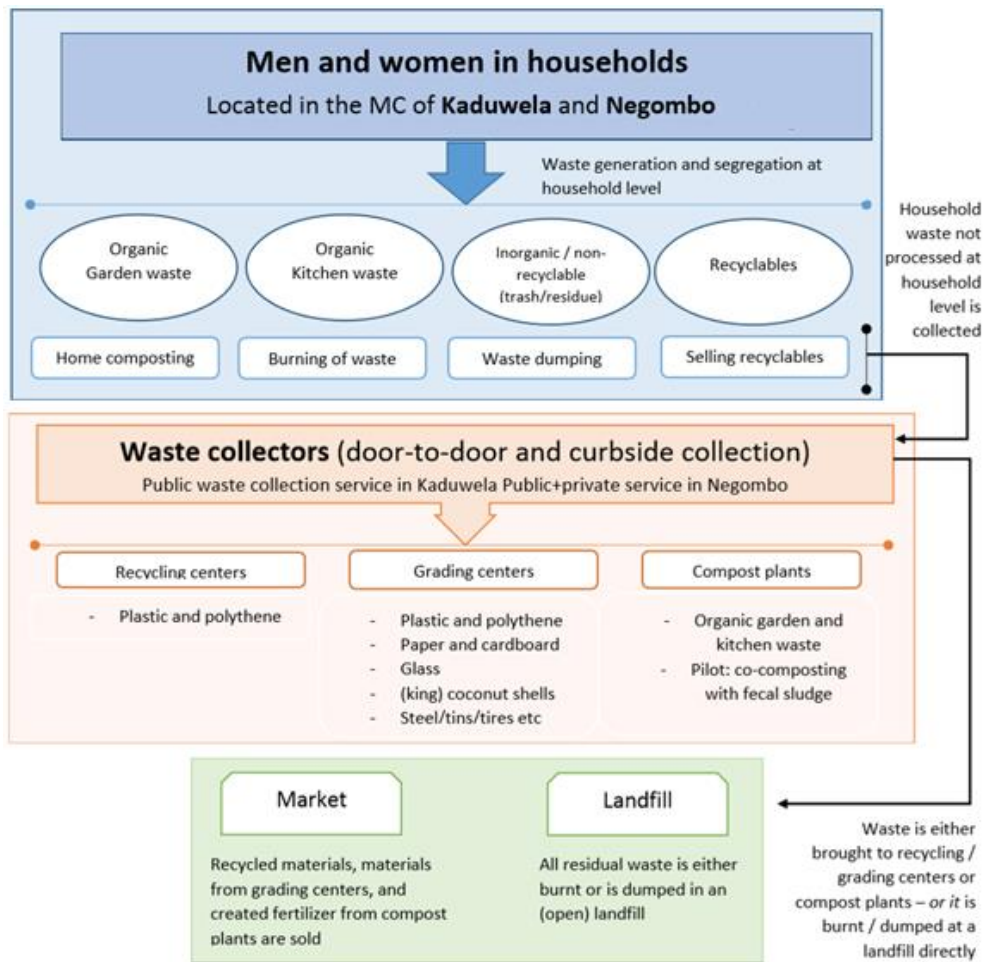


Figure 9
Overview of
Chapters

To study the household practices in both Negombo MC and Kaduwela MC, the respondents were first asked *who* within their household oversees separating waste, and *who* within their household is responsible for taking out the trash. When the person in charge of the waste within the household was determined, the enumerator requested to speak to the person in charge for the remainder of the survey. The main results will be discussed in the following subchapters.

6.1 Kaduwela Municipal Council

In Kaduwela MC, out of all the cases in which the respondent indicated to be responsible for waste segregation him- or herself (45.6% of cases), the same person remained the respondent for the remainder of the survey. Some of the initial respondents also indicated that their wife was responsible for waste segregation (27.9%); their children were responsible (1.5%); their maid was responsible (17.6%); their father or their mother were responsible for separation (6% total). In almost all cases, the person responsible for waste segregation was used as a respondent for the remainder of the survey. All presented quotes in this subchapter are taken from interviews with respondents living in Kaduwela MC.

Indicated Segregation Practices

"I only separate food/kitchen waste from other waste. They collect it like that; organic and inorganic. So, in the inorganic bag I put plastics, polythene, cans, paper and other waste (Maid in household, 28 years of age, Strata B).

Not only did the respondents indicate that they must segregate waste for it to be collected, several respondents indicated that they gain personal benefits from separating in two categories: organic and inorganic waste. One of these benefits is home composting and using this compost in their own garden.

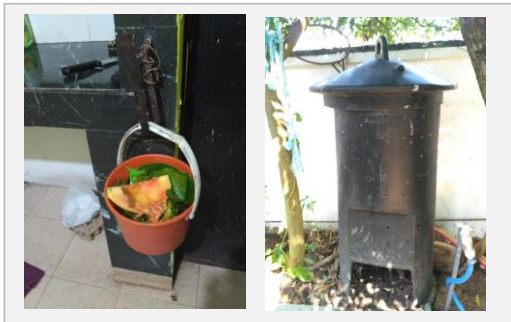


Figure 10 Organic storage bin (left) and compost bin (right), seen in Kaduwela MC

When respondents were asked about their perceptions towards home composting, it was found that respondents living in Strata A were significantly less willing to invest time in home composting than respondents living in Strata C ($p < .000$). Also, respondents living in Strata A were significantly less willing to invest time in home composting than those living in Strata B ($p < .000$).

All of the respondents were asked whether they perceive home composting to be beneficial for them. It was found that the respondents living in Strata A in general do not think it is beneficial, whereas the respondents living in Strata's B and C do consider home composting to be beneficial for them.

Thus, home composting seems to be less popular in Strata A than in Strata's B and C. This might be because respondents living in Strata's B and C, which are wards with inhabitants living on less income, are more dependent on their own compost than the respondents living in Strata A. Respondents in Strata A were interviewed on the matter: during these interviews this assumption was confirmed. Purchasing compost from the store is stated to be an easier and homogenised alternative by the interviewed respondents.

This variance in interest towards home composting seen between the Strata's is highlighted by the following quote. This respondent discussed the problems he encountered with the storage of organic waste, needed for home composting:

"We have a problem with rats. I think that the waste collectors should come more often, they only come two times a week now. Because the food waste is kept so long, a lot of insects and rats come. This is not good. I don't want to put out poison because that is also bad for us, so now I have a cat. Because of the cat there are less rats now" (Male respondent, Strata A)

The quote above illustrates a complaint towards the waste collection service. Other complaints were also heard in Kaduwela. Frequently heard complaints include the frequency of collection, and the types of waste which are or are not collected. Glass, for example, is not collected in several areas in Kaduwela:

"There is a problem with the glass bottles. The garbage collectors don't take the glass bottles, it is a problem, because then I am left with a lot of glass in my house. There are people who sell glass, so I give it to them for free; I just don't want it in my house anymore. Sometimes I also just mix glass with my other waste, I put it in the bottom of the bag. It just needs to go. Can't you tell them that they should start collecting glass also?" (Male respondent, Strata A)

Though there are complaints about the limited waste collection, respondents indicate that they have to segregate their waste in order for it to be collected. The vast majority (88,6%) of Kaduwela's respondents indicates segregating their waste in at least two categories (organic -inorganic). *'It is good for the environment'* and *'I have to, otherwise it will not be collected'* are the most heard reasons for separation.

93,4% of the respondents in Kaduwela stated that they would recommend their friends and family to segregate their waste, and 4,9% ticked the *'I don't know/ I don't want to answer'* box, thus leaving only a very small percentage of people who do *not* recommend others to segregate. This is in line with the collected data on the waste collection service in Kaduwela, which will be presented in Chapter 7. As will be discussed there, collectors indicate that they only collect waste when it is segregated. These relatively high levels of segregations are confirmed by observations within the houses and on the streets, which showed that waste in general is segregated in at least two categories (organic – inorganic) and often even in three (organic – recyclables – inorganic trash).

Knowledge and Awareness

The knowledge and awareness in Kaduwela regarding the benefits of waste segregation is quite high. Most respondents in Kaduwela heard about segregation on television (N = 33), or through mouth-to-mouth information from the waste collectors (N = 29). When the respondents were asked about the governmental policy, 73.8% of respondents did hear about it at some point in time, and 26.2% of respondents never heard about the policy. The proportion of respondents who have heard about the policy is quite large. This is in line with the data collected on governance, presented in Chapter 5, which shows a high occurrence of community awareness projects. Respondents indicated that they have known about the benefits of waste segregation for years; mainly through the means of community meetings, leaflets and through verbal communication. The fact that waste has only been collected when segregated

since a few years has also added to people's knowledge of segregation benefits, and has led to the high levels of segregation practices within this municipal council. Vignette 3 tells the story of a middle-aged woman living in Strata B in Kaduwela. She has been separating her waste for years. She discusses the importance of home composting for her household. The practices of this woman are quite representative for the respondents in Kaduwela.

Vignette 3: Interview with a 64-year- old female respondent, living in Battaramulla (Strata B)

My husband and I moved here about 15 years ago, from Colombo. We both live on our pensions now, I had a governmental job and my husband had a job in the private sector. We never had any children, but we rent out rooms in our house. We have a clear division of labour in our household, my husband is responsible for the gardening and I am responsible for the cooking and cleaning. Because it is becoming difficult for me, I have a maid who comes two times a week; she helps me with cooking and cleaning. She also gives my husband massages, because he has back pain. The municipal waste collectors come on Wednesday and on Saturday, I put my waste outside and they come to collect it. I separate my waste; I have a bucket in which I put food and kitchen waste and an old rice bag (big) in which I put all my plastics, cans, paper and polythene together. We have to separate food waste and other waste, otherwise the collectors will not take it. We started doing this about three years ago, because the municipal council gave us leaflets and told us that we have to separate, otherwise they would stop collecting. Because of this I bought a plastic bucket in which I put my kitchen waste. I did hear about the new policy (1st of November policy), it was all over the newspapers and television, but it doesn't make a difference for me because I was already separating. I did not hear anything about a fine, is there a fine? Well it doesn't matter for me anyway, I do separate. I always used to separate garden waste like leaves and other plants, and since two years I have a compost bin. My husband puts the leaves and other garden waste inside the compost bin, on the top side. Then on the bottom, the fertilizer comes out, my husband uses this in the garden again. We also have to put water in the compost bin, otherwise it becomes too dry and it will not become good fertilizer. I don't put kitchen waste in the bin, because then we get a problem with insects and rats. We can't make the fertilizer as good as the municipality does. They have good medicine (?) to make good fertilizer, to keep all the insects and rats away. We don't have that medicine, so we cannot do it as well as they can. Not all the garden waste is put in the bin, we burn a lot of the leaves as well. We burned the leaves in a wheelbarrow, but I put the wheelbarrow outside on the street last week, because the smoke was very much and it was irritating me. Somebody stole it from the street, so now I need a new one. It is good to burn leaves; because of the smoke all the mosquitos go away. It is also good to burn leaves, because the ashes ('Alu'), are very good. If you put ashes around trees and plants, the insects won't come to eat plants. The Gollubella and Hangolla are insects that bite leaves, and Alu helps. It is a natural insecticide.

Box 5 Vignette 3: Interview with a societal actor, representative of the majority of Strata B's inhabitants

In summary: the strong incentives (people must segregate waste, otherwise the collectors will not collect it), the high knowledge of the benefits of separating waste ("it is good for the environment") and personal benefits (e.g. home composting; found mainly in Strata B and C) all stimulate the respondents in Kaduwela to segregate their waste. This is confirmed by the data; 88,6% of Kaduwela's respondents indicate to segregate their waste.

6.2 Negombo Municipal Council

Similar to Kaduwela MC, in almost all cases the person who was the respondent for the survey was the same as the person in charge of waste segregation and of taking out the trash. Therefore, it can be said that the relevant household member was used as the respondent in almost all cases. All the quotes presented in this subchapter are taken from respondents from Negombo MC.

Indicated Segregation Practices

"Of course I separate my things, because every room has a different bin. So in the kitchen, the kitchen waste is only in that bin, and in the other rooms there is other waste" (Male respondent, Strata B).

The quote above illustrates the practice of a respondents in Strata B, who did not have any other reason for segregating his waste than for the reason of ease. Within the same interview, he did not know of any (environmental) benefits of waste segregation, and he indicated that all waste is collected simultaneously. He does not segregate in two or three tiers, but segregates his waste in separate bins that are located in separate rooms. The interview with this respondent illustrated that the indication of segregation does not necessarily mean that people are aware of segregation benefits, and indicated segregation also does not necessarily mean that waste is segregated in organic-inorganic or organic-inorganic-recyclable waste. A major challenge in properly segregating waste, according to a variety of respondents in Negombo, is the issue of the placement of waste on curbs. When organic waste is placed in plastic bags, dogs and rodents will be attracted to the food and cause a disturbance. Putting the organic waste in bins can similarly be a challenge, as the quote below illustrates:

"Bins cannot be put on the street because they will be stolen" (Female respondent, Strata A).

These challenges heard in Negombo have led to people burning their waste, or simply dumping their waste on the streets far away from their personal space. The quote below provides an example of a respondents living in Strata C, who indicates that she dumps or burns her waste. Organic waste is not home composted but simply buried.

"We bring our waste to the seaside or we burn the waste. Our kitchen waste is used as animal feed or we bury it. We also bury the leaves. If we plant our plants on top of this, they grow better" (Female respondent, Strata C).

In response to the new policy, national awareness campaigns have been launched to stimulate people to buy decomposable garbage bags. These bags increase the environmental sustainability of waste collection and disposal. The decomposable, environmentally friendly garbage bags can be bought in supermarkets, and are thick enough to do a better job at keeping dogs and rodents out than the thin shopping bags do. The purchasing of these garbage bags, however, is perceived to be "too much effort". In Sri Lanka, everything you buy is put in a polythene bag. People thus have an entire collection of these bags stored in their homes, which they use for garbage storage.

The perceptions of people towards the need to segregate vary from area to area. The following two quotes are examples on perceptions towards waste collection taken from respondents in Strata C:

"I have to separate, but I burn all my waste anyway, so doesn't matter. Collection is bad" (Male respondent, Strata C), and:

"Waste is never collected, but I do separate my vegetables and fruits because of home-composting" (Female respondent, Negombo, Strata C).

These provided quotes illustrate the opinionated bad collection service in Strata C (Pitipana). The first quote shows us that people come up with alternative ways to deal with their waste, in this case the respondent burns his waste as it is often not collected. He indicates that he does know that he has to segregate, but that there is no enforcement or incentive for him to segregate: he just burns all his waste anyway. The second quote similarly illustrates the non-existing waste collection service in Strata C. Here the respondent indicates that she has personal benefits from filtering out her organic waste, which provides an incentive for her to segregate in two tiers (organic – inorganic).

Complaints regarding the waste collection service not only heard in Strata C. Respondents living in Strata A and B also complained about the limited collection service. The quote below provides an example of a respondent who indicated that her leaves are not collected, which is a cause for annoyance:

"Leaves are not collected by the collectors, so I burn them. The smoke is annoying" (Female respondent, Strata A).

The following quotes discuss that even though people may indicate that they do segregate, their practices may not be as desired.

"We segregate all of our waste, we have to. We are in a rental house since a few months and our neighbours told us from the start that we have to separate. So we do it" (Female respondent, Strata A)

Enumerator: could you show us how you separate your waste in your bins? – Observations show that indeed the organic waste is put in a bin separated from the inorganic waste. There is no observed bin for inorganic waste in or around the house of the respondent. The respondent was asked what her practices with inorganic waste are. As the question was initially not understood, the respondent was explained that plastics, food wrappers, and items like sanitary towels are considered inorganic waste. Her answer was as follows:

"We sell the plastics, once in a while a guy comes by who we can sell it too. Some of the other waste we give to the collectors. The rest of the waste we burn. We burn it just outside, on the street. Everybody does that here. The waste collection is not regular so we don't want to keep all of the waste in the house. The food waste is also collected not frequently so we sometimes give it to

the stray dogs, or we bury it in the garden for the plants” (Female respondent, Strata A).

This respondent initially stated that she segregates her waste, and has been doing so ever since she moved to her current house a few months ago. Even though she claims to segregate her waste, the practices with this segregated waste include the burning of waste or the usage of waste for personal benefits such as the selling of recyclables or the re-usage of organic waste. This quote illustrates that also in Strata A the collection service is not regular, which increases the practice of waste burning.

Segregation Incentives

Financial reasons are a very obvious incentive for people to segregate recyclables, as was seen in Strata’s A and B in Negombo. The financial incentives here are that people who keep their recyclables separately, can sell these items in exchange for a small amount of money or an item. The private buyers also have an incentive; they can sell the recyclables in large amounts on the market. This incentive moves them to go out and collect recyclable waste from households. The two quotes below illustrate this:

“The private sector comes to collect glass and aluminium and paper. There is no fixed day, but when they walk through the street they call out so we know that they are there. This happens about one time per two months. We get 5 rupees per kg of glass, 10 rupees per kg of metal and 5 rupees per kg of paper” (Male respondent, Strata B), and:

“The collectors for recyclables come and we can get an item in exchange. For example, this bin in which I store organic waste I got in exchange. We can also get cooking items for example. We never give recyclables to the government” (Female respondent, Strata B)

Besides the financial incentive discussed on the previous page, respondents may have other incentives to segregate. For example, in Strata C, several respondents owned pigs. They often segregated their organic household waste to feed their pigs. Both the financial incentives as the practice of feeding livestock with organic waste are practices which are not seen in Kaduwela.

Another important difference between the two case studies, is roaming waste. In Negombo, and especially in Strata C, a lot of waste lying around was observed. The lacking waste collection service combined with low levels of caring are given as a main reason. Figure 11 (next page) shows waste lying around, people interviewed in the surroundings contribute to the waste dumping. When the only respondent who cared about the dumped waste found at the scene was interviewed, a group of people living in the surroundings gathered around us. Informal conversations with these people confirmed the assumption that people just don’t care about the waste lying at the beach. The people also indicated that there is just no other way to deal with the waste, as there is a non-existent waste collection service in the area.

Perceptions and Knowledge within Households

The awareness and knowledge towards the benefits of waste segregation, in general, seems to be lower in Negombo than in Kaduwela. It seems to be a common practice to burn plastic, paper and leaves, and keep other waste segregate for the collectors to collect. In areas where there is an active waste collection service, all non-segregated waste is collected together. The quotes below indicate that people are aware of the fact that they are officially obliged to segregate their waste;

"A few months ago we put all of our waste together, but then we received a leaflet from the Municipal Council. The leaflet informed us that we have to separate, otherwise our waste will not be collected. Now we separate kitchen and food waste, paper, and polythene. For us, medicine covers are a major source of waste. We put the medicine waste with the paper and plastic waste" (Middle aged couple, Strata A (Angurukaramulla), and:

"We got leaflets that now we have to separate, so we do. We separate in two bins; one for organic and one for inorganic waste. The organic waste is collected on Mondays and inorganic on Fridays. We give our bins to the collectors, or we just burn it when they don't come. Many times they just don't come to collect and the waste starts to smell" (Male respondent, Negombo, Strata B).

The first quote illustrates a couple in Strata A who has altered their practice after the new governmental policy. However, hazardous medicinal waste is put together with paper and plastic waste. In Negombo, it is quite obvious that Strata C has not altered their non-segregation practice, but respondents in both Strata's B and C are seen to have altered practices. This is likely due to the non-existent waste collection in Strata C which leaves the people living in this Strata with absolutely no incentive to segregate.



Figure 11 Leaflets distributed in Negombo MC

Figure 11 (left) displays leaflets distributed in Negombo.

The respondents who do segregate their waste in Negombo, almost always indicate that their reasoning is: *"it is good for the environment"* or *"for health reasons"*. The leaflets discuss these benefits of waste segregation.

Only a small amount of respondents stated their reasons for segregation are that they are told to do so, or that they *have to* in order for it to be collected. This is in line with the fact that waste is often collected unsegregated in Negombo – whereas it *has to be* segregated in order for it to be collected in Kaduwela, as has been discussed in Subchapter 6.1.

Observations in Pitipana

The situation in Strata C (Pitipana) is quite bad in terms of roaming waste. Respondents living in this area indicate that waste is never collected. Waste that is not used as animal feed is dumped at the seaside or burnt. The pictures below illustrate the severity of waste dumped at the seaside in Pitipana (left) and shows the interviewing process of a man living in Pitipana (right). This man is telling us about the bad situation of waste dumping. A quote from this interview can be found below:

"The waste goes into the sea. I am a fisherman and I catch so much waste in my nets. Also many fish die. It is very bad that all this waste is here, I cannot do my job properly. Can you please tell the people who live here that it is bad what they do? I can't tell them because they will be angry with me, I also live here"
(Male respondent, Strata C).

This respondent and his family suffer by the roaming waste: it doesn't only impact his job as a fisherman, he also mentioned that it is very smelly and dirty, and with strong coastal winds it is sometimes very hard to breathe. He also indicated that the other people living near the beach don't seem to be bothered by the roaming waste, and just keep dumping their waste. Of course, they do have good reason: *"Nobody comes to pick up the waste"*, but the respondent suggested that it might be possible for the community to gather all their waste and bring it somewhere else than the beach. He even proposed that it might be possible for the community to burn all their waste simultaneously on a location far away from their homes. However, the community is not interested to talk and discuss possible solutions for the roaming waste. According to the respondent this is because they simply don't care.



Figure 12 Roaming waste (left) and Interview on the Negombo Beach (right)

In summary of Negombo MC; financial incentives seem to be an important reason for respondents to segregate their recyclables as they get paid for selling these. A lot of dumped waste can be seen in Negombo, especially in Strata C where the waste collection service seems to be non-existent. Besides dumping, organic waste is also re-used as animal feed. The situation in Strata's A and B seem to be better.

6.3 Practices: Comparison in Numbers

The figures below present a comparison between the two case studies and between the three Strata groups within each of the case studies on three practices found among the respondents. Please find more information on these figures on the next page.

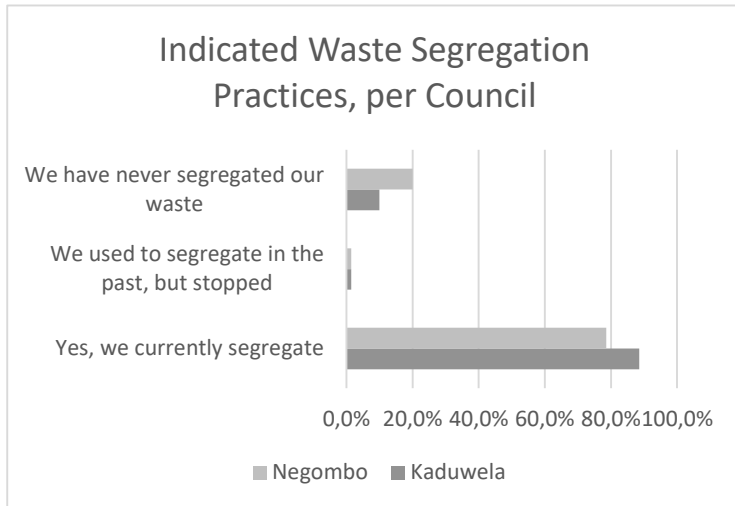


Figure 16 Practices per council

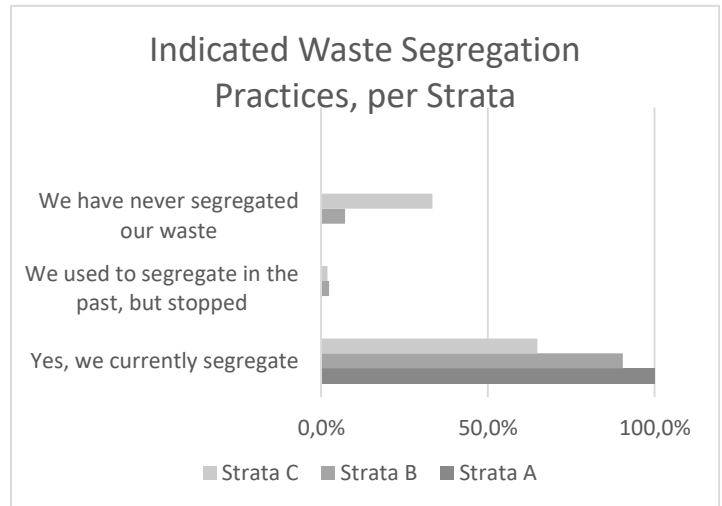


Figure 13 Practices per Strata

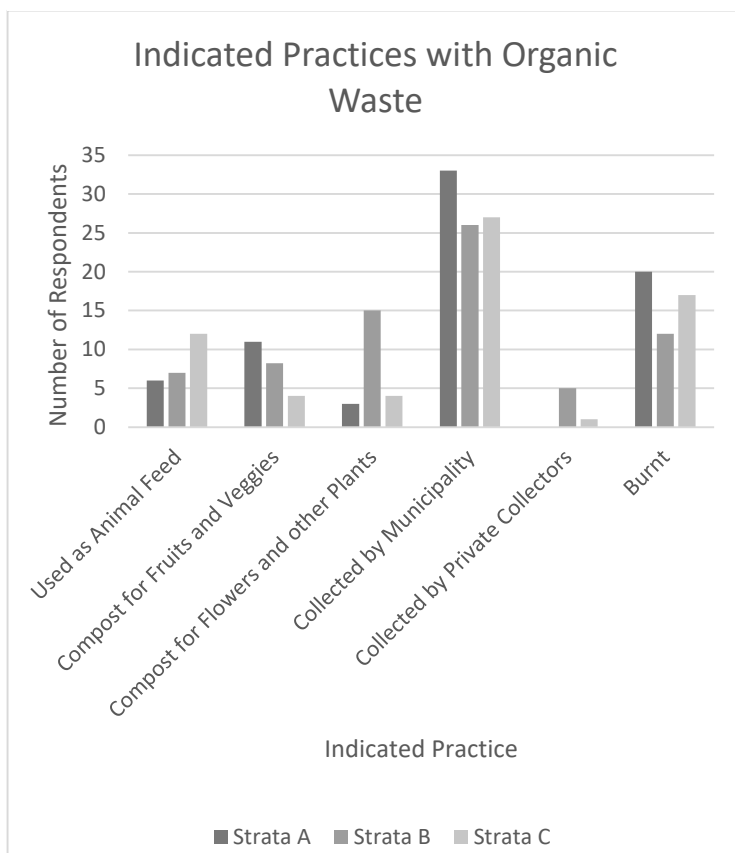


Figure 15 Organic waste practices

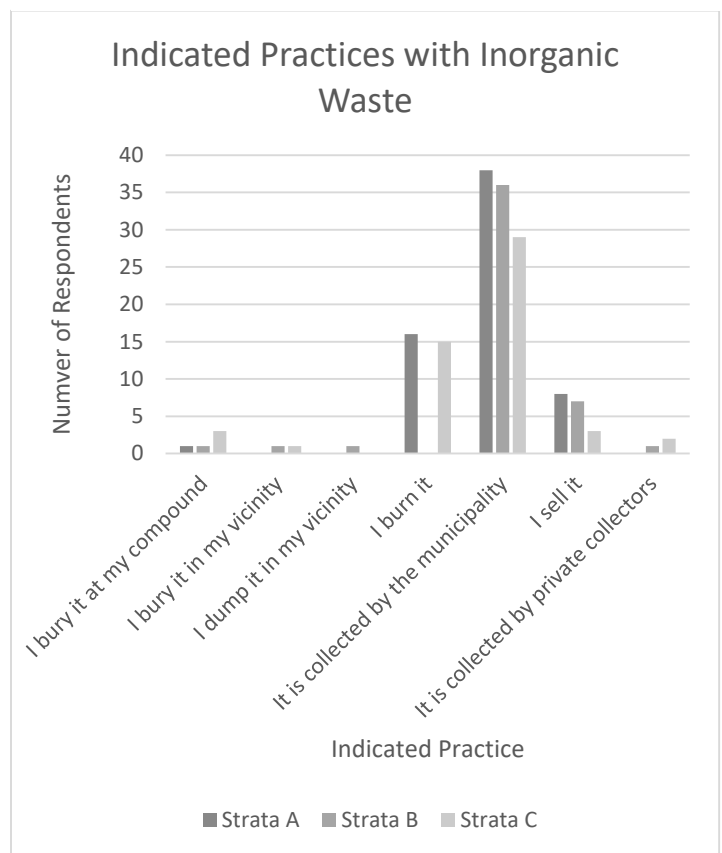


Figure 14 Inorganic waste practices

The four figures on the prior page, portraying the indicated waste segregation practices per Strata and per council, and the indicated practices with organic and inorganic waste per Strata, will be discussed in the following paragraphs.

Figure 13 indicates that all respondents in Strata A indicate to segregate their waste; respondents living in high income, low density areas, across both case studies, state that they segregate. Almost all of the respondents who indicated that they have never segregated their waste, live in Strata C. This tells us that across both case studies, people in Strata A indicate to segregate more than people in Strata B, and least so in Strata C.

Figure 16 portrays indicated segregation practices per case study. It can be seen that out of all respondents, the respondents living in Kaduwela in general indicate to segregate more than those living in Negombo. Accompanying numbers shows that out of the (n=140) total respondents, 88.6% of Kaduwela's respondents (n=70) and 78.6% of Negombo's respondents (n=70) indicated that they currently segregate their waste. This "*segregation*" question solely filtered out segregation in general, it did not focus on either organic waste from non-organic waste separation or on organic, non-organic and recyclable segregation. It is important to keep in mind here that people might indicate that they segregate their waste, without being aware of (environmental) benefits of waste segregation, and without being aware of the governmental policy. As discussed in the previous subchapters, people can keep their organic waste separately for their own benefit (home composting, stench, animal feed) from their other waste, or they might filter out recyclables to sell for an additional income. In order to study these practices with organic and organic waste, Figures 14 and 15 are presented (see previous page).

Figure 14 portrays inorganic waste practices per Strata; the majority of people who state that their waste is collected by the municipality lived in Strata A, and the minority indicating the same lives in Strata C. This could indicate that the waste collection service for inorganic waste is better in the richer areas than in the poorer areas, or it indicates that people in Strata C have other ways to deal with inorganic waste. Both The figures provide a number of respondents who gave a certain answer. Each respondent was given the possibility to give multiple answers. Figure 15, similarly to Figure 14, tells us that Strata A most often indicates that their waste is collected by the municipality. When organic waste is not given to waste collectors in Strata C, organic waste is burnt, used as animal feed, or used for compost. This is in line with my observations.

It is surprising here that quite a number of respondents living in Strata A indicated that they burn their organic waste, as I observed much more piles of "burning waste" in Strata C than in Strata A. However, as discussed before, home composting is practices significantly more in Strata B and C than in Strata A. Informal conversations confirmed my assumption that people in Strata A burn their organic waste as alternative to home composting – I was told that the burning of organic waste is not something bad, and in fact, it even keeps away mosquitos and other bugs. Therefore, the burning of organic waste is seen as something good and beneficial.

When the practice of waste burning is studied per case study, it can be seen that 42,9% of respondents in Kaduwela indicate to burn their organic waste and 27,1% of respondents in Negombo indicate the same. Regarding inorganic waste: 25,7% of respondents in Kaduwela and 27,1% of respondents in Negombo state to burn their waste.

Reasons Indicated for Waste Segregation Practices

Figure 17 (below) gives an overview of the provided reasons for waste segregation indicated by respondents who segregate, with the percentages of respondents (y axis) indicating the given reason. Every respondent was given the possibility to indicate multiple reasons. This figure is based on all the respondents who indicated to sometimes segregate some part of their waste. This figure shows us that, when respondents *do* segregate, they often do it for the same reasons. However, the environmental benefits and health reasons do score higher in Negombo than in Kaduwela, and “I have to” scores much higher in Kaduwela. This result was expected, as we knew that the waste of people in Kaduwela is only collected when segregated, and mixed waste is often collected in Negombo. This also tells us that among the people who are already segregating, the awareness levels are quite similar.

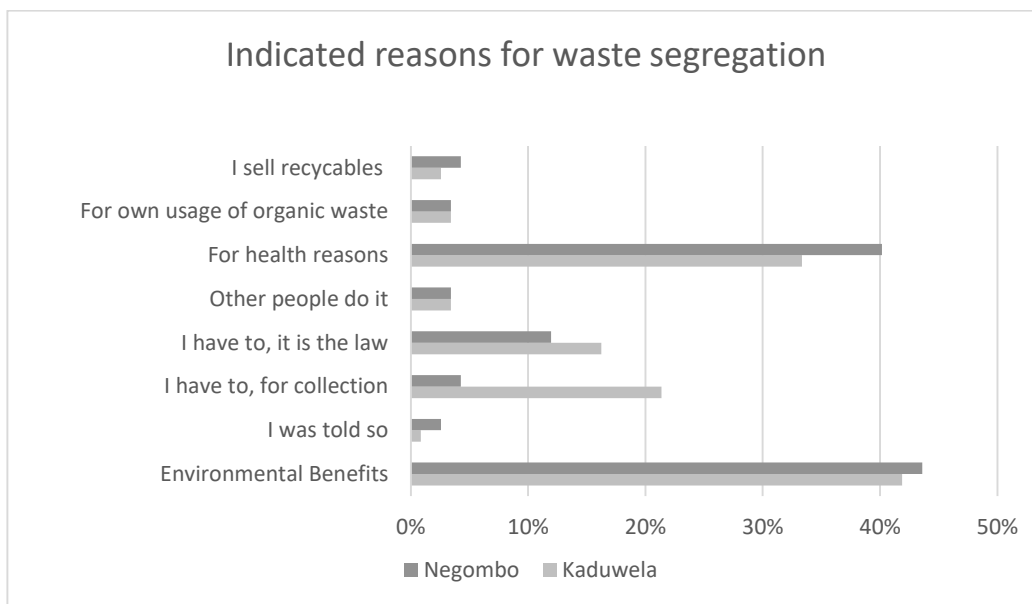


Figure 17 Indicated reasons for waste segregation

Non-segregation practices

The respondents who currently do not segregate their waste, indicated that it is too difficult to segregate, it is not useful for their household, it doesn't work, nobody does it around them, it is too expensive, it requires too much work, it takes up too much time, their household members don't want to, they have no obligation, and/or that they think that all the waste is thrown together anyway and therefore it is not useful to segregate their household waste in the first place. Surprisingly, all the respondents who currently do *not* segregate their waste, did indicate that they have received

information about separation, and they are aware of certain benefits coming along with waste separation.

Respondents perceptions

The perceptions of all respondents (n=140) were tested in the survey, using six variables and twenty questions¹⁷. A relevant/surprising finding was that respondents in both case studies scored low on the "responsibility scale" (1 = strongly agree; 5 = strongly disagree). Respondents in Kaduwela (N = 69) had a mean score of M = 1.89 and respondents in Negombo (N = 70) a mean score of M = 2.37. This shows that both districts perceive the government to be responsible for the waste collection. However, the respondents in Kaduwela *significantly* consider the government to be *more* responsible than the respondents in Negombo; there was a significant difference between the two districts, $t(138) = -2.7, p = .008$.

Table 4, displayed on the next page, provides a comparison of data between the two case studies. This chapter up till now has discussed that the segregation practices in Kaduwela seem to be better than those in Negombo. Reasons given for this, discussed in this chapter, can be that the incentives for the respondents in Kaduwela are more obligation based and the respondents in Negombo more often indicate financial incentives and the feeding of livestock with organic waste to be reasons behind segregation.

Besides these indicated differences between the case studies, the table on the next page (Table 4) provides of some key data, compared between the two case studies. This data provides alternative reasons for the differences in segregation practices between the two case studies. Large differences in data can be seen in the dwelling in which respondents live. Undoubtedly, respondents living in an apartment or flat building, are less often involved with home composting activities than people living in a house with a garden and with a larger land plot. A large difference in religion can also be seen between the case studies: a large percentage of Kaduwela's respondents is Buddhist, whereas Negombo's respondents are most often Christian. Religion could be a possible reason for the higher percentage of respondents in Kaduwela indicating proper segregation practices.

A very surprising finding is that a much larger percentage of respondents in Kaduwela think that their neighbours segregate into three categories than the respondents in Negombo. This could be because, as I have observed, more roaming waste is found in Negombo than in Kaduwela. This could influence the opinions of the respondents towards the practices of their neighbours. The perception of people towards their neighbours practice can in return influence their own behaviour. When I presented this assumption to a key-informant (IWMI researcher), he confirmed that people in Sri Lanka are very much influenced by what they think their neighbour does and might cause people to have thoughts in line with "*why should I segregate if my neighbours don't segregate*".

¹⁷ See Appendix 5 and 6 for information on the Likert Scale variables

Table 4 Comparison case studies

	Kaduwela MC	Negombo MC
Respondents living in a permanent dwelling - bungalow or house	57,1%	91,2%
Respondents living in a permanent flat or apartment dwelling	38,6%	8,8%
Level of Congestion - "many people live in my area"	50,7%	36,8%
Size of land plot - "my household has less than 5 Perches"	5,7%	18,8%
Household has a garden	43,5%	38,4%
Buddhist respondent	94,2%	25,7%
Christian respondent	2,9%	51,4%
Hindu respondent	1,4%	21,4%
Sinhalese Ethnicity	97,1%	67,1%
Female Respondents	61,4%	64,3%
Mean Household Members	1,36 members	1,59 members
"Do you think your neighbours segregate their waste in organic - recyclables - trash?"	27,5% thinks their neighbours segregate in 3 categories	1,4% thinks that their neighbours segregate in 3 categories
Indicated practice: 'yes we currently segregate'	88,6%`	78,6%
Waste found 'lying around' - observation	Not so much, a little in Strata C	A lot in Strata C and a fair amount observed in Strata B

6.3.2 Governmentalities and Practices

The degree of awareness among the respondents was measured by asking the respondents if they knew about (the benefits of) waste segregation, which benefits they heard of, what their source of information is and was, how long ago they heard about waste segregation for the first time, and whether or not they have heard about the new implemented policy. Before asking these awareness questions, general questions were asked about their practices in order to limit the bias. As has been discussed, the indicated awareness levels among the respondents who currently segregate their waste seem to be quite similar in both case studies. The topic of the new governmental policy was introduced at a much later stage of the survey, again with the purpose to limit positive answers and bias. In Strata A; 45% indicated that they are aware of the new policy and 55% of the respondents have not heard about the new policy. In Strata B; 66.7% have heard of the new policy, and in Strata C 96.7% of respondents indicated that they are aware of the new policy. Within this last strata area, one-third of respondents indicated that they have started separating due

to the new policy. Not so surprising, the knowledge of the benefits of waste segregation is higher in Strata A than in other areas, and lowest in Strata C. This is true for both case studies. This question covers *all* respondents; not solely those who currently segregate. The respondents in both case studies scored low on the knowledge of waste *Likert scale*. This scale consists of three statements; '*I have no idea what happens to waste*'¹⁸, '*I have seen what happens to waste*' and '*I know what happens to waste*'. The data shows that the respondents in both case studies scored around 3 (undecided/I don't know), with a mean of M=2,85 in Kaduwela and M=2,91 in Negombo. This shows that all respondents either do not know / are undecided about what happens to waste, or they agree with the statements confirming their knowledge about what happens to waste. The respondents in Negombo are less aware of what happens to waste than the respondents in Kaduwela.

As discussed in the beginning of Subchapter 6.3, household practices seem to be dependent on Strata area. Appendix 9 shows differences in education level, the ownership of televisions within households, and the access to maid service per Strata. This appendix provides alternative explanations for the difference in mentalities in Strata areas, which are expressed in household practices. Strata A has the highest percentage of respondents who have finished a higher education degree, and Strata C has the highest percentage of illiterate respondents. Education levels are likely to influence people's mentalities and practices. Also, people with a certain education level and certain income level are likely to cluster together and portray similar practices, as has been discussed in the theoretical framework.

Gender

Respondents were asked who is in charge of waste separation within the households, and who is responsible for taking out the trash. After these first questions, the initial respondent was asked to collect the person in charge, so that this person could be the respondent for the remainder of the survey. The aim here was that the person who was used as a respondent was the same person as the person in charge of waste segregation practices. 17.4% of initial respondents indicated that their maid is in charge of segregation practices. In regard to gender, out of all initial respondents, 83.6% indicated that a woman is responsible for waste separation within the household. This includes initial female respondent who stated that '*I am responsible*', men who stated '*my wife is responsible*', and people who stated '*my maid is responsible*' or '*my mother is responsible*'. 19.6% of initial respondents indicated that a male household member is responsible for waste separation, almost all of the respondent who indicated this were also the initial respondents. Nearly all of the people indicated to be responsible for waste separation within the household, were also responsible for taking out the trash. The final female responsibility does not indicate that men within households don't segregate waste too. As the following quote illustrates, initial practices can still be corrected by the person holding the final separation responsibility:

¹⁸ *The data for this statement is circumscribed; making it 'positive'*

"If I mess up the waste separation and put waste in the wrong bin, my mom adjusts it" (Male respondent, Negombo Strata A).

The person responsible for separating the vegetables and fruits from the other waste, was indicated to be an adult female household member in 69,2% of the cases. Other respondents indicated that both male and female household members (15,4%), male household members or the maid (3,3%) are responsible for this activity. Similar numbers are found for the categories 'other food waste', 'garden waste', 'plastic', 'polythene', 'cans', 'glass', 'paper', and 'carton' – all for which the female household member is mostly responsible for separating.

6.4 Summary – Household Practices

The household practices discussed in this chapter are not something that occur on their own. Not only are the households in both case studies governed in very different ways, the waste collection services in both case studies are very different. These collection services will be discussed in further detail in Chapter 7. Quite a number of complaints were heard from the respondents in both case studies, and in Strata C of Negombo the waste collection service even seems to be non-existent. Due to limited or not sufficient waste collection service, respondents indicated that they face issues with rodents and have the need to hide or give away glass waste and the need to burn or dump both organic and inorganic waste.

Variance in Practices: Dependent on Case Study or on Strata Area?

In Kaduwela, the vast majority (88,6%) of respondents indicate to segregate their waste in at least two categories. Interviews, informal conversations and observations show that people in Kaduwela quite often even segregate their waste into three tiers: organic – recyclables – inorganic. In Kaduwela, 78,6% of respondents indicate to segregate their waste into two categories.

Figures 13 and 16, presented on page 45, show that household segregation might not be solely dependent on the governance structure per case study, as these figures prove the indicated segregation practices in Strata A to be much higher than those indicated by respondents living in Strata's B and C. The limited segregation practices in Strata C are likely to be caused by the limited collection service seen in the strata across both case studies. This is confirmed by Figures 14 and 15, which can be found on page 43. The majority of respondents who indicated that their waste is not collected, is located in Strata C. Thus, the waste collection service seems to be better in richer areas with less population density than in poorer areas with higher density.

The assumption that practices are dependent on Strata area is confirmed by the fact that there are differences in educational levels between the Strata areas¹⁹. These education levels are likely to influence people's mentalities, which in turn influences their practices.

¹⁹ See Appendix 9

The figures on page 45 also show that the practice of burning waste is higher in Strata A than in other Strata's, which is likely to be an alternative means to deal with organic waste, as respondents in Strata A are much less willing to be involved with home composting than respondents in other Strata's. Another reason for the variance in practices across Strata's could be that the knowledge of the benefits of waste segregation is highest in Strata A and lowest in Strata C in both case studies.

Though the two paragraphs above provide an insight that the segregation practice may not be dependent on the pre-existing governance structure as discussed in Chapter 5, but may be dependent on the Strata in which the respondent lives, observations have shown that roaming waste is much more present in Negombo than in Kaduwela. The limited differences between indicated practices between both case studies could also be explained due to the fact that several respondents in Negombo indicate that they do segregate, but then when it is not collected they still get rid of it in other ways, and that respondents may have not understood what is meant by segregation as is illustrated by the first quote presented on page 38. The Likert Scale data presented on page 48 similarly indicates that the respondents in Negombo are less aware of what happens to waste than the respondents in Kaduwela.

Alternative reasons for the existing variance in segregation practices between the two case studies could be the high variance in religion seen between case studies, or the perception of respondents towards the practices of their neighbours.

Reasoning Segregation

Reasoning waste segregation is quite different in both case studies, and could also provide an explanation for the observed variance in segregation practices between both case studies.

In Kaduwela, people often state that they are obliged to segregate in order for their household waste to be collected. '*It is good for the environment*' is another often heard reason for segregation heard in Kaduwela. In this case study, perceived benefits of home composting are also quite common. Subchapter 6.1 discussed that respondents from Strata B and C perceive home composting to be significantly more positive than respondents in Strata A.

Convenience and personal benefits seem to be the largest incentives to segregate indicated by respondents in Negombo. Due to very limited collection service, rodents attracted to waste, and the fact that bins are stolen from the streets, people burn or dump their waste. This dumping practice is most obvious in Strata C.

Chapter 7: Results on Practices from 'Collection to Dumping Grounds'

The previous two chapters discussed the governmentalities of the multilevel governance actors and the household practices. In both these chapters the issue of limited waste collection service came out quite clearly. The collectors play an important role in this waste chain. When solid waste remains uncollected, it may block drains, cause flooding and spread diseases (Un-habitat, 2010). This chapter builds upon the previous chapters to discuss the chain between waste collectors and the final waste dumping grounds. In Sri Lanka as a country, collection is not working as it is supposed to, as the following quote taken from a newspaper article illustrates:

"Another council worker also complained that most households and offices do not separate waste. He recalls instances of residents handing over food waste mixed with plastic materials stuffed in polythene bags on the days of the week when the council collects organic waste. 'Some of us sort them out on the garbage truck itself, but what's the use, all the garbage is dumped together at Methotamulla', he revealed. Another worker, who had been on waste collection rounds for 36 years, laments that past efforts failed. Now, he says, council workers insist on only collecting biodegradables, while leaving polythene bags and plastic materials to be collected later. 'But when we go back, we see all the plastic waste thrown on the roads. They become mosquito habitats', he said" (Warakapitiya, 2016).

After reading the prior two chapters, one could easily blame the waste collectors for the unsustainable waste segregation practices seen in Sri Lanka. As has been discussed in Chapter 6, limited waste collection services cause people to feel the need to burn or dump their waste, and overall limits their incentive to segregate waste. This quote presented above illustrates a possible view of the collectors, or referred to as council workers. This quote clearly illustrates that collectors face challenges: they struggle with non-segregated household waste that needs to be collected, the waste that is being dumped in a non-segregated manner – which takes away the incentive for collectors to insist on collecting segregated waste, and the problem of dumped waste faced by the collectors.

The trash coming from both case studies are dumped by the waste collectors at non-sanitary landfills. The trash from Negombo MC is directed to the landfill in 'Kochchikade' and that of Kaduwela MC goes to 'Karadiyana'. The environmental standards for both disposal facilities are disregarded and emissions are not controlled. These landfills do not have leachate control, which causes volatile compounds to evaporate. Also, solids and liquids are being disposed to the surface, groundwater or the ocean. Even though modern disposal techniques are available, and are introduced in several transitional countries, Sri Lanka still is involved with uncontrolled disposal (Un-habitat, 2010). This chapter will discuss the practices in the waste collection service and waste management centres in both case studies.

7.1 Kaduwela Municipal Council

Waste Collection Service

All waste collection services in Kaduwela municipal council (MC) are regulated through public service, and all waste facilities have been in place before the November 1st; no new waste facilities have been created because of the new governmental policy.

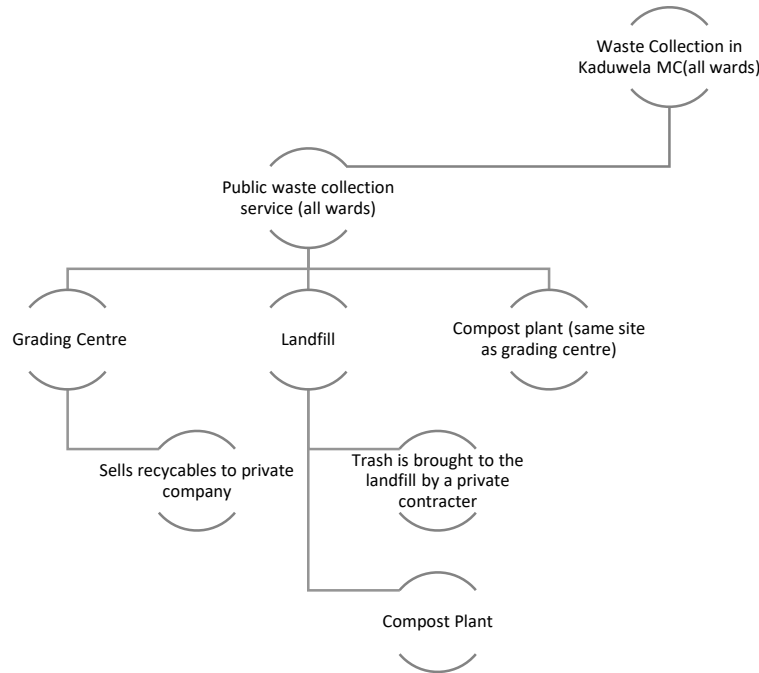


Figure 18 Overview waste chain Kaduwela

Figure 18 provides an overview of the situation in Kaduwela MC. The waste collection services in Kaduwela MC have barely changed due to the new governmental policy. The collectors state that they already collected segregated waste before November 1st 2016; inorganic is segregated from organic waste. After the waste is collected by the waste collection service, which is solely a public service, all of the waste is brought to one site. The waste collection trucks do not have segregated designated compartments for organic and inorganic waste, but the inorganic waste is all put in the front of the truck by the waste collectors and the organic waste is all compacted at the back. The inorganic waste and organic waste are emptied from the truck in segregate areas of the site; the organic waste is all re-located by tractors on existing heaps of organic waste at the 'compost' part of the waste site. The inorganic waste is all dumped in another area of the waste site. After the inorganic waste is all heaped up, several waste scavengers go through this heap, and recyclable goods are extracted. These recyclables can be sold on the spot to a private contractor who pays the scavengers per kg of sorted recyclable waste²⁰. He then sells the recyclables on the public market for a higher price, which provides the private contractor with a profit.

One of the main challenges heard from the waste collectors and at the grading centre is that there are not enough labourers active in the sector. The waste collectors

²⁰ See Appendix 8 for the prices and costs of recyclables

complained that they now have too much work to do, and do this for a quite small pay check. In order to earn an additional income, the waste collectors participate in the activity of segregating and selling recyclables. The male respondent interviewed in Kaduwela's grading centres stated the following:

"Since three years we have been having less and less labourers. There are not enough people who want to work in collection. It is also very labour intensive to separate the waste ourselves, but we do it because we get paid for the recyclables" (Male Waste Collector).

During the interview with this respondent, and during conversations with other waste collectors, it became clear that they are facing a lot of pressure. In Kaduwela, the collectors have been obliged to solely collect segregated waste since a few years. They however stated that households often don't comply, which means that the collectors either just leave the unsegregated waste standing at people's houses, or they collect it in an unsegregated manner. When they opt for the first, they are often exposed to angry householders. The collectors also often complained about the collection vehicles, which make their task of collecting segregated waste even more difficult:

"The tractors break very quickly. Then we can't collect waste because there are no other vehicles" (Male Waste Collector).

"The waste collectors do not comply with the system. It is also our fault because the vehicles make it very difficult to separate the waste in the vehicles. We need new trucks and then maybe the collectors will also keep the waste separated in them" (LA, Kaduwela)

The collectors are currently obliged to collect waste with tractors, as there are no proper vehicles with separate parts for organic and inorganic waste available. The local authority, as can be seen in the second quote, recognize this challenge.

The issue of trash in Kaduwela Municipal Council

Based on interviews with several people working in the waste dumping sites, it became clear that there are a lot of issues regarding the means of proper waste dumping. After waste is sorted in heaps of organic waste and a heap of inorganic waste, recyclables are picked out of the inorganic waste by scavengers. Left over waste from the inorganic heap, as well as inorganic waste filtered out of the organic waste, can be classified as trash. This trash no longer can serve a purpose, and cannot be re-used to serve a purpose later on.

All of this trash in Negombo is brought to a legal landfill, which has been created for this purpose. Kaduwela however faces the problem of limited land in combination with high urbanization; which has led to a non-existent designated space for an official legal landfill. There is currently no possibility to create such a space.

Until a few years ago, all of Kaduwela's trash was being burnt at the waste management centre. However, due to increased urbanization and population growth, the lands surrounding this centre have become inhabited and massive protests

organized by these inhabitants made an end to the practice of waste burning. Kaduwela does not have access to an incinerator, which would regulate the waste burning and filter out toxic smoke from the burnt waste. After the protests, there were no proper solutions or ways to deal with the trash. The ultimate solution, as indicated by several workers in independent interviews, was then collectively decided upon: a private contractor was hired to 'take away' the trash. A blind eye is turned to what exactly happens to all this trash. By extensive interviewing, it became clear that the private contractor comes to collect trash every day with a private tractor, and this trash is then dumped in an illegal landfill.

The Perception of the Local Authority to this Illegal Dumping Practice

The practice of illegal dumping was only discovered during interviews at the waste management centre after the interview with the local authority had already taken place. Of course, after finding out about this illegal practice, it was necessary for this research to return to the local authorities for a follow-up interview. As this is quite a delicate matter, the interview started with quite a number of general questions and with the conformation of unloaded observations. When the topic of the illegal and dangerous dumping practice was carefully touched upon, the local authority initially started to beat around the bush. Finally, after the local authority was ensured that these questions are solely asked for a Master's thesis, he acknowledged the problem.

He indicated that he feels quite bad about this waste dumping practice, as Kaduwela as municipal council really is trying to implement a proper waste management system, but there is no other solution.

"We do have a plan, to reduce the waste going to the landfill. Now about 40 to 50 tonnes per day goes to the landfill. We need to reduce this. But that is why we have our five-year plan. The landfill is not under control; but we don't have a designated place to control the situation. We send our waste secretly; we need to stop this. We have had discussions with the government several times, but there is no proper answer. We just have to manage it the best we can. The private contractor takes our trash, we pay 9000 rupees per load, one load is about five to six tonnes of waste. We as a Municipal Council pay" (LA, Kaduwela).

This illegal practice is, according to the local authority, the only and thus best way to deal with Kaduwela's trash. The local authority indicated that the central government knows of this problem, and they have asked the central government to help improve the situation several times. However, a solution has not been found so far.

According to the local authority, the measures to improve the situation lie within Kaduwela's five-year plan. This plan, as is discussed in Chapter 5, aims to reduce the produced waste. With a reduction of waste production, and an increase in waste re-use and recycling, they can at least aim to limit the problem.

7.2 Negombo Municipal Council

The waste chain in Negombo has altered quite a bit due to the newly implemented governmental policy. The prior and current situation in the waste chain will be discussed in the following paragraphs.

Waste Collection: Public *and* Private Collection Service

Whereas Kaduwela only enjoys a public waste collection service, Negombo has both a public and private service. The waste collection is done by a private company which is named "Seven Hills". Negombo is divided in fifteen waste collection service areas, out of which three areas are served by Seven Hills and the other twelve areas enjoy public waste collection service. Both private and public services are paid for by the Negombo municipal council, adding up to a total of about six lacks in Sri Lankan Rupees per month. This money comes out of the health budget consisting of a total of four million rupees per month.

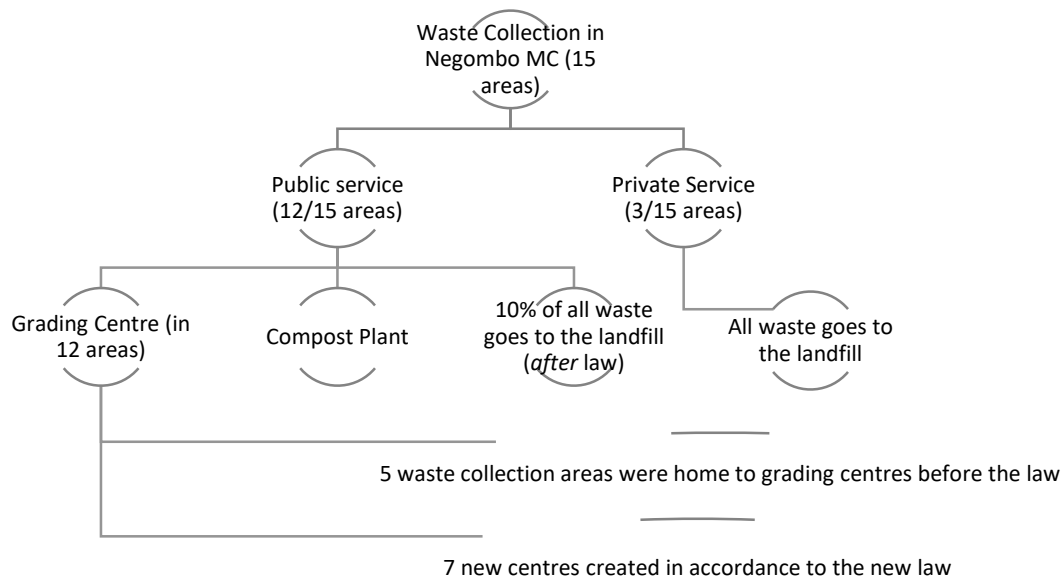


Figure 19 Overview waste chain Negombo

Figure 19, above, illustrates the waste chain in Negombo. As can be seen, the private waste collection service provided by Seven Hills, sends all their waste directly to the landfill. The public waste collection service does bring their collected waste to the grading centre and compost plant. After the implementation of the governmental policy, the public waste collectors started to collect segregated waste, which reduced the amount of waste directed to the landfill to about 10%. Figure 19 also illustrates the fact that after the implementation of the governmental policy, seven new grading centres have been created. Before the 1st of November 2016, Negombo was only home to five of such centres. Now, instead of dumping most of the waste at landfills, the segregated waste collected by the public collectors goes to designated areas.

Waste Collectors

As has been discussed in the previous paragraph, it is a bit odd that the public waste collection service now is said to be much more active in collecting segregated waste and driving this segregated waste to designated areas, whereas the private waste collection service just dumps 100% of its collected waste at landfills. The private collection service company (Seven Hills) was contacted by telephone to inquire about these practices. Unfortunately, the company was not willing to have a personal interview and did not allow me to visit their company.

During the phone interview which was carried out by my IWMI colleague due to language restrictions, Seven Hills suggested that they do not “care” about waste segregation and they collect all mixed waste at the same time. Seven Hills is active since 2002, and they have never collected segregated waste. They collect once a week within their assigned areas which corresponds to an amount of 40 tonnes of waste per week. They also confirmed that all of the collected waste goes directly to the landfill, none of the waste is segregated or goes to the compost or recycling yards. It did not seem that Seven Hills is planning to change their practices, as they are allegedly not affected by the governmental policy. They stated that this policy is only implemented for the public waste collection service. When the local authorities of Negombo were approached to validate or discredit this remark, they stated that they do not really know what the rules are and to whom they apply. The local authorities also mentioned that there is no enforcement of the policy, so they can’t force Seven Hills to start collecting segregated waste and stop directing 100% of waste directly to the landfill.

The public waste collectors were interviewed in person. The Negombo public waste collectors collect waste along the main town road once a day, and three times a week in the rest of the Negombo area. The public collection service collects about 90% of all Negombo’s waste, the private collection service collects the other 10% of waste. According to the waste collectors, they aim to collect segregated waste, but this is not always possible. They collect 60 tonnes of waste per day, out of which 10% is mixed waste. Six to seven tonnes are directed to the compost plant per day.

In Negombo, Strata C is supposed to enjoy public waste collection. However, as the ward is so far from the main road, it is allegedly not possible for the waste collectors to reach this small highly populated and poor area. According to the waste collectors, the surrounding area closer to the main road does enjoy a collection service. In Strata B, the private waste collection service executed by Seven Hills is active. Thus, in this ward all of the waste is collected together as mixed waste.

Alterations in Waste Management Centres

When the compost plant in Negombo MC was visited (Mid-December 2016), an interview with the head of the compost plant was conducted. As mentioned previously, new grading centres have been created in Negombo due to the newly implemented governmental policy. The twelve grading centres are in a different location than the one compost facility. The compost facility of Negombo has been in place since 2006,

and currently, according to the Public Health Inspector (PHI) of Negombo, processes six tonnes per day of waste.

The head of the compost plant however, indicated that although the compost plant is built for six to eight tonnes, they only used to receive around five tonnes of waste. After the implementation of the new governmental policy, now about ten tonnes of waste per day arrive at the compost plant. This is much more than the amount indicated by the PHI of Negombo. According to the head of the compost plant, the plant really struggles to deal with this large amount of organic waste due to a variety of reasons. They already received complaints from neighbouring households as the smell coming from the compost plant has increased. The mentioned struggles also include a non-efficient labour force, limited space in the compost plant, and a much too high amount of incoming organic waste:

“We have nine labourers working here, but only four to five people are actually working. You can see them; they just sit around. In order to prevent the smell, the organic material needs to be turned, but it is not done enough. We don’t have enough space in the compost plant, and the manpower is also not enough. We also get the market waste on Mondays and Wednesdays, this is four tonnes. This adds to the household waste, so these days we get ten tonnes of waste. This is more than we can handle” (Head of compost plant, Negombo MC).

The quote above illustrates the struggles faced by the compost yard, as indicated by the head of the compost plant. These struggles have increased after the new governmental policy was implemented.

On the positive side: because more household waste is collected in a segregated manner, and more organic waste is directed to the compost yards, the total amount of residual waste reduced by 25% due to the new governmental policy. According to the LA, only about 10% of the waste is dumped at the landfill.



Figure 20 Compost yard, Negombo

Figure 20 portrays some of the photos taken at the compost yard. As can be seen, the compost yard is creating fertilizer or compost made from the organic waste.

The compost facility costs four lacks (four hundred thousand rupees) per month, which comes out of the health budget of the local authority. The facility produces six to eight tonnes per month of fertilizer, which they sell in bags of 5KG for 50 rupees per bag, and bags of 50KG for 100 rupees per bag. They also produce about ten tonnes of animal feeds. Middle-men come to buy large quantities of bags, which they then sell in their own stalls to people.



Figure 21 Grading centre, Negombo

Figure 21 portrays some of the photos taken at the grading centre. The waste grading centres are reportedly not struggling by the higher amounts of segregated waste collected due to the new policy, as more waste grading centres have been created in accordance to the governmental policy. The five existing centres have been expanded by another additional seven new waste grading centres. These twelve grading centres are able to deal with the increased amounts of segregated waste. The grading centres however do report a limited work force to segregate the waste.

Alterations as Perceived by the LA

The local authority indicated the waste separation practices within households have gone up drastically²¹; only five areas (out of fifteen) were separating their waste, now twelve areas are. The areas covered by public service produce about 60 tonnes of waste per day, which is only collected when segregated. The private collectors direct all of the household waste directly to the landfill. The grading centre sells about four tonnes of polythene per month, which increased from two and a half tonnes per month due to the new policy. The grading centre owns a bailing machine, which was a donation from the World Bank, received March 2016. The plastic sold is about three tonnes per week, which increased from 500 kg due to the new policy. These numbers may be different from those indicated by other actors: these portray the perceptions of the LA.

²¹ *The interview took place in the beginning of December 2016, only one month after the policy was implemented*

7.3 Summary – ‘From Collection to Dumping Sites’

Chapter 7 has explored the waste related practices of the waste collectors and the labourers active in the compost yards and grading centres in both case studies. Subchapter 7.1 discussed that the situation in Kaduwela has barely changed due to the recently introduced centralized policy. In Negombo, as discussed in Subchapter 7.2, quite a lot of change can be seen: new grading centres are created and compost yards face increased pressure.

Although the LA in Kaduwela does seem to have the best intentions, quite a lot of visible practices within the waste chain are not as desirable. A designated legal landfill is not available within Kaduwela, which has led to the practice of illegal dumping within this municipal council. A private contractor visits the waste management centre daily to collect the trash with a privately owned tractor, and then proceeds to illegally dump this trash in an illegal landfill. The situation in Negombo also leaves a lot to be desired. Strata C in Negombo is supposed to enjoy public waste collection. However, as the ward is so far from the main road, it is allegedly not possible for the waste collectors to reach this small highly populated and poor area. According to the waste collectors, the surrounding area closer to the main road does enjoy a collection service. In Strata B, the private waste collection service executed by Seven Hills is active. Thus, in this ward all of the waste is collected together as mixed waste.

The waste collection trucks in both case studies are not suitable for collecting segregated waste, as the local authorities have not (yet) assigned the needed financial resources to enable the relevant actors to purchase vehicles. The same is true for the active labour force, which is currently far from sufficient. In both case study sites there were complaints about the limited labour force, and in both case studies this insufficiency is recognized by the local authorities. Figure 22 below provides an illustration of the waste collection service in both case studies.



Figure 22 Waste collection - Negombo and Kaduwela

A number of differences between the case studies have been discussed in this chapter. Table 5 portrays an overview.

Table 5 From collection to dumping sites - comparison between case studies

	Kaduwela	Negombo
Waste Collection days	All waste is collected on the same day, it is segregated on the truck	One day organic waste, the other day inorganic waste. Same truck is used for different days.
Recyclables	Recyclables are sold to private contractor in the waste grading centre	Buyer visits houses, no private contractor at centre
Waste Collectors	Public service	Private and public service
Segregated waste collection	Waste is reportedly only collected when segregated	Private collectors collect all non-segregated waste
Impacts of governmental policy on waste centres	No new centres	New waste grading centres have been opened
Impacts of policy on compost yards	No new compost yards	New compost yards
Impacts of policy on organic waste	Compost yard has more organic waste than it can handle, however, this was already the case before the policy implementation	After the policy implementation, the compost yard had to deal with an extensive amount of organic waste with which they are unequipped to deal with

As can be seen in the table, recyclable waste is dealt with in different manners in both case studies. The private buyers of recyclables in Negombo and the waste scavengers and waste collectors who go through heaps of waste in the grading centre of Kaduwela, seem to be aided due to the implementation of the new policy. In both case studies, the mentioned actors now have more recyclable waste to buy and sell due to the new governmental policy.

Chapter 8: Discussion

This chapter will discuss the overarching relationships between the governance actors, households and waste collection service providers, as individually discussed in respectively Chapters 5, 6 and 7. In addition, it discusses these relationships within the adopted theoretical framework.

Interaction within the Multilevel Governance Structure (§ 5)

The four actors in the governance structure (central government (CG), western provincial council (WPC), local authority (LA) in Kaduwela and local authority of Negombo) all have different governmentalities which are expressed in their practices. As is discussed in the theoretical framework, governance always entails the different forms of purposeful acting of collective concerns. The collective concern with which all actors are faced is the improper and unsustainable solid waste management in Sri Lanka.

Sri Lanka's solid waste governance has been taking place under decentralized and privatized systems over the past decades. However, under these systems barely any results were achieved. In 2016, the central government signed the Paris Agreement (2016) which prompted the CG to make a change: it implemented a governmental policy focused on proper solid waste segregation, collection and disposal. This policy has affected all governance actors as well as society.

The act of implementing a governmental policy is a centralized and hierarchal form of governing. However, the CG does not claim accountability for the implementation, does not portray a willingness to enforce the policy, and does not provide financial and human resources to assist the WPC and LA's to comply with the policy. Similarly, the WPC has provided limited assistance to aid the LA's in improving the solid waste situation. They have provided limited financial resources to the LA's to build compost yards. The CG launched a gazette containing solid waste management rules, but these rules are not complied with by the LA's, as they do not have the means to do so.

Both the CG and the WPC aim to be *steering* through top-down power. Their *modes of thought*, or governmentality, do not focus on productive power: both actors aim to govern others. They do this without enabling the capacities of the lowest level of multilevel governance: the LA's. Rather, the governance actors are governing each other in a hierarchical form: CG-WPC-LA. This grid of relationships and power in which the governing practices take place is a result of the co-production and interaction of governance actors within the multilevel governance structure: governmentality. The centralized governmental policy implemented by the CG does not necessarily influence the practices or cause behavioural change among the governed actors (WPC and LA).

The limited change in practices was visible in both LA's: they both had certain approaches in their governance structures which have barely changed due to the governmental policy. The approaches found in both LA's are different in each case study. The LA of Negombo has not invested in awareness interventions, whereas the

LA of Kaduwela has aimed to influence the minds of the people living in their municipal councils with the aid of awareness incentives.

Because of the limited change in practices found in all involved actors, it can be concluded that the centralized approach is not gaining the desired effects. The WPC and LA's are still required to help with the governing: the state is thus not 'almighty'. The CG is not claiming accountability, not providing resources to the other actors, and is portraying limited control and command actions exercised as part of an authoritarian ruling mechanism. The CG is thus also not taking the steps to become more powerful. By trying to implement the policy with a top-down approach, however, it aims to remove some of the power from the WPC and LA's. This may seem like changed methods of governing, but they are not: the decentralized multilevel governance structure is still in place, and has blurred boundaries between levels of governing actors.

Thus: the governmentalities of the four governance actors are different, which shapes the varying practices found in each level of the multilevel governance structure. The rationality of governance, which is about steering and the most effective way of inducing change, is not likely to lie within a centralized system and thus far has shown limited effects.

Relationship Governance System and the Waste Chain (§ 5 and 7)

The varying governmentalities of the governance actors and the practices found in the waste chain are closely related. The LA of Kaduwela seems to be very interested in the topic of solid waste and has a five-year plan in action. This LA has also imposed a rule on the waste collectors several years ago, which states that the collectors are only to collect segregated waste. Though this is not always possible due to limited availability of waste collection vehicles, the waste collection in general has been quite sustainable for a few years now. As discussed in Chapter 5, the LA does not have a legal landfill, which makes the final waste disposal a difficult issue. The LA however is trying to do the best they can with their limited resources. This is different in Negombo, where a lower interest of the LA in solid waste has been found. The LA's public service does not reach Strata C in Negombo, and Strata B is not served by a public waste collection service, but rather by a private waste collection service. This private service collects non-segregated, mixed household waste and directs all of the waste straight to the landfill. The LA did not mention an intention to change the practices of the private collection service, and even if it wanted to, it does not have the power to do so. It is also not possible for the LA to fire the private collection service, as it does not have sufficient manpower and collection vehicles to serve the whole governed area with a public collection service. The LA of Negombo, however, did create new compost yards in compliance with the law, which have been funded by the WPC. Also, the grading centres report to have an increased pressure which means that the waste collection service in at least Strata A is now collecting more segregated waste and directing less waste to the landfill.

The governmentalities of the LA's, which with the means of *conduct of conduct* can steer society in a certain direction, can be seen to have influenced the norms and values of the waste chain. The capacities of the actors in the waste chain are not

sufficiently increased by the LA: they have limited man power, limited pay, and insufficient waste collection vehicles.

Thus it can be said that the governmentalities influence the practices in the waste chain to a certain degree. In Kaduwela, where the LA has been very focused on proper waste management, the waste chain's practices are reasonably sustainable. Due to a lack of land space and a lack of CG's interference they are, however, not perfect as can be seen in the issue around the illegal landfill. Here, the centralized governmental policy has not been altered. The governmentalities of Negombo's LA, were never very focused on solid waste management. However, due to the new centralized governmental policy, some practices in the waste chain have altered, namely those in Strata A. Thus despite of the governmentalities present in Negombo, the CG's policy has had an effect.

By drawing upon the definition of governmentality by Salskov-Iversen et al. (2000) in terms of two main dimensions, these results can be interpreted as follows: the realities and rationalities as part of governmentality of the LA's in both case studies were found to be different which are expressed in different pre-policy waste chain practices within the governance frame. After the implementation of the policy, Negombo's LA reality did change, as this LA is not pressured towards more sustainable solid waste practices which are solely seen in Strata A. Strata B and C are not effected as the waste chain practices are not being pressured by the policy: the practices of the privatized waste collection in Strata B and the non-existent waste collection in Strata C are decided by the governmentalities of Negombo's LA and not affected by the governmental policy.

Relationship Household Practices and the Waste Chain (§ 6 and 7)

The waste collection service seems to be better in richer areas with less population density than in poorer areas with higher population density. The practices found in the waste chain have a direct impact on the household practices:

- in Kaduwela the collectors only collect segregated waste and thus the households have strong incentives to segregate.
- the collection in Strata B in Negombo is done by private collectors who don't care about segregation and collect mixed waste, thus the households also do not have an incentive to segregate.
- the collection in Strata C in Negombo is non-existent and so the households do not have an incentive to segregate, and have to deal with their waste in an alternative manner.
- the households in Strata A in Negombo do segregate their household waste in a more sustainable manner which can be seen in an increased pressure on the compost yard in Negombo, and an increase of numbers in grading centres in Negombo.

Thus the practices seen in both case studies can be seen as *generative* and *mutually dependent* on the structure between other actors in the waste chain.

Interaction Governance System and Household Practices (§ 5 and 6)

The governmentalities and governance practices found in the LA's of both case studies have affected the practices of households to a certain degree.

In terms of awareness, a direct translation of the awareness interventions and community projects can be seen. In Kaduwela, where the interventions were a top priority for the LA, the respondents are more aware than the people living in Negombo of the benefits of waste segregation. This awareness is then translated to household practices: the percentage of respondents who segregate waste is higher in Kaduwela than in Negombo. This high level of waste segregation is also caused by strong and obligatory incentives which have been implemented in Kaduwela, so they are not solely caused as a result of voluntary governance.

As has been discussed in the previous few paragraphs, it seems that the household practices are not solely dependent on the local governance structures found in each case study. Rather, the household practices are very dependent on the Strata area. This can be understood through varying waste collection services, as has been discussed in "Relationship Household Practices and the Waste Chain", above. It can, however, also be interpreted in terms of income levels: Strata A has higher income levels than Strata B, which in turn has higher income levels than Strata C. Perhaps the higher education levels, which are related to higher income levels, have influenced household practices. As has been discussed in the theoretical framework, the waste segregation practices are not independent actions, but co-exist in a field of practice and in a network of people. There are different communities and sub-communities, depending on, for example, education found within the same spaces.

"People do not develop ideas and ways of doing 'from within' by themselves. Their thinking and doing are shaped by fellow citizens and by the objects and situational factors which form an integral part of the contexts of their behaviours" (P. 814, Spaargaren, 2011).

This quote is very relevant to interpret the varying household practices in each ward. The thinking and doing in each ward are shaped within the frame of each ward and Strata area, which are then expressed in household practices.

When looking at the effects of centralization the mentalities and practices of people have not changed due to the implemented policy. Rather, these mentalities were already in place in each case study, dependent on 1) *the* governance structures followed by the LAs, which can be seen in more sustainable segregation practices in Kaduwela, where extensive interventions and community awareness projects have been in place and less sustainable practices in Negombo, where the LA has not been so interested in waste, and 2) the Strata area in which the people live: the waste collection service, the income level and the educational levels of the households are likely to influence household practices.

Therefore, centralization has not changed mentalities and practices of people, rather the mentalities and practices of people are dependent on a variety of other factors.

Chapter 9: Conclusion

This thesis aimed to capture and explain the effects of the recently introduced centralized governmental policy, in terms of governmentalities and practices in Sri Lanka. A short recap of the effects, and resulting implications, will be given in this concluding chapter, starting by discussing the two posed sub-questions.

Sub-question 1: What are the waste related practices of relevant actors, and how did the practices of these relevant actors change?

- The practices of the **central government** were influenced by a supranational power: after the CG signed the Paris Agreement, they implemented a centralized governmental policy to comply with this international agreement. However, their accompanying practices remain limited: the CG has thus far not provided financial or human resources to assist the other actors present in the multilevel governance structure to comply with the policy. The CG does not claim accountability for proper implementation, and does not enforce the policy.
- The practices of the Western Provincial Council are limited. The WPC has launched a gazette in 2008, which does discuss the matter of solid waste. This gazette, however, is not implemented. The WPC does not provide resources to assist the LA's with the implementation of both the gazette and the governmental policy. In terms of changing practices: after the governmental policy was implemented, the WPC has provided financial assistance to build new waste grading centres.
- The **LA of Kaduwela** has barely changed in terms of waste related practices and governance methods. This LA already had a five-year plan in place and was implementing interventions and community awareness projects.
- The **LA of Negombo** has not invested in awareness- or other incentives. Their practices in terms of local governance have not changed.
- The **household** practices in Kaduwela are better in terms of proper waste segregation, than the household practices in Negombo. A large variety of practices among Strata areas can be seen.
- The practices of the **waste chain** actors in **Kaduwela**, have not changed due to the policy. The collectors have been collecting segregated waste since a few years. Kaduwela's waste dumping practices are very unsustainable: all trash is dumped in an illegal landfill.
- The practices of the actors active in the **waste chain** in **Negombo** have changed to a certain degree. In this case study, the compost yards are facing a lot of pressure to deal with higher amounts of incoming organic waste and more grading centres have been established. In terms of collection service, the practices in Strata A in Negombo seem to have changed: more segregated waste is collected. In Strata C there is no waste collection service, and it is not likely that one will be established any time soon. In Strata B the waste collection service is done by a private company called Seven Hills. This company collects all non-segregated waste, and dumps all of the waste directly in the landfill.

Sub-question 2: How do the practices of the different local governance actors impact on the waste segregation practices of households, and in return, how do these (non-) changed household practices effect the governmentalities of the governance actors?

The household waste segregation practices are influenced by the experience of these households under different local governance structures, which can be seen in a number of ways:

- Interventions posed by the LA stimulate the households to segregate
- Community awareness programs have an effect on people's awareness and knowledge of sustainable solid waste management: more knowledge translates into better practices
- In the case of no or bad collection service, households do not have incentives to segregate and deal with their waste in other ways
- Collection services from the LA differ depending Strata area: the more educated people living in the richer and less dense Strata A enjoy better waste collection service and portray better segregation practices than those living in Strata's B and C.

The household practices then influence the governmentalities of the governance actors. In Kaduwela, where the waste collection service is much better than in Negombo, people are willing to comply with the governmental policy more. This makes it possible for the LA in Kaduwela to manage the municipal solid waste in a more sustainable manner and could even influence the LA's governmentality and willingness to continue the improvements. In Negombo a vicious circle of non-interest is visible: the households living in Strata B and C portray unsustainable segregation practices, and the LA does not see the need to assist in changing these practices. They could, for example, improve the waste collection service, or provide better incentives and awareness campaigns. However, the governmentality and interest of Negombo's LA is not focused on solid waste. The governmentality of the CG seems to be un-altered. No actions or plans are portrayed to improve the solid waste situation of Sri Lanka.

The **main research question**, "*What are the effects of the recently introduced centralized policy on solid waste governance on governmentalities and practices in Sri Lanka?*" has been answered. The effects of the policy on local governmentalities and practices is limited: centralization seen in a top-down governmental policy does not change household practices. It did, however, change the practices in the waste chain Negombo. This means that the governmentalities of the LA do not directly influence the practices of the waste chain actors: rather they have been stimulated to improve the solid waste management after the implementation of the governmental policy. Because the practices of the waste collectors serving Strata A have changed, the households living in this area were faced with stronger incentives to change their segregation practices. More segregated waste is collected in Strata A, and more segregated waste is dealt with by the compost yard and waste grading centres in Negombo. The governmentalities and accompanying practices of the LA's have influenced people's knowledge, awareness and mentalities, and thus has influences household practices to a certain degree. Overall, a better interaction between the multiple levels of governance is needed, and responsibility needs to be taken.

Further research could focus on the relation between supranational institutions and national governments. How could supranational institutions make sure that the compliance with an agreement, such as the Paris Agreement, is not limited to the implementation of a governmental policy? This thesis discussed the relationships and interactions between actors in the multilevel governance structure, it however did not study in detail how the households perceive the existing governance structure. Further research could focus on bottom-up governance. Does society want more power, and does society think that they, within communities, could improve the solid waste situation themselves? Research is also needed to examine the possibilities for the CG to re-structure its finances. As of now, the local governance actors do not have financial resources to comply with the policy. The CG similarly states to have insufficient funds. A cost-benefit analysis could contribute to the examination of the most efficient cost allocation, and could contribute to the CG's interest to waste.

Policy Implications

After studying the current waste governance structure in Sri Lanka, I have come to the conclusion that a more "hybrid" form of governance could be highly beneficial. The local governance actors have knowledge of their municipal council areas, and they are aware of what they are in need of. Thus, the LA's are more likely achieve locally appropriate governance. By shifting to a hybrid governance form, the power remains with the LA's, while the CG could assist by providing assistance in terms of 1) law enforcement, 2) financial and human resources to make compliance possible, and 3) awareness and knowledge programs in order to enhance peoples' awareness towards proper waste management. However, as discussed in this thesis, the interest of the CG in the issue of solid waste is quite low. This makes it unlikely that the CG will be interested in providing assistance to the LA on this matter. An improved compliance of the CG could be achieved by increased involvement of supranational institutions. Supranational institutions could also assist Sri Lanka with establishing controlled disposal, and the phasing out of open dumps by providing financial assistance and expert knowledge.

The central government is not the most important and capable actor in the governance structure. A proposed hybrid mode could entail that society's practices should be taken more seriously when a new policy is introduced, and the CG will take the LA's opinions and proposed strategies into account.

Overall: a better cooperation between the central and local government, an increase in community awareness and better waste collection services could make a large difference in changing the mentalities and thus the practices of the relevant actors.

Bibliography

- Adaderana. (2016). MCs decide not to collect unsorted waste. *Adaderana News*. Colombo, Sri Lanka.
- Amos, K. (2010). Governance and governmentality: relation and relevance of two prominent social scientific concepts for comparative education. *Educação E Pesquisa*, 36(SPE), 23–38. <https://doi.org/10.1590/S1517-97022010000400003>
- Aprilia, A., Tezuka, T., & Spaargaren, G. (2012). Household Solid Waste Management in Jakarta , Indonesia : A Socio-Economic Evaluation. *Waste Management*, 70–95. <https://doi.org/http://dx.doi.org/10.5772/51464>
- Arora, D. K. (2015). *Chemicals and Waste Management*, 2015.
- Backstrand, K. (2010). *Environmental Politics and Deliberative Democracy: Examining the Promise of New Modes of Governance*. Edward Elgar Publishing.
- Bjerkli, C. L. (2013). *Camilla Louise Bjerkli Urban services and governance*.
- Bulkeley, H., & Betsill, M. (2005). Rethinking Sustainable Cities: Multilevel Governance and the “Urban” Politics of Climate Change. *Environmental Politics*, 14(1), 42–63. <https://doi.org/10.1080/0964401042000310178>
- CEA. (2014). National Solid Waste Management Program in Sri Lanka.
- Ceylon Today. (2016, September). SL ratifies Paris Agreement. Colombo.
- Chen, C. C. (2010). Spatial inequality in municipal solid waste disposal across regions in developing countries. *International Journal of Environmental Science and Technology*, 7(3), 447–456. <https://doi.org/10.1007/BF03326154>
- Colombo Gazette. (2016, September). Residential garbage must be segregated from November. Colombo, Sri Lanka.
- Cutter, S., Barnes, L., Berry, M., Burton, C., Evans, E., Tate, E., & Webb, J. (2008). A place-based model for understanding community resilience to natural disasters, 18, 598–606. <https://doi.org/10.1016/j.gloenvcha.2008.07.013>
- Dias, K. (2016, November). National classified garbage collection programme launched. *Newsfirst*. Colombo, Sri Lanka.
- Drezner, D. W., Davis, C., Hafner-burton, E., Goldsmith, J., Haass, R., Haftel, Y., ... Sartori, A. (2007). Regime proliferation and world politics: is there viscosity in global governance? *The Fletcher School, Tufts University*.
- Dubbeling, M., Bucatariu, C., Santini, G., Vogt, C., & Eisenbeiß, K. (2016). *City Region Food Systems and Food Waste Management*. Eschborn Germany.
- Edwards, R. (2010). Mobilizing lifelong learning : governmentality in educational practices Mobilizing lifelong learning : governmentality in educational practices. *Education*, 939(April 2012), 37–41. <https://doi.org/10.1080/0268093021012760>
- Eheliyagoda, D., & Prematilake, N. (2016). Assessment of a Planned Municipal Solid Waste Management System in Sri Lanka. *Journal of Applied Sciences and*

Environmental Management, 20(1), 58–61.

Esham, M., & Garforth, C. (2016). Climate change and agricultural adaptation in Sri Lanka : a review, 5529(September).
<https://doi.org/10.1080/17565529.2012.762333>

Fernando, S., Drechsel, P., Manthirithilake, H., & Jayawardena, L. (2014). A Review - Septage Management Related Regulatory and Institutional Aspects and Needs in Sri Lanka. *Sabaragamuwa University Journal*, 13(1), 1–15.

Giddens, A. (1986). Action, Subjectivity, and the Constitution of Meaning. *JSTOR Social Science*, 53(3), 529–545.

Global Alliance on Health and Pollution. (2015). The Sustainable Development Goals , Targets , Indicators and their Links to Chemicals , Wastes and Pollution, 1–11.

Guerrero, L. A., Maas, G., & Hogland, W. (2013). Solid waste management challenges for cities in developing countries. *Waste Management*, 33(1), 220–232.
<https://doi.org/10.1016/j.wasman.2012.09.008>

Kern, K., & Alber, G. (2006). Governing climate change in cities: modes of urban climate governance in multi-level systems. *Proc. Organ. Econ. Co-Op. Dev. Conf. Competitive Cities and Climate Change*, Pp. 1–30. Paris: OECD.

Krell, D. F., Writings, B., Being, F., Francisco, S., Heidegger, M., Studied, G., & His, I. (1993). Being and Time (1927), (1927), 1–5.

Lemke, T. (2002). Foucault , governmentality, and critique. *Rethinking Marxism*, 14(2), 1–17. <https://doi.org/10.1080/089356902101242288>

Lemos, M. C., & Agrawal, A. (2006). Environmental Governance. *Annu. Rev. Environ. Resourc*, 31(1), 297–325.
<https://doi.org/10.1146/annurev.energy.31.042605.135621>

Lombardi, E. (2017). What Does the Paris Climate Agreement Say about Waste?

Loorbach, D. A. (2010). Transition Management for Sustainable Development: A Prescriptive, Complexity-Based Governance Framework. *Governance, An International Journal of Policy, Administration, and Institutions.*, 23(1), 161–183.
<https://doi.org/10.1111/j.1468-0491.2009.01471.x>

Louise Bjerkli, C. (2013). Governance on the ground: A study of solid waste management in Addis Ababa, Ethiopia. *International Journal of Urban and Regional Research*, 37(4), 1273–1287. <https://doi.org/10.1111/j.1468-2427.2013.01214.x>

Mccall, L. (2005). The Complexity of Intersectionality Author(s): Leslie McCall Source:, 30(3), 1771–1800.

Mosse, D. (2004). Is good policy unimplementable? Reflections on the ethnography of aid policy and practice. *Development and Change*, 35(4), 639–671.
<https://doi.org/10.1111/j.0012-155X.2004.00374.x>

MPCLG. (2016). Guidelines for the Islandwide Programme on Segregated Waste Collection. Colombo, Sri Lanka.

Nicolini, D. (2012). *Practice Theory, Work & Organization* (2nd ed.). Oxford, United

Kingdom: Oxford University Press.

- Nightingale, A. J. (2011). Bounding difference: Intersectionality and the material production of gender, caste, class and environment in Nepal. *Geoforum*, 42(2), 153–162. <https://doi.org/10.1016/j.geoforum.2010.03.004>
- Nzeadibe, T. C., & Anyadike, R. N. C. (2010). Solid waste governance1 innovations: An appraisal of recent developments in the informal sector niche in urban Nigeria. *Geography Compass*, 4(9), 1284–1296. <https://doi.org/10.1111/j.1749-8198.2010.00385.x>
- Otsuki, K. (2013). Ecological rationality and environmental governance on the agrarian frontier: The role of religion in the brazilian amazon. *Journal of Rural Studies*, 32, 411–419. <https://doi.org/10.1016/j.jrurstud.2013.09.003>
- Owens, K., & Zimmerman, C. (2013). Local Governance Versus Centralization: Connecticut Wetlands Governance as a Model. *Review of Policy Research*, 30(6), 629–656. <https://doi.org/10.1111/ropr.12050>
- R.Schatzki, T., Knorr, C. K., & Savigny, E. von. (2001). *The Practice Turn in Contemporary Theory*. New York: Routledge.
- Randeria, S. (2007). The State of Globalization: Legal Plurality, Overlapping Sovereignties and Ambiguous Alliances between Civil Society and the Cunning State in India. *Theory, Culture & Society*, 24(D), 1–33. <https://doi.org/10.1177/0263276407071559>
- Reckwitz, A. (2002). Toward a theory of social practices: A development in culturalist theorizing. *European Journal of Social Theory*, 5(2), 243–263. <https://doi.org/10.1177/13684310222225432>
- Reddy, V. R. (2015). Ex - post Impact Assessment of the Study : â€™™ Impact of Climate Change on Water Resources and Agriculture in Sri Lanka ', (April), 1–21.
- Rijke, J., Farrelly, M., Brown, R., & Zevenbergen, C. (2013). Configuring transformative governance to enhance resilient urban water systems. *Environmental Science and Policy*, 25(ii), 62–72. <https://doi.org/10.1016/j.envsci.2012.09.012>
- Rogers, E. (1986). *Communication Technology. The new media in society*. New York, USA: The Free Press.
- R pke, I. (2009). Theories of practice - New inspiration for ecological economic studies on consumption. *Ecological Economics*, 68(10), 2490–2497. <https://doi.org/10.1016/j.ecolecon.2009.05.015>
- Rose, J., & Scheepers, R. (2001). Structuration Theory and Information System Development-Frameworks for Practice. *Ecis*, 217–231.
- Rose, N., O'Malley, P., & Valverde, M. (2006). Governmentality. *Annual Review of Law and Social Science*, 2(1), 83–104. <https://doi.org/10.1146/annurev.lawsocsci.2.081805.105900>
- Salskov-Iversen, D., Hansen, H., & Bislev, S. (2000). Governmentality, globalization, and local practice: transformations of a hegemonic discourse. *Alternatives*, 25(2),

183–222. <https://doi.org/10.2307/40644996>

Shields, S. A. (2008). Gender: An intersectionality perspective. *Sex Roles, 59*(5–6), 301–311. <https://doi.org/10.1007/s11199-008-9501-8>

Shove, E., Watson, M., Hand, M., & Ingram, J. (2007). *The Design of Everyday Life*. (B. E. Office, Ed.). Oxford, UK: Berg, imprint of Oxford International Publishers Ltd.

Spaargaren, G. (2011). Theories of practices: Agency, technology, and culture. Exploring the relevance of practice theories for the governance of sustainable consumption practices in the new world-order. *Global Environmental Change, 21*(3), 813–822. <https://doi.org/10.1016/j.gloenvcha.2011.03.010>

Steg, L., & Vlek, C. (2009). Encouraging pro-environmental behaviour: An integrative review and research agenda. *Journal of Environmental Psychology, 29*(3), 309–317. <https://doi.org/10.1016/j.jenvp.2008.10.004>

Stewart-Withers, R., Banks, G., McGregor, A., & Meo-Sewabu, L. (2014). Development Fieldwork - A Practical Guide. In N. Aguilera & James (Eds.), *Scheyvens, Regina* (2nd ed., pp. 60–80). London: SAGE.

Torfin, J., & Sorensen, E. (2014). The European debate on governance networks: Towards a new and viable paradigm? *Policy and Society, 33*(4), 329–344. <https://doi.org/10.1016/j.polsoc.2014.10.003>

Triguero, A., Alvarez-Aledo, C., & Cuerva, M. C. (2016). Factors influencing willingness to accept different waste management policies: Empirical evidence from the European Union. *Journal of Cleaner Production, 138*, 1–9. <https://doi.org/10.1016/j.jclepro.2016.05.119>

Un-habitat. (2008). *State of the World's Cities 2010/2011: Bridging the Urban Divide*. Nairobi, Kenya: Earthscan.

Un-habitat. (2010). *Solid Waste Management in the world's cities*. Washington DC: Earthscan.

UNFCCC. (2016). Nationally Determined Contributions. *Government of Nepal, Ministry of Population and Environment*, (September).

United Nations Department of Economic and Social Affairs. (2005). *Household Sample Surveys in Developing and Transition Countries. Studies in Methods* (Vol. F).

United Nations Department of Economic and Social Affairs. (2016). Sustainable Development Knowledge Platform.

van Dijk, H. (2016). *Globalization and Governance*. Wageningen: Wageningen University and Research Center.

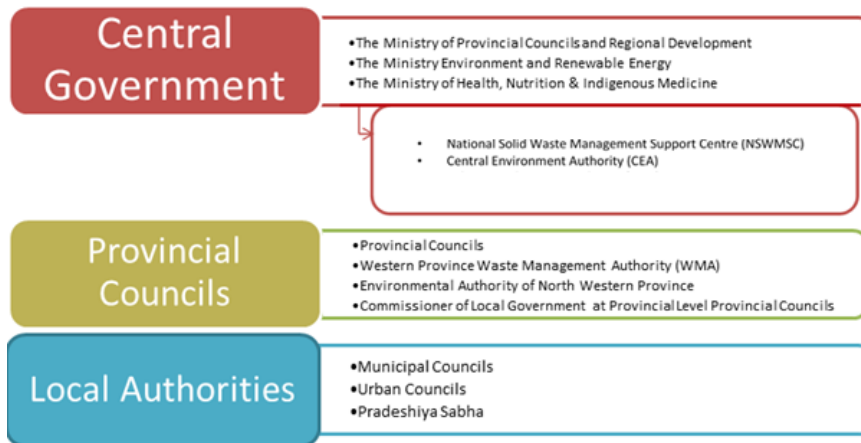
van Dijk, M. P., & Oduro-Kwarteng, S. (2007). Urban management and solid waste issues in Africa. *ISWA World Congress*, (September), 1–9.

Vidanaarachchi, C. K., Yuen, S. T. S., & Pilapitiya, S. (2006). Municipal solid waste management in the Southern Province of Sri Lanka: problems, issues and challenges. *Waste Management (New York, N.Y.)*, *26*(8), 920–30. <https://doi.org/10.1016/j.wasman.2005.09.013>

- Visvanathan, C., & Trankler, J. (2001). Municipal Solid Waste Management in Asia: A Comparative Analysis, 1–14.
- Warakapitiya, K. (2016, December). Wasteful habits, wasted efforts. *The Sunday Times*, p. 21. Colombo, Sri Lanka.
- Wijayapala, R. (2016). MOUNTING GARBAGE: SEGREGATION THE ANSWER TO ALL EFFORTS. *Sunday Observer*. Colombo, Sri Lanka.
- Zimmer, A. (2012). Everyday governance of the waste waterscapes. A Foucauldian analysis in Delhi's informal settlements, (July 2011), 330 p.
- Zurbrügg, C. (2003). How to Cope with the Garbage Crisis, (February), 1–13.

Appendices

APPENDIX 1 GOVERNMENT STRUCTURE AND RELEVANT ACTORS



Central Government

The central government refers to the institution of the state. This actor defines and implements policies, with a certain envisioned aim of these programs. The relationship between this envisioned aim and the actual effects of the program has been discussed as *governmentality* which makes it possible to understand the different realities of the involved actors (Lemke, 2002).

Policy Discourse

Policy can be seen as a tool for solving *problems* such as the societal problems surrounding improper waste management. Policy is a part of governance, and has certain objectives. A policy problem is defined by certain actors; the policy makers. These policy makers have a certain world view, which affects the policy and the reality in which the policy potentially will intervene. The *problem* the policy addresses is thus a subjective truth, while policies are presented as a rational and transparent way to solve the problem (Drezner et al., 2007; N. Rose et al., 2006; H. van Dijk, 2016).

The Government of Sri Lanka (GoSL) applies the “*polluter pays*²²” principle in its attempt to conserve the environment. GoSL stimulates urban waste recovery, recycling, and waste re-use. Within the central government, the Ministry of Environment and Renewable Energy is the main stakeholder relevant for this study. This ministry is responsible for a) Solid waste management at the national level; b) preservation of the environment for the present and future generations; and c) formulation and effective implementation of programs to combat pollution of the environment. The Ministry of Provincial Councils and Regional Development is responsible for implementing the

²² The Polluter Pays principle states that the person(s) who is/are polluting, should pay the price for this pollution

“Local Authority Act” and the “Provincial Council Act” at the national level (Fernando, Drechsel, Mantharithilake, & Jayawardena, 2014).

Provincial Councils (PC)

Provincial Council’s direct responsibilities related to waste management is not clearly defined. The Provincial Council does see to the supervision of the Local Authorities. The Provincial Council is also (under subject 27, Sri Lankan Law) partly held responsible for the protection of the environment within their province (Fernando et al., 2014). The Provincial Council launched a program to collect only segregated garbage from residences in all 23 municipal council areas in the country.

Local Authorities (LA)

The Local Authorities in Negombo MC have a different approach to waste than the Local Authorities in Kaduwela MC. Kaduwela MC has invested time and effort in awareness projects which stimulated proper waste segregation. Negombo MC has not engaged in any such efforts. The awareness of people, their concerns and their effort to engage in environmental sustainability is likely to be affected by the interventions implemented by the Local Authorities. The local authorities in both case studies have less binding power but rather a negotiated power with its subjects. This can be understood as *soft law* and has uncertain outcomes, especially within legally plural contexts (Randeria, 2007).

Public awareness and broadening of knowledge interventions

The environment, exposure, incentives and actors can all influence the public awareness towards solid waste management practices within a household. Public awareness can affect the behaviour and willingness to change that behaviour of people to adopt adequate waste management practices (Zurbrügg, 2003). Environmental awareness does not directly impact peoples’ behaviours. The proven impact of people’s awareness on their environmental behaviour is very weak, and information campaigns, while creating awareness, do not necessarily achieve the expected results (Spaargaren, 2011).

Waste collectors, compost plants and waste grading centres

Waste collectors collect waste from households and bring this waste to compost plants or grading centres. As of November 1st the governmental policy states that waste is only going to be collected if it is separated into organic-inorganic waste. In Sri Lanka, there are a little over 130 compost plants scattered across the country. Inorganic and recyclable waste is brought to grading centres by waste collectors. These centres sort out and group recyclables from non-recyclables. The centres often sell the recyclables to private contractors.

Male and female household members

The waste segregation practices of households will not be interpreted as an individual choice of the household members, but as a result of their (social) environment, municipal area they reside in, infrastructure in their neighbourhoods and a variety of other factors.

"The success or failure of policies and governance structures can be understood by studying actors, their perceptions/opinions and their practices" (Aprilia et al., 2012).

"Morality is a public affair, adaptable to shifting political rationalities: one's dedication to work, personal health and general lifestyle are all relevant parts of governmentality" (P 187, Salskov-Iversen et al. 2000)

Moral and normative concerns

Though the impact of people's awareness of their environmental behaviour is not direct, the moral and normative concerns of people will affect their practices. It is likely that, if people have strong pro-environmental values, they will portray pro-environmental behaviour. Moral concerns also include the extent to which certain practices and behaviour norms are perceived and accepted as common (Steg & Vlek, 2009). When people see their neighbours and community members disposing their waste in a certain manner, this will probably influence their own behaviour and practices. Part of moral and normative concerns and behaviour could be related to the density level and/or income level of the area people live in. Other so called external factors can include environment and infrastructure, exposure to interventions, financial incentives, and involved actors. These external factors are closely related to public awareness, and probe people to change their practices regarding waste generation and waste separation.

Intersectionality

Certain factors can define who a person is and perceives to be, and can influence people's perceptions and opinions, and thus also their practices (Aprilia et al., 2012). Both the public awareness and the intersectionality of a person and household, can tell us about their practices regarding solid waste. How people perceive waste, what they consider to be waste, and what they do with their waste, is expected to be related to their socio-cultural factors, educational level, ethnicity and economic characteristics. Intersectional research looks at gender, ethnicity, caste, class etc. not as separate categories, but assumes that all are interconnected (Nightingale, 2011; Shields, 2008). In order to see the entire picture revolving around one's gender, race, ethnicity, caste and class must be taken into account (Mccall, 2005; Nightingale, 2011). Here, identity is a unity and should be seen as one whole (Mccall, 2005). By including *intersectionality* as a concept within this thesis, I aim to understand the practice theory as a cultural theory by building upon the work of Reckwitz (2002). As Reckwitz explains, this cultural theory falls somewhere between the *homo economicus* (individual intentions and interests) and the *homo sociologicus* (action on collective norms and values). The practice theory then can add to understand the "*tacit or unconscious layer of knowledge which enables a symbolic organization of reality*" (p. 246, Reckwitz). Here the actor (performing a practice) has certain (routinized) mental activities of understanding (Reckwitz, 2002).

"A practice is social, as it is a 'type' of behaving and understanding that appears at different locales and at different points of time and is carried out by different body/minds" (P. 250, Reckwitz 2002).

These different bodies inhabited by different minds are analysed and understood by using the concept of intersectionality. It is tricky to discuss and study household characteristics; though certain characteristics are likely to alter the waste segregation practices within households, the choices and decisions regarding waste segregation made within households are very dependent on the environment in which these households find themselves. Choices and decisions regarding waste segregation, leading to certain practices, cannot and won't be understood as independent isolated choices made by individuals (Spaargaren, 2011). Practices are however conditioned within networks of actors; the actors here are the carriers of practices. These networks of actors can be formed on the basis of ethnicity, education and other socio-cultural factors. These factors also influence the ways a *body* is understood. *"A practice can be understood as the regular, skilful 'performance' of (human) bodies"* (P.251, Reckwitz 2002). The body is not an 'instrument' controlled by the agent, practices are in itself bodily performances. Simultaneously, the way an actor understands the world has knowledge, wants something (mind) *and* the resources available to the actor (things) *and* the way the actor understands, knows, wants and feels (knowledge), influences that routinized bodily performance (Reckwitz, 2002).

APPENDIX 2 DAILY MIRROR NEWSPAPER CLIPPINGS

MCS WILL COLLECT ONLY SEGREGATED GARBAGE FROM NOV. 01

Daily Mirror (Sri Lanka) 2 Nov 2016 BY SANDUN A. JAYASEKERA



Local Government and Provincial Councils Minister Faiszer Musthapha yesterday instructed Special Commissioners of all Municipal Councils to strictly adhere to the instructions issued by the Ministry not to collect non-segregated garbage effective from November 1.

Minister Musthapha in August issued a circular to all Municipal Councils to collect only segregated garbage from November 01, 2016. Those who failed to adhere to the instructions and segregate solid waste before disposal will be brought before the law and punish accordingly.

"This programme was launched un-

der the patronage of President Maithripala Sirisena at the President's Official Residence this morning. Today under the patronage of the Chief of Staff of the Prime Minister's Office, the Minister of Law and Order and Prison Reforms, Sagala Rathnayaka, the same programme was also carried out at the Temple Trees," Minister Musthapha said yesterday.

According to the programme all the Municipal Councils would only collect segregated waste. Provincial Commissioners revealed that many Government institutions including schools, Police Stations, Parliament and Elections Commissioners office did not segregate their

waste. Accordingly, Minister Musthapha took immediate steps to inform all the Cabinet Ministers to make all the institutions under those Ministries aware regarding the garbage segregation. All the Police Stations have been informed regarding the decisions by the Secretary of the Ministry of Law and Order and Prison Reforms.

Following lengthy discussions, the Ministry has made a strong decision to launch the programme by November 01, 2016. There is a plan to expand the programme to Urban Councils and Pradeshiya Sabhas after having understood the issues and challenges and rectifying them. At the end of each month a review of the programme will be prepared and presented.

Police have been directed to take stern legal action against those who do not dispose garbage in the prescribed manner from November 01 and assistance from the tri forces would be sought for the purposes of proper enforcement. The police request the general public to assist and inform them by providing information when a person or

group of persons disobeyed the directive.

Any information in such regard can be communicated through 011-2587124 and 011-2593111.

Write a comment

Page View Share Comment Save to Co... More

Bump it Dump it



MCs say no collection of garbage unless segregated

2016-09-29 17:16:42

8667 20



All Municipal Councils in the country have decided to refrain from collecting garbage from November 1 unless they were segregated, the Provincial Council and Local Government Ministry said today.

The ministry said the decision would affect all residences, shops, schools, hospitals and state institutions.

The decision was taken during a discussion held with all Municipal Commissioners and other officials last morning with the participation of Local Government and Provincial Councils Minister Faiszer Musthapha and Ministry Secretary Kamal Padmasiri.

"Disposed waste should be segregated under three categories as biodegradable waste, non-biodegradable waste and plastic or glass. Some of the Municipal Councils are already collecting segregated garbage," the ministry stated.

During the discussions, the Municipal Commissioners pointed out that Municipal Councils had to face various difficulties with waste management due to irregular waste disposal.

Minister Musthapha said that steps would be taken to strengthen the Environmental Police to strictly implement the law against individuals who dispose waste on roadsides. **(Darshana Sanjeewa)**



Sri Lanka Premium 24x7 News Portal
adaderana.lk



MCs decide not to collect unsorted waste

September 29, 2016 03:17 pm



Like 149K people like this. Be the first of your friends.

The Ministry of Local Government and Provincial Councils today said that all the Municipal Councils in the country have decided to refrain from collecting garbage unless they are segregated from November 01, 2016.

The agreement was reached during discussion held this morning (29) with the participation of the Minister of Local Government and Provincial Councils, Faiszer Musthapha, Secretary of the Ministry, Kamal Padmasiri, all the Municipal Commissioners and other officials.

Therefore this decision will apply to all residences, shops, schools, hospitals and state institutions, the ministry said.

Disposed waste should be segregated under three categories as biodegradable waste, non-biodegradable waste and plastic/glass.

During the discussion, it was uncovered that Municipal Councils have had to face various difficulties with waste management due to irregular waste disposal.

Minister Faiszer Musthapha had also stated that steps will be taken to strengthen the Environmental Police to strictly implement the law against individuals who dispose of waste on the roadside.

Only segregated garbage from November 1

Saturday, October 29, 2016 - 05:15

All the Municipal Councils have decided to collect only segregated garbage from November 1, according to a concept of Provincial Councils and Local Government Minister Faiszer Musthapha. The programme will be inaugurated under the patronage of President Maithripala Sirisena at the President's Official Residence. At noon the same day, under the patronage of the Chief of Staff at the Prime Minister's office, Law and Order & Southern Development Minister Sagala Rathnayaka, the same programme will be carried out at Temple Trees.

Plans are underway to expand the programme to Urban Councils and Pradeshiya Sabhas after having understood the issues and challenges and rectifying them. At the end of each month, a review of the programme will be prepared and presented. Police has been directed to take stern legal action against those who do not dispose garbage properly from November 1 and assistance from the tri forces will be sought.

In terms of section 272 (5) of the Municipal Councils' Ordinance, the Municipal Councils hold power to enact by-laws in relation to health and safety. All Municipal Councils have already enacted by-laws on health and safety on which basis garbage disposal and collection takes place. The provisions also call for segregation of waste.

In terms of section 272 (5) of Municipal Councils Ordinance, the penalties for disregarding by-laws on garbage disposal are as follows:

- First time offenders will be fined a sum not exceeding Rs. 1,000.
- Second or third time offenders will be fined a sum not exceeding Rs. 2,000.
- Offenders who repeatedly disobey the by-laws will be fined a sum not exceeding Rs. 25,000 each time.

According to Section 261 of the Penal Code on public nuisance, any act that can be considered causing public nuisance, can be punished.

According to the National Environmental Act, No. 47 of 1980, disposing garbage which can harm the environment is illegal. According to the Section 23 of the same act, if the garbage disposed in a public or private place is harmful to the health of people, the Central Environmental Authority holds power to direct institutions to dispose such garbage in an appropriate manner. If a particular person neglects those directions, he or she will be fined.

The programme would result in a reduction of garbage in cities by 50 percent - 60 percent in urban areas.

APPENDIX 5 LIKERT SCALE

	Strongly Agree	Agree	Undecided/I don't know	Disagree	Strongly Disagree
I know what happens to waste	1	2	3	4	5
I am willing to pay for improved waste collection service	1	2	3	4	5
It is alright to dump waste outside; other people will take care of it	1	2	3	4	5
I think the private sector should do more for waste service	1	2	3	4	5
I have seen what happens to solid waste	1	2	3	4	5
I think the government is responsible for waste collection	1	2	3	4	5
I don't have space for home composting	1	2	3	4	5
It is good if the government imposes fines for people who do not separate waste	1	2	3	4	5
I think that it is a waste of time to separate my waste	1	2	3	4	5
I think the current service provided by the government is insufficient	1	2	3	4	5
I think it is good to home compost	1	2	3	4	5
A fine would change my behaviour	1	2	3	4	5
I have no idea what happens to my waste	1	2	3	4	5
Home composting is a waste of time	1	2	3	4	5
The government is responsible for the waste I dump outside	1	2	3	4	5
I think it is a waste of time to segregate my waste	1	2	3	4	5
I would never pay a fine	1	2	3	4	5
Home composting is not beneficial for me	1	2	3	4	5
I would be interested in using co-compost made out of fecal sludge combined with household waste	1	2	3	4	5
I am not responsible for what happens to my waste	1	2	3	4	5

APPENDIX 6 LIKERT SCALE VARIABLES AND THEMES

#	Theme/Variable	Statements
1	Knowledge of what happens to waste	I know what happens to waste
		I have seen what happens to solid waste
		I have no idea what happens to my waste
2	Home composting	I think it is good to home compost
		I don't have space for home composting
		Home composting is not beneficial for me
		Home composting is a waste of time
3	Perceptions on financial incentives	A fine would change my behavior
		It is good if the government imposes fines for people who do not separate waste
		I am willing to pay for improved waste collection service
		I would never pay a fine
4	Perceptions on government and private sector	I think the current service provided by the government is insufficient (not enough)
		I think the private sector should do more for waste service
		I think the government is responsible for waste collection
		The government is responsible for the waste I dump outside
5	Perceptions on waste dumping	It is alright to dump waste outside; other people will take care of it
		I think that it is a waste of time to separate my waste
		I think it is a waste of time to segregate my waste
		I am not responsible for what happens to my waste
6	Feecal sludge	I would be interested in using co-compost made out of feecal sludge combined with household waste

Waste separation practices in Sri Lanka

Survey (adapted for thesis: all answer boxes have been reduced in size)

November/December 2016

Note:

1. Please use the **person within the household who is responsible for waste separation** as a respondent
2. In case the most relevant person is absent/not willing to respond, please ask an available household member to function as a respondent to this survey. All respondents must be above 18yrs of age
3. Please cover all selected households within the townships, please see the households assigned to enumerators.
4. Please explain to the respondent what is meant with recyclables, organic, and inorganic waste
5. Please explain to the respondent what the purpose of the study is and how the data will be used
6. Please discuss confidentiality, anonymity, and the right not to answer/stop the survey

Module A: Identification

General Information

Please fill in the blank fields:

Name of town/ward	
Name of Council (Put an ' X ' next to council)	0. Kaduwela 1. Balangoda 2. Negombo
Enumerator Name	
Respondent name	
Respondent's telephone number	
Date of Questionnaire Taken	

Module B: Current waste practices

Identification of the person 'in charge'

1)	Within the household, who is generally responsible for separating the waste (kitchen waste, food waste, plastics, garden waste, paper, glass, other waste) within the household?	
	0.	I am responsible for waste separation
	1.	My husband is responsible for waste separation
	2.	My wife is responsible for waste separation
	3.	My children are responsible for waste separation
	4.	My maid is responsible for waste separation
	5.	We are all responsible
	6.	My father is responsible
	7.	My mother is responsible
	8.	Other person, please indicate:

2)	Within the household, who is generally responsible for taking out the trash?	
	0.	I am responsible for taking out the trash
	1.	My husband is responsible for taking out the trash
	2.	My wife is responsible for taking out the trash
	3.	My children are responsible for taking out the trash
	4.	My maid is responsible for taking out the trash
	5.	We are all responsible
	6.	My father is responsible
	7.	My mother is responsible
	8.	Other person, please indicate:

Note: Please use the person who is generally responsible for waste separation and/or taking out the trash as a respondent for the remainder of this survey – if he/she is available. Please make sure that the respondent is over 18yrs of age (in the case that children are responsible for before mentioned task)

Current waste separation practices within the household

1)	What are the current waste separation practices within the household?	
	0.	I currently separate household waste → Go to section ① → Skip sections ② and ③
	1.	I separated household waste in the past , but have stopped this activity → Go to section ② → Skip sections ① and ③
	2.	I have never separated the household waste → Go to section ③ → Skip sections ① and ②

Section ①

(Respondent currently separates household waste)

1) **What types of household waste do you separate, and who is in charge of this activity?**

Please fill in an X after every 'resource' column

Resource is currently filtered out	0. This resource is separated by adult female household members	1. This resource is separated by adult male household members	2. This resource is separated by both adult male and female household members	3. This resource is separated by the maid, cook, or gardener	3. This resource is separated by children	3. This resource is not separated
Vegetables and fruit waste						
Other food waste						
Garden waste						
Plastics						
Polythene						
Cans						
Glass						
Paper						
Carton						

2)	Reasons for separating household waste Multiple answers possible	
	0.	It is good for the environment
	1.	I was told that I should separate
	2.	I have to, otherwise it will not be collected
	3.	I have to, it is the law
	4.	Other people do it
	5.	For health reasons
	6.	There are fines I can get if I don't separate
	7.	I will get punished if I don't separate
	8.	I separate organic waste for own use
	9.	I sell recyclables
	10.	Other reasons, please specify;
	11.	I don't know / I don't want to answer

3)	Would you recommend others to separate household waste?	
	0.	Yes Why? Please write down a reason subtracted from question 2. Choose from reason: 0,1,2,3,4,5,6,7,8,9,10):
	1.	No
	2.	I don't know / I don't want to answer
4)	What do you do with the organic materials (food/kitchen/garden waste) that you separate? Multiple answers possible	
	0.	I use it as animal feed
	1.	Use it to grow my vegetables/fruits (compost)
	2.	Use it to grow my flowers and other plants (compost)
	3.	It is collected by municipality
	4.	It is collected by private collectors
	5.	I bring it somewhere. Please specify where the respondent brings the organic waste:
	6.	I burn it
	7.	Other, please specify:
	8.	I don't know / I don't want to answer
5)	What do you do with the inorganic materials (recyclable waste + other trash) that you separate? Multiple answers possible	
	0.	I bury it at my compound
	1.	I bury it in my vicinity
	2.	I dump it in my vicinity (waste is dumped, not buried)
	3.	I burn it
	4.	It is collected by municipality
	5.	It is collected by private collectors
	6.	I sell it
	7.	I give it to people who sell it
	8.	I bring it somewhere. Please specify where the inorganic waste is taken:
	9.	Other, please specify;
	20.	I don't know / I don't want to answer

6)	What are the incentives you have to separate waste? Multiple answers possible
	0. If I don't separate, I get a fine
	1. If I don't separate, waste will not be collected
	2. If I don't separate, I get another form of punishment
	3. I need to separate in order to use organic waste as compost in my own garden
	4. I can sell items like plastic, glass, tins etc (recyclables)
	5. The waste collectors told me that I have to separate waste
	7. I don't know / I don't want to answer
7)	Please tell me about your recyclables
	0. I do not separate recyclables, I put them with my other (inorganic) waste
	1. I keep all recyclables together: plastic /glass/paper in the same bag/bin
	2. I keep my glass separate from the other recyclables (plastic/paper)
	3. I keep glass, plastics, and paper all in separate bags/bins
	4. I don't know / I don't want to answer
8)	How do you store your trash (other than organic/recyclable waste)?
	0. In a separate bin, which I give to the waste collectors
	1. In a shopping bag or plastic bag
	2. I store my trash in the same bag as my recyclables
	3. I store my trash in the same bag as my organic (food/kitchen) waste
	4. I don't know / I don't want to answer
9)	When did you start separating waste?
	0. A few weeks ago
	1. A few months ago
	2. More than a few months ago
	3. I don't know / I don't want to answer

Section ②

(Respondent separated waste in the past, but has stopped this activity)

1)	When did you stop separating waste?	
	0.	A few weeks ago
	1.	A few months ago
	2.	More than a few months ago
	3.	I don't know / I don't want to answer
2)	Reasons to stop separating household waste Multiple answers possible	
	0.	It took too much time
	1.	It was too difficult
	2.	Nobody did it anymore
	3.	The laws changed
	4.	I don't think that it is useful
	5.	I think that all the waste is thrown together anyway (no use in separating)
	6.	I don't know / I don't want to answer
3)	How do you store your organic waste (food/kitchen/garden waste)?	
	0.	In a compost bin, which I use for my own home composting
	1.	In a separate bin, shopping bag or plastic bag
	2.	I store my organic waste in the same bag as my inorganic waste
	3.	I don't know / I don't want to answer
4)	How do you store your recyclables (tins/plastic/glass)?	
	0.	Not in anything, I just put them outside on collection days
	1.	In a shopping bag or plastic bag
	2.	I store my recyclables in the same bag as my other waste
	3.	I don't know / I don't want to answer
5)	How do you store your trash (other than organic/recyclable waste)?	
	0.	In a separate bin, shopping bag or plastic bag
	1.	I store my inorganic waste in the same bag as my other waste
	2.	I don't know / I don't want to answer
4)	Who decided to stop separating the household waste?	
	0.	I decided
	1.	My husband decided
	2.	My wife decided
	3.	My child(ren) decided
	4.	My maid decided
	5.	None of the above, please indicate another person who decided:
	6.	I don't know / I don't want to answer

Section ③ (Respondent has never separated household waste)

1)	What are your reasons for not separating waste? For every possible reasons for using there has to be an 'X' for Yes or for No		
	Possible reasons. Fill in yes or no for every possible reason!	0. Yes , this is the reason	1. No , this is not the reason
	I never received information		
	It is too difficult		
	It doesn't work		
	It is not useful for my household		
	Nobody does it		
	It is too expensive		
	It requires too much work		
	It is physically demanding		
	It takes up too much time		
	Other people in my area don't do it		
	My household members don't want to		
	I don't have to (no obligation)		
	I think that all the waste is thrown together anyway (no use in separating)		
	I don't know what happens if I separate my waste		
	No one collects my waste		
	I do not know where to bring segregated materials		
	Other reason, please specify		
2)	How do you store your organic waste (food/kitchen waste)?		
	0.	In a compost bin or separate bin (separate from inorganic waste)	
	1.	In a bag, separately from my inorganic waste	
	3.	I store my organic waste in the same bag as my inorganic waste	
	4.	I don't know / I don't want to answer	
3)	How do you store your recyclables (paper/plastic/glass)?		
	0.	Not in anything, I just put them outside on collection days	
	1.	In a separate bin or bag	
	4.	I store my recyclables in the same bag as my other waste	
	5.	I don't know / I don't want to answer	
4)	How do you store your trash (other than organic/recyclable waste)?		
	0.	In a separate bin, which I give to the waste collectors	
	1.	In a shopping bag	
	2.	In a polythene/plastic bag	
	3.	I store my inorganic waste in the same bag/bin as my other waste	
	4.	I don't know / I don't want to answer	

Module C: Previous waste separation practices

1)	Has anything changed in your waste separation behaviour, compared to 6 months ago?	
	0.	Yes -> <i>continue to question 2</i>
	1.	No -> <i>go to Module D, awareness</i>
2)	Compared to six months ago, what changed?	
	0.	6 months ago I did not separate my waste, but now I separate my organic waste from my inorganic waste
	1.	6 months ago I did not separate my waste, but now I separate my organic waste, inorganic waste and recyclables
	2.	6 months ago I did not separate my waste, but now I separate my recyclables (paper/plastic/glass) from my other waste
	3.	6 months ago, I used to separate my waste. No I do not separate anymore
	4.	I don't know / I don't want to answer
4)	Who decided to change the practices regarding separating the household waste?	
	0.	I decided
	1.	My husband decided
	2.	My wife decided
	3.	My child(ren) decided
	4.	My maid decided
	5.	None of the above, please indicate another person who decided:
	6.	I don't know / I don't want to answer
5)	What are the reasons that you started separating your waste, as compared to 6 months ago?	
	0.	It is good for the environment
	1.	I was told that I should separate by my neighbours/friends
	2.	I was told that I should separate by the local authority
	3.	I was told that I should separate by the garbage collectors
	4.	I have to, otherwise it will not be collected
	5.	I have to, it is the law
	6.	Other people do it
	7.	For health reasons
	8..	There are fines I can get if I don't separate
	9.	I will get punished if I don't separate
	10.	I separate organic waste for own use
	11.	I sell recyclables
	12.	I don't know / I don't want to answer

Module D: Awareness

1)	What do you think happens to the separated waste? Multiple answers possible	
	0.	The government takes care of it
	1.	It goes to a compost site
	2.	It is all thrown together
	3.	It is recycled
	4.	I don't know / I don't want to answer

Contact with intervention

Have you heard about waste separation in terms of separating the following: Organic (food/kitchen/garden) waste Inorganic (trash) waste Recyclables (plastic/glass/paper)	0. Yes	1. No
→ If no, skip to Module E: waste collection services		
Where did you first hear about solid waste separation from? Fill in Code	Code:	
When did you hear about solid waste separation for the first time? Days/Months/Years ago	
Where did you hear about solid waste separation from most recently ? Fill in Code	Code:	
Did you hear about the new law regarding waste separation, which has been implemented on November 1 st , 2016?	0. Yes	1. No
From what source did you hear about the new November 1 st law (before this survey)? Fill in Code	Code:	

CODES. PLEASE SELECT ONE AND FILL IN 'CODE' AFTER QUESTION

- | | |
|------------------------|-------------------------|
| 1. Television | 7. From an organization |
| 2. Radio | 8. From the government |
| 3. Newspaper | 9. Campaigns |
| 4. Neighbour | 10. Local Authority |
| 5. Leaflet or pamphlet | 11. Waste collectors |
| 6. Friend | 12. Ward / town |

12. Other. Please explain:

Module D: Impacts of the new law

Please inform the respondent about the waste separation law implemented November 1st, as you have learnt during the training.

1)	Has your waste separation behaviour changed due to the new law?	
	0.	Yes, I started separating because of the new law
	1.	No , I wasn't separating before and I still am not separating
	2.	No, I already was separating before the law
	3.	I don't know / I don't want to answer
2)	What possible impacts of the new implanted law are relevant to your situation? Multiple answers possible	
	0.	I bought new bins to store my organic waste in
	1.	I had to buy new equipment
	2.	I got a fine because of the new law
	3.	I used to only separate recyclables, now I also separate organic from inorganic waste
	4.	I used to only separate organic waste, now I also separate recyclables from inorganic waste
	5.	The waste collectors told me that I have to separate because of the new law
	6.	The waste collectors refused to collect my waste
	7.	I stopped burning my waste because of the new law
	8.	I started burning my waste because of the new law
	9.	I burn my waste more now, because of the new law
	10.	It is unclear to me on which days what type of waste is collected
	11.	My waste is collected less frequently due to the new law
	12.	Because of the new law, I spend more time separating my waste
	12.	The new law made me aware of the benefits of waste separation
	13.	I don't know / I don't want to answer
3)	Do you think your future separation behaviour will change due to the new law?	
	0.	Yes
	1.	No
	2.	I don't know / I don't want to answer

Module E: Waste Collection Services

Waste collection service in area of residence

1)	Waste collection service What statement is most appropriate for your situation?
	0. My waste is collected on <i>fixed days</i>
	1. My waste is collected on <i>unfixed days</i> , the collectors come at <i>random</i> moments
	2. My waste is never collected
	3. I don't know / I don't want to answer
2)	How is your waste collected?
	0. My organic waste (kitchen waste), inorganic waste (trash) and recyclables (cans/plastic) are all collected on the same day (all waste is collected on the same day)
	1. My organic waste (kitchen waste), inorganic waste (trash) and recyclables (cans/plastic) are all collected on different days (all waste is collected on different days)
	2. My organic waste (kitchen waste) is collected on a different day from my inorganic waste (trash) and recyclables (cans/plastic). Inorganic waste and recyclables are collected on the same day (organic / non organic waste is collected on different days)
	3. I don't know / I don't want to answer
3)	What do the waste collectors do with your household waste?
	0. They pick up the separated waste, and keep it separated in their trucks
	1. They pick up the separated waste, but I know that they throw the waste all together in their trucks
	2. They pick up the separated waste, but I think that they throw the waste all together in their trucks
	3. I don't know / I don't want to answer
4)	Who collects your waste?
	0. Municipality collects all waste
	1. Private collectors collect all waste
	2. Municipality collects some waste, private collectors collect some waste Please specify who collects what: Municipality collects: Private collectors collect:
	3. Other, please specify:
	4. I don't know / I don't want to answer

5)	Do you have to pay for waste collection services?	
	0.	Yes → Please specify amount of rupees, and unit (rupees per day/week/month) Sri Lankan Rupees <i>per</i> (fill in)
	1.	Yes, I pay my taxes to the council and they take care of waste collection
	2.	No, I do not have to pay
	3.	No, officially I do have to pay , but I don't
	4.	My waste is not collected
	5.	I don't know / I don't want to answer
6)	In what cases is waste collected?	
	0.	All waste is collected
	1.	Waste is only collected when it is separated (organic/inorganic)
	2.	Waste is not collected. If so, please explain what is done with the waste:
	3.	I don't know / I don't want to answer

Frequency waste collection service

CODES. PLEASE SELECT ONE AND FILL IN 'CODE' AFTER QUESTION	
1. Every day	5. Three times per month
2. Every other day	6. Two times per month
3. Twice a week	7. Once a month
4. Once a week	8. Less frequent than once a month
9. Other. Please explain:	

1)	How often is your waste collected? Please fill in a code after every question	
	How often is your organic waste (kitchen waste/food waste) collected?	Code:
	How often are your recyclables (cans/plastic/glass) collected?	Code:
	How often is your trash (non-recyclable non organic waste) collected?	Code:
2)	Is all of the waste collected on the same day(s)? All of the waste is collected at the same time	
	0.	Yes
	1.	No
	2.	I don't know / I don't want to answer

Module F: Perceptions

Perceptions

1)	What do you think the waste separation practices of your neighbours are? If you don't know, just guess an answer	
	0.	I think that my neighbours separate household waste in organic and inorganic waste
	1.	I think that my neighbours separate household waste in organic, plastic/cans and rest (mixed) waste
	2.	I think my neighbours mix all their waste together; they do not separate their waste
	3.	I don't know / I don't want to answer

Perceptions on statements.

Please fill in whether the respondent strongly agrees (1), agrees (2), is undecided (3), disagrees (4) or strongly disagrees (5) with the following statements. Fill in an 'X' after **every** statement.

	Strongly Agree	Agree	Undecided/I don't know	Disagree	Strongly Disagree
I know what happens to waste	1	2	3	4	5
I am willing to pay for improved waste collection service	1	2	3	4	5
It is alright to dump waste outside; other people will take care of it	1	2	3	4	5
I think the private sector should do more for waste service	1	2	3	4	5
I have seen what happens to solid waste	1	2	3	4	5
I think the government is responsible for waste collection	1	2	3	4	5
I don't have space for home composting	1	2	3	4	5
It is good if the government imposes fines for people who do not separate waste	1	2	3	4	5

	Strongly Agree	Agree	Undecided/I don't know	Disagree	Strongly Disagree
I think that it is a waste of time to separate my waste	1	2	3	4	5
I think the current service provided by the government is insufficient	1	2	3	4	5
I think it is good to home compost	1	2	3	4	5
A fine would change my behaviour	1	2	3	4	5
I have no idea what happens to my waste	1	2	3	4	5
Home composting is a waste of time	1	2	3	4	5
The government is responsible for the waste I dump outside	1	2	3	4	5
I think it is a waste of time to segregate my waste	1	2	3	4	5
I would never pay a fine	1	2	3	4	5
Home composting is not beneficial for me	1	2	3	4	5
I am not responsible for what happens to my waste	1	2	3	4	5
I would be interested in using co-compost made out of faecal sludge combined with household waste	1	2	3	4	5

Module G: Characteristics of respondent

Respondent's Information

1)	Gender of Respondent	
	0.	Female
	1.	Male
	2.	Other
2)	Age of Respondent	
	0.	18-20
	1.	21-40
	2.	41-60
	3.	61+
	4.	I don't know / I don't want to answer
3)	Education of Respondent	
	0.	Illiterate
	1.	Primary Level
	2.	Secondary Level
	3.	Higher Education
	4.	No formal education, but literate
	5.	I don't know / I don't want to answer
4)	Ethnicity of Respondent	
	0.	Sinhalese
	1.	Burgher
	2.	Tamil
	3.	Malay
	4.	Moor
	5.	Other, please specify:
	6.	I don't know / I don't want to answer
5)	Origin of Respondent (Country in which the respondent was born)	
	0.	Sri Lanka
	1.	Indian Subcontinent
	2.	Other Asian Countries
	3.	Africa
	4.	Europe
	5.	North America
	6.	Australia or Oceania
	7.	South America
	8.	I don't know / I don't want to answer
6)	Religion of Respondent	
	0.	Hindu
	1.	Muslim
	2.	Christian
	3.	Buddhist
	4.	No religion
	5.	Other, please specify:
	6.	I don't know / I don't want to answer

Household income

1) Please give the various sources of income for the household. Multiple answers possible

Source of income	Please circle Yes or No for each source of income	
Selling of produce (agriculture):		
- Vegetables	0. Yes	1. No
- Fruits	0. Yes	1. No
- Fishery	0. Yes	1. No
- Dairy products	0. Yes	1. No
- Poultry or livestock sale	0. Yes	1. No
Selling recyclables (glass/plastic/paper)	0. Yes	1. No
Wages/Salary	0. Yes	1. No
Remittances	0. Yes	1. No
Business/trade	0. Yes	1. No
Self-employment	0. Yes	1. No
Pension	0. Yes	1. No
Renting out rooms in your house	0. Yes	1. No
Other, please specify :		

Does your household own / have the following?			
An own garden (next to house)	0. Yes	1. No	2. Don't want to answer
A car	0. Yes	1. No	2. Don't want to answer
A TV	0. Yes	1. No	2. Don't want to answer
An antenna (cable)	0. Yes	1. No	2. Don't want to answer
A maid/gardener/cook	0. Yes	1. No	2. Don't want to answer

Household profile

Household includes all the people living in your house and sharing meals cooked in the same kitchen. Please circle the correct answers regarding the household where the respondent currently lives;

Number of household members:	0. 0-2 people	1. 2-4 people	2. 4-6 people
	3. 6-8 people	4. 8-10 people	5. More than 10
Who is the household head in your household?	0. I am the household head	1. My husband	2. My wife
	3. My son	4. My son-in-law	5. My father-in-law
	6. My father	7. My mother-in-law	8. My brother
How many young sons (boys under 16 years of age) are household members?	0. NO young boys	1. 1 young boy	2. 2 young boys
	3. 3 young boys	4. 4 young boys	5. More than 4 young boys
How many adult males (above 16 years of age) are household members?	0. NO men	1. 1 man	2. 2 men
	3. 3 men	4. 4 men	5. More than 4 adult men
How many young daughters (girls under 16 years of age) are household members?	0. NO young girls	1. 1 young girl	2. 2 young girls
	3. 3 young girls	4. 4 young girls	5. More than 4 young girls
How many adult women (above 16 years of age) are household members?	0. NO adult women	1. 1 adult woman	2. 2 adult women
	3. 3 adult women	4. 4 adult women	5. More than 4 adult women

Housing

1)	In what kind of house does the respondent live?	
	0.	Permanent (all walls are made of bricks and concrete). Bungalow or other house
	1.	Permanent, apartment complex/apartment building/flat
	2.	Semi-permanent (wall is brick but roof is made of tiles and metals)
	3.	House is made of wood
	4.	Other, please specify....
	5.	I don't know / I don't want to answer

2)	Source of water supply	
	0.	Ground water (deep tube well)
	1.	Ground water (shallow tube well)
	2.	Running water within house
	3.	Shared tap (with other households)
	4.	I don't know / I don't want to answer

Area of residence

1)	Level of congestion How congested is the area you live in	
	0.	Very; many people live in a small area
	1.	Medium; quite a lot of people live in the same area
	2.	Not at all, not many people live in my area, there is lots of space around me
	3.	I don't know / I don't want to answer
2)	Infrastructure What level of infrastructure is there around your house?	
	0.	Broad roads
	1.	Narrow, but paved roads
	2.	Non paved roads
	3.	I don't know / I don't want to answer
3)	Size of land plot How large is the plot of land on which you live? Total perches; including the house.	
	0.	Less than 5 perches
	1.	5 to 10 perches
	2.	10 to 15 perches
	3.	15 to 20 perches
	4.	20 to 50 perches
	5.	More than 50 perches
	6..	I don't know / I don't want to answer

APPENDIX 8 RECYCABLES COST OVERVIEW

A private contractor purchases recyclables from the collectors, which motivates them to collect recyclables. Kaduwela MC.

Item	Pay to Collectors in Sri Lankan Rupees	Market Price in Sri Lankan Rupees
Cardboard	12	17
Aluminium	100	<i>Varying day-to-day market prices</i>
Plastic	32	
Pet Bottle	15	
Coconut shell	5	7
Metal	15	22
Polythene	40	55

APPENDIX 9 COMPARISON BETWEEN STRATA AREAS IN PERCENTAGES

	Strata A in percentage of respondents	Strata B in percentage of respondents	Strata C in percentage of respondents
Respondent is Illiterate	9.3%	0.0%	11.1%
Respondent has finished primary school level	18,6%	7,1%	48,1%
Respondent has finished secondary school level	48,8%	71,4%	40,7%
Respondent has finished a higher educational degree	23,3%	21,4%	0.0%
Respondents indicates that their household owns a television	100%	100%	96,2%
Respondent indicates that their household has a maid	34,9%	21,4%	3,8%