

Waste Management Strategy and Action Plan for Negombo City, Sri Lanka, 2020–2030



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This city strategy was developed through a multi-stakeholder consensus-based process led by Negombo Municipal Council (NMC) with the technical assistance from the IGES Centre Collaborating with UNEP on Environmental Technologies (CCET) and United Nations Environment Programme - International Environmental Technology Centre (UNEP-IETC). The strategy had been formulated based on available data and the NMC may, in the future review and update the strategy as more information becomes available. The views or opinions expressed do not necessarily represent the official decision or stated policy of the Government of Sri Lanka, the United Nations Environment Programme, or the Institute for Global Environmental Strategies, nor does citing of trade names or commercial processes constitute endorsement.

Citation

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List of Abbreviations

| | |
|---------|---|
| C&D: | Construction and Demolition |
| CCET: | IGES Centre Collaborating with UNEP on Environmental Technologies |
| CEA: | Central Environment Authority |
| D: | day |
| IETC: | International Environmental Technology Centre |
| JICA: | Japan International Cooperation Agency |
| LA: | Local Authority |
| MoE&WL: | Ministry of Environment and Wildlife resources |
| MOEJ: | Ministry of the Environment Japan |
| MoMWD: | Ministry of Megapolis and Western Development |
| MSW: | Municipal Solid Waste |
| MT: | metric tonnes |
| NGO: | Non-governmental Organisation |
| NMC: | Negombo Municipal Council |
| NSWMSC: | National Solid Waste Management Support Centre |
| PHI: | Public Health Inspector |
| UNEP: | United Nations Environment Programme |
| WMA: | Waste Management Authority |
| WMSAP: | Waste Management Strategy and Action Plan |
| WP: | Western Province |

Acknowledgement

The Waste Management Strategy and Action Plan (WMSAP) for Negombo is the outcome of committed team effort of city officials led by the Mayor and Commissioner of the Negombo City. The strategy also received inputs from committee members of Negombo Municipal Council (NMC) which comprised of Finance Committee, Health Committee, Industrial Committee, Sports and Youth Affairs and Communal Development Committee, and stakeholders from relevant ministries, institutions, private sectors, academic institutions, non-governmental organisations (NGOs), community groups, civil society organisations (CSOs), and some case study cities from Sri Lanka. WMSAP for Negombo was developed through a consultative process where the suggestions and ideas of all the above stakeholders were considered in drafting and refining the strategy to make it more practical and implementable. In this regard, Negombo City express its sincere gratitude to all the above stakeholders for their active participation in the consultative meetings and workshops. Negombo City would also like to thank ministries and institutions namely Ministry of Environment and Wildlife Resources (MoE&WL), Central Environment Authority (CEA), Waste Management Authority-Western Province (WMA-WP), National Solid Waste Management Support Centre (NSWMSA) and Ministry of Megapolis and Western Development (MoMWD) for their support and guidance throughout the strategy development process.

WMSAP for Negombo is a visionary document which address the major challenges in the current waste management system in Negombo City and establish a transition towards resource recycling, financially sustainable and environmentally sound waste management system in the city. WMSAP includes a comprehensive list of actions, goals and implementation directives based on the city study and series of workshops and meetings on strategy development. In addition, it also includes short-term, mid-term and long term targets to be achieved during the period of 2020–2022, 2023–2025 and 2026–2030 respectively. Negombo city is would like to work hard in achieving the targets in the city strategy in cooperation with all the relevant stakeholders and citizens. Hence, the city would like to request everyone to support and cooperate in achieving the goals and targets in the strategy in line with the vision of the strategy - “Clean Environment-Healthy Green City”.

Negombo City would like to extend their appreciation towards Ministry of the Environment Japan (MOEJ) in partnership with the United Nations Environment Programme (UNEP) for their financial assistance for the project. The Strategy was developed based on the agreement by the Negombo City and IGES Centre Collaborating with UNEP on Environmental Technologies (CCET) where Negombo City recognises the important role played by CCET and Federation of Sri Lankan Local Government Authorities (FSLGA) throughout the strategy formulation process including technical inputs and overall project facilitation. Last but not the least, Negombo City would also like to thank Dr. Anurudda and his team from Peradeniya University for their inputs to the strategy.

Foreword

Negombo as one of the major growing economic and tourist hubs in Sri Lanka, has invariably faced various challenges in its journey of becoming a clean, green, smart, attractive and sustainable city, where all the communities can reside peacefully and satisfactorily, also, in harmony with nature. In past years, the city had been recognized as a central trading port for Dutch and Portuguese, and in recent years, the city has proved its economic strengths providing added opportunities for small and medium sized enterprise and industries, especially in the sectors of tourism and fisheries.

However, parallel to the industrial advancement and urbanization in the city, Solid Waste Management has emerged as crucial topic to be addressed with immediate concern. The city generates 100-200 tons of residential, industrial and commercial waste daily, where landfilling and recycling are used as major waste management methods, yet, inadequate waste management systems, lack of public awareness and facilities and several other factors have intensified the city's waste problem.

The city had been yearning for a proper strategy to overcome the issue, and for that reason, Negombo Municipal Council has formulated "The Waste Management Strategy and Action Plan (WMSAP) for Negombo 2020". The strategic plan identifies the city's identical features and acts a regional waste management system keeping in line with Western Development Plan. It contains long-term goals from 2020 to 2030, where complete sustainable ecological solutions in terms of planning, initiating, monitoring and executing will be provided for waste management.

The Waste Management Strategy Action Plan (WMSAP) for Negombo is a fruitful outcome of a long-term hard effort of many stakeholders, namely, commissioner and the committee members of the council, relevant government authorities and other private and civil society organizations. I would also like to express my gratitude to the United Nations Environment Programme - International Environmental Technology Centre (UNEP-IETC), IGES Centre Collaborating with UNEP on Environmental Technologies (CCET) and the Ministry of Environment, Japan (MOEJ) for their technical and financial assistance in developing the WMSAP for Negombo City. This effort of all the stakeholders would definitely result a prosperous and sustainable green city of Negombo, to shine as one of the top eco-cities in Sri Lanka.



W.M. Dayan Lanza

Mayor, Negombo Municipal Council

Foreword

Almost everyone who goes to Sri Lanka, be it for a meeting, business or tourism has been in the suburbs of the coastal city of Negombo, even if they may not know it. This is because Negombo is located just 7 km away from the Bandaranaike International Airport, which plays a major role in the Sri Lanka tourism industry as the entry and exiting point for most international tourists. Over the past two decades the city has witnessed an increasing generation of municipal waste. Today, only around 50 per cent of this waste is collected. This city level waste management strategy, developed in line with Sri Lanka's national waste management policy of 2019, lays out a clear and tractable roadmap for dealing with this challenge. Once implemented, the strategy and action plan will enhance the wellbeing of people in the city through control and prevention of pollution, while also facilitating development of the national tourism industry. UNEP, and its International Environmental Technology Center, look forward to continued cooperation with Sri Lanka, and its municipalities, in developing solutions to waste management challenges.



Keith Alverson

Director of International Environmental Technology Centre, UNEP

Foreword

Like many other fast-growing cities in Asia, the waste management has always been a major societal problem for Negombo City. In this regard, IGES Centre Collaborating with UNEP on Environmental Technologies (CCET) in coordination with Ministry of Environment and Wildlife Resources (MoE&WL) has selected Negombo city as one of the target cities to cooperate for the development of its waste management strategy and action plan.

Thanks to the strong leadership, commitment and encouragement of Hon. Mayor, and Commissioner of Negombo city, as well as with the close coordination and supervision of the PHIs, concerned departments and representatives from local communities, Waste Management Strategy and Action Plan (WMSAP) 2020-2030 of Negombo city was successfully developed. This strategy cum action plan provides guidance to Negombo city in establishing sustainable waste management with potential of extended resource recovery and operational change by limiting the waste landfilling to only non-recyclables and non-recoverable. The proposed actions in the strategy would provide the opportunities to the people to consider better waste management starting from the segregation at source, improvement of waste collection, treatment and proper disposal of wastes under proper financial mechanisms, sound policies and robust institutional and monitoring frameworks and finally contribute to the consideration of ways to achieve sustainable lifestyle among the society.

Waste management is a social system which requires participation of all the stakeholders of the city. Its sustainability could be materialized through the change of our own lifestyles with the understanding of the concept of 3Rs and the interest of all citizens in making our city clean, healthy and comfortable.

I hope this developed strategy will provide an assistance to the peoples of Negombo city for its sustainable development with its beautiful environment.



Kazunobu Onogawa,

Director, IGES Centre Collaborating with UNEP on Environmental Technologies

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1. Introduction to the Strategy

Negombo is a major commercial and service centre for a large commercial, manufacturing and service area in Gampaha District, Western Province of Sri Lanka. Here, a combination of rapid economic development, growing tourism coupled with lifestyle change has resulted in increasing amounts of waste being generated in the city, posing significant health and environmental challenges.

The total waste generated in the city is about 158 metric tonnes per day (MT/D), of which only about 50% is collected, with the remaining uncollected waste being illegally dumped into the surrounding environment (Karunarathana et al., 2019). Over 80% of the collected waste is disposed of into the Ovitiyawatta landfill, which is situated along the bank of the Maha Oya river – a key source of fresh water for the country (Karunarathana et al., 2019). Out of remaining 20% of the collected waste, about 7% of degradable waste is used for compost production and remaining about 12% is being collected at the collection center in Negombo city (Karunarathana et al., 2019). At the landfill, as the solid waste is only covered by a layer of soil, rain water percolates through resulting in leachate, which collects in a small ravine between the dumping areas. This leachate is neither collected nor blocked from entering the waterway which degrades the fresh water nearby, ground water, as well as surrounding environment, which is a feeding ground for various animals such as birds, cows and dogs, and produces a bad odour.

Considering the need for proper waste management in Negombo City, in March 2018 the Ministry of Environment and Wildlife Resources (MoE&WL) and Negombo Municipal Council (NMC) requested IGES Centre Collaborating with UNEP on Environmental Technologies (CCET) to develop a waste management strategy and action plan for Negombo City. This

resulted in the “Waste Management Strategy and Action Plan of Negombo 2020–2030”, developed by CCET in collaboration with United Nations Environment Programme (UNEP) International Environmental Technology Centre (IETC), with financial support from the Ministry of Environment Japan (MOEJ), in line with the National waste management policy 2019 and Western Province Solid Waste Management Master Plan which is being developed in cooperation with Japan International Cooperation Agency (JICA). The Waste Management Strategy and Action Plan (WMSAP) for Negombo provides guidance and a long-term vision for Negombo City in efforts towards transforming the conventional waste management practices, comprising waste collection and disposal, to be more sustainable, in line with the Waste Hierarchy (i.e., prevention, reduction, recycling, recovery, disposal).

The city strategy also intends to identify required local policies, programmes and approaches to enhance Municipal Solid Waste (MSW) management, including collection, diversion and sound disposal, whilst ensuring citizen engagement and financial sustainability, as well as strengthen organisational capacity with appropriate regulations for managing MSW in Negombo City.

An implementation plan with key activities and specific tasks was also developed for each of the identified goals via a series of consultative meetings/ workshops with relevant stakeholders to ensure efficient operation of waste management and resource recovery in the city.



Figure 1: Photos of waste management in Negombo City
Source: CCET, 2018

2. City Strategy Development Process

The WMSAP of Negombo 2020–2030 was developed through a quick study, a series of consultative meetings including local ward meetings, technical meetings and large-scale strategy formulation workshops with the aim of addressing the actual waste management problem on the ground, as well as building consensus among all the stakeholders on the goals and actions of the strategy. A further aim of this consultative process of strategy formulation was to create a sense of ownership among Negombo citizens for the city strategy. Figure 2 shows the key steps taken in preparing Negombo’s WMSAP between March 2018 and January 2020.

At first, an inception meeting was co-organised by NMC and CCET inviting all the key stakeholders in January 2019, followed by a series of ward meetings with local citizens in February 2019 (Singh et al., 2019) (a). Further, a quick study was conducted that included a literature review, data and information collection based on a field study and observation of waste management system and facilities, ward meetings with local citizens and ward leaders, and interviews with relevant NMC officials and other stakeholders. A draft status report was drawn up in March 2019 and published in December 2019, which covered the City’s current waste management system along with gaps and challenges to be addressed in future strategies (Karunarathana et al., 2019).

A two-day multi stakeholder consultation workshop was held in July 2019, attended by over 60 participants representing national and regional ministries, relevant departments of NMC, private sectors, academic institutions, non-governmental organisations (NGOs), community groups, neighbouring and some selected cities from Sri Lanka (CCET, 2019). The gaps in and challenges for the current waste management were presented during the workshop in line with the

findings from the drafted status report on waste management in Negombo. Some of the invited cities such as Kandy, Morotuwa and Dompe, and a waste sector NGO, HELP-O and Janathakshan presented their good practices on waste management as inputs to the strategy development process. The workshop involved active discussions on the current waste management system including gaps and key challenges, identification of vision, mission, practical goals, indicators, targets and actions to overcome those challenges with the aim of moving towards a sustainable and resource efficient society.

Based on the above workshop, a first draft of the city strategy was drawn up in August 2019. A technical meeting was then organised by NMC and CCET in September 2019 to discuss the contents of the city strategy and receive feedback from the technical committee members, based on which the city strategy was further revised. The technical committee included members from relevant ministries and institutions such as Ministry of Environment and Wildlife Resources (MoE&WL), Central Environment Authority (CEA), Waste Management Authority (Western Province), National Solid Waste Management Support Centre (NSWMSA) and Ministry of Megapolis and Western Development (MoMWD). The final draft was then presented at the final city workshop in Negombo in January 2020, inviting the Mayor and Commissioner of Negombo City, officials from relevant ministries and NMC, academic institutions, civil society, NGOs and private sectors for their feedback, based on which the city strategy is to be finalised for submission to the NMC (CCET, 2020).

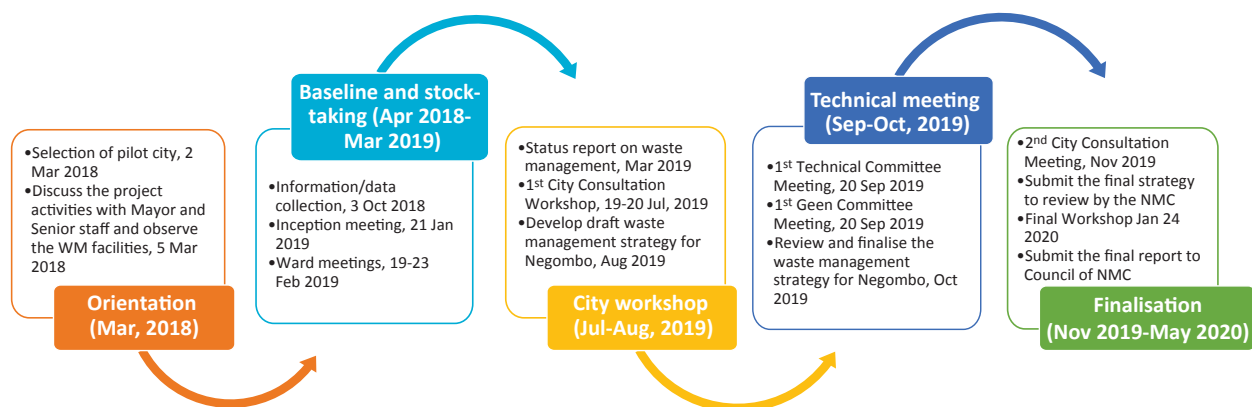


Figure 2: Key steps in developing Negombo's city strategy

Source: CCET, 2020



Figure 3: Photos of meetings, workshops and data collection during development of Negombo's city strategy

Source: CCET, 2018-2019

3. Waste Management Gaps and Challenges – Where We are Now

3.1. Overview

Negombo is a major coastal city in Gampaha District, Western Province of Sri Lanka, 35 km north of Colombo along the Colombo-Puttalam Highway. Its centre lies 7 km away from the Katunayake Bandaranayke International Airport and Free Trade

Zone. It is also a major commercial and transport hub, as well as educational facilitator and health service provider for the region, as it has good rail and road network links with Gampaha District. Table 1 below gives the basic facts on NMC.

Table 1: Basic information on Negombo Municipal Council

| Item | Description |
|------------------------------|--|
| Province | Western Province of Sri Lanka |
| District | Gampaha |
| Local Authority Status | Municipal Council |
| Location | Negombo is situated about 35 km from Colombo, and 25 km from Gampaha (capital of Gampaha District) |
| Climate | 27.8 °C average annual temperature 2500 mm average annual rainfall Elevation 0~3 m above MSL |
| Extent of the Authority Area | 30.8 sq.km |
| No. of Council Wards | 29 |
| No. of Council Members | 48 |
| No. of families | 38,991 |
| Population (MC records) | 161, 484 (~ 100,000 daily floating population) |
| Average Population Density | 52.42 persons/ha |
| Major economic activities | Fisheries, tourism, commerce, services (education & medical) |

Source: Department of Census & Statistics, 2018

3.2. Current status of waste management

A previous estimate of the daily amount of waste generated within the NMC area was 157.68 metric tonnes a day (MT/D) (Japan International Cooperation Agency, 2003, North Western SWM Action Committee, 2008), which gives an average household waste generation rate of 0.62kg/person/day (derived from direct measurement based on a household survey (Japan International Cooperation Agency, 2003)).

The figure is only an approximation and does not take into account changes in consumption patterns over the last 17 years. Of the total waste generated, 63.9%, or 100.77 MT/D, is derived from households, giving an overall average waste generation rate of 0.9764 kg/person/day, which includes household waste, institutional waste, commercial waste, and other waste shown. The amount of commercial waste generated is 17.52 MT/D (11% of MSW), which gives a

general commercial waste generation rate of 9.65kg/enterprise/day. These quantities were extrapolated from survey data for a mixture of large and small waste generators within the commercial areas of several cities (Japan International Cooperation Agency, 2003; North Western SWM Action Committee, 2008), together with NMC statistics for the total number of business centres. The figure for market and daily fair (Pola) waste generation, 11.85 MT/D, or 7.5% of MSW, is based on estimates for each of the markets and Polas within NMC and equates to

a market waste generation rate of 6.7kg/stall/day. The amount of hazardous waste from households and commercial establishments is relatively small, comprising typical everyday items such as spray cans, batteries, fluorescent tubes and razor blades) which are disposed in normal garbage. Table 2 below gives estimates of waste from the different generation sources described above and Figure 4 shows the contribution of different sectors to overall waste generation in NMC areas.

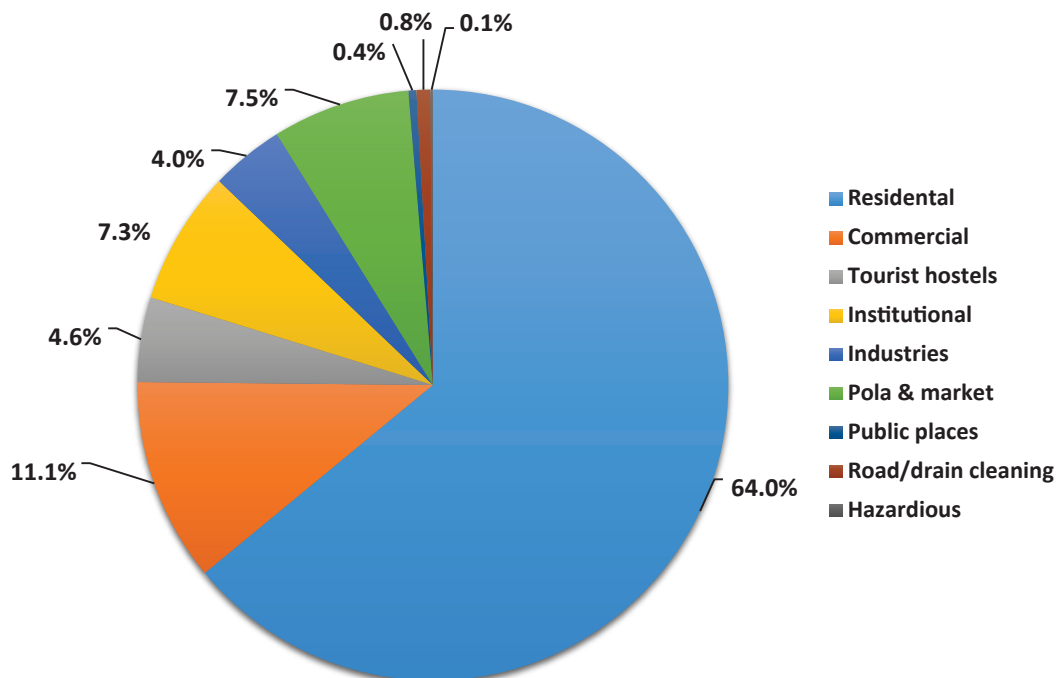


Figure 4: Contribution of different sectors to overall waste generation in NMC areas
Source: Karunarithana et al., 2019

3.2.1. Waste stream and flow

Field investigation results into the proportions of waste being disposed of on-site by burning or burying within the generator's premises ("Onsite disposal" in Table 2), discharged for collection, directly hauled

to landfill, composted on-site, sold or discharged to NMC collection for recycling by waste generators ("Recycling" in Table 2) at source or illegally dumped in unauthorised places ("Illegal disposal" in Table 2) are tabulated in Table 2 and also illustrated in Figure 5.

Table 2: Estimated waste stream flow

| Category | Amount generated | NMC collection | | Onsite disposal | | Onsite composting | | Recycling | | Illegal disposal | |
|----------------|------------------|----------------|------|-----------------|------|-------------------|------|-----------|------|------------------|------|
| | (MT/D) | % | MT/D | % | MT/D | % | MT/D | % | MT/D | % | MT/D |
| Residential | 100.77 | 31.0 | 31.2 | 48.9 | 49.3 | 6.0 | 6.0 | 3.4 | 3.4 | 10.7 | 10.8 |
| Commercial | 17.52 | 92.1 | 16.1 | 4.2 | 0.7 | 0.0 | 0.0 | 3.7 | 0.7 | 0.0 | 0.0 |
| Tourist hotels | 7.29 | 37.1 | 2.7 | 12.2 | 0.9 | 0.5 | 0.0 | 50.2 | 3.7 | 0.0 | 0.0 |
| Institutions | 11.54 | 73.1 | 8.4 | 22.1 | 2.6 | 0.0 | 0.0 | 4.8 | 0.6 | 0.0 | 0.0 |
| Industries | 6.33 | 5.2 | 0.3 | 40.4 | 2.6 | 1.8 | 0.1 | 50.0 | 3.2 | 2.6 | 0.2 |
| Pola & Markets | 11.85 | 75.5 | 8.9 | 23.3 | 2.8 | 0.0 | 0.0 | 1.2 | 0.1 | 0.0 | 0.0 |
| Public places | 0.69 | 100.0 | 0.7 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Drain cleaning | 1.20 | 100.0 | 1.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Hazardous | 0.20 | 100.0 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| TOTAL | 157.68 | | 69.9 | | 58.8 | | 6.2 | | 9.7 | | 10.9 |

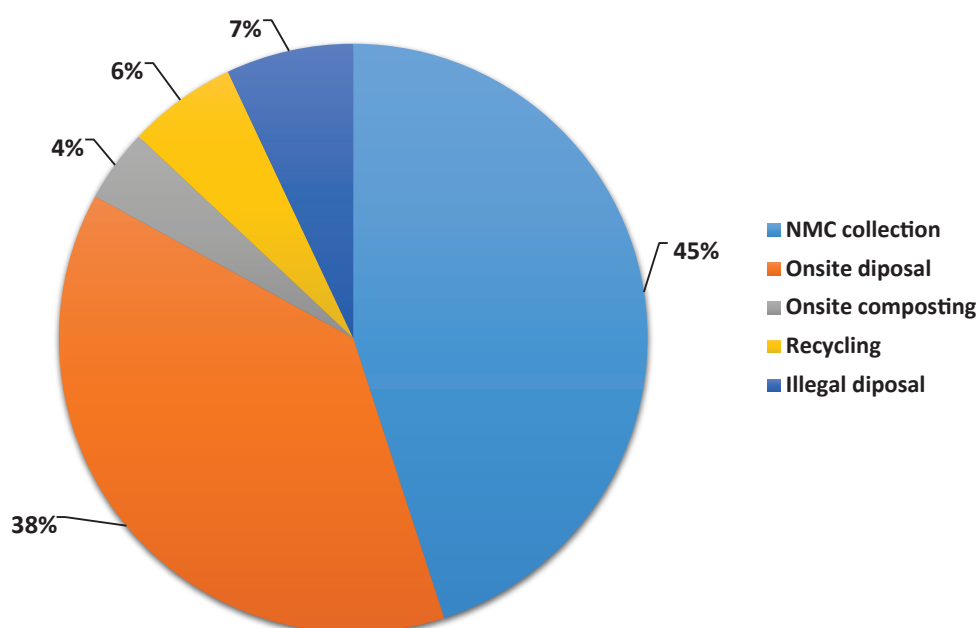


Figure 5: Contribution of different sectors in Negombo's waste stream

Source: Karunarathana et al., 2019

3.2.2. Municipal solid waste composition

Waste composition data and statistics are not readily available in NMC; however, a study was conducted in 2002 by Japan International Cooperation Agency (JICA) study team as shown in the following Figure 6, which

shows the composition of MSW using samples from waste collection trucks at the Ovitiyawatta dumpsite. Definitions of each waste category is explained in Table 3.

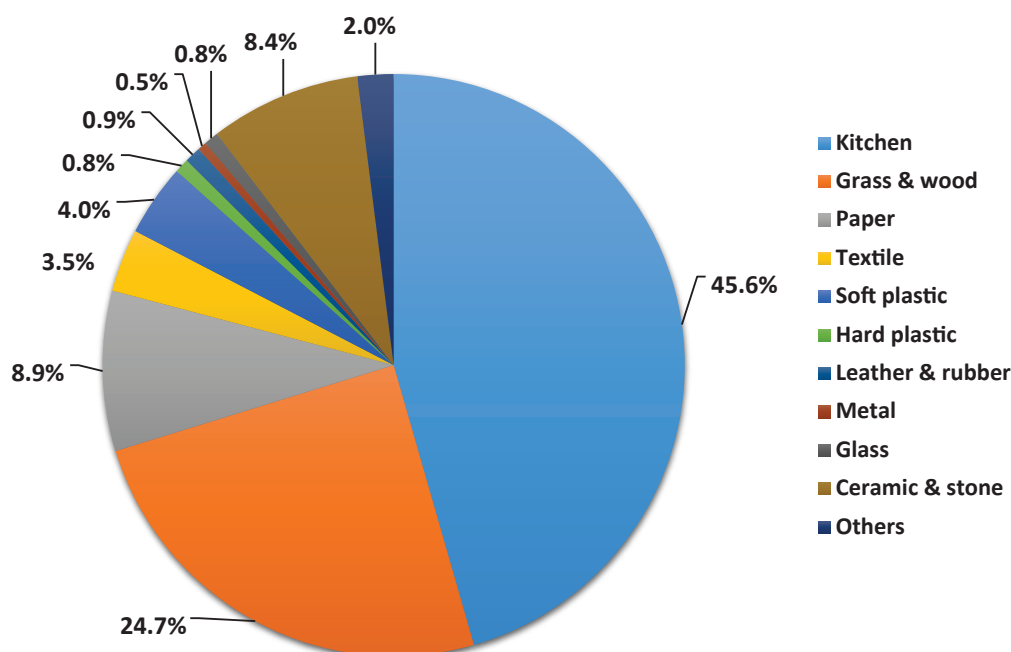


Figure 6: Composition of MSW disposed at Ovitiyawatta dumpsite, Negombo MC
Source: Japan International Cooperation Agency, 2003

Table 3: Waste generation sources and definitions of waste

| Source | Description |
|-----------------------------|--|
| Household | Waste generated from domestic activities, including food preparation, cleaning, swill, backyard sweeping, gardening and other miscellaneous household wastes (e.g., old clothing) |
| Commercial | Waste generated by trade, services, processing and production enterprises [Excluding hotels, markets and industries] |
| Hotels | Waste produced by tourist hotels, lodges and rest houses within the city |
| Markets | Waste from markets selling a high proportion of vegetables, fruit, meat and/or fish (e.g., central market, fish market, Lellama), including the Pola (daily fairs) held at various locations inside the NMC |
| Institutions | Waste from schools, other education centres, hospitals, central and provincial government offices, police stations, prisons and religious institutions [Hospital waste includes some hazardous items as discussed further under hazardous/special waste and later in this report] |
| Industries | Waste from major or minor industries such as sawmills and other industries |
| Construction and demolition | Waste originating from construction, refurbishing and demolition activities, etc. This waste is not usually handled by NMC but is collected and disposed of by the contractors involved. Typically, it is used as clean fill in other sites or in low-lying areas, hence is not considered further in this study |
| Hazardous (Special) | Hazardous waste originating from various sources, including household items (e.g. batteries, spray cans). These waste items are described separately by category, as appropriate |
| Other | Sweeping and other waste from public parks and beach parks. Beach litter collected by the Hotel Association tractor. Road/drain cleaning waste, collected by NMC handcart labourers |

3.3. Policies and legal framework

The first piece of legislation pertaining to waste management in Sri Lanka was introduced in 1862 when the country was under British colonial rule. The first law was implemented through the Nuisances Ordinance (15 of 1862), which was subsequently amended (61 of 1939; 3 of 1946; 57 of 1946). This Ordinance empowered the city government and government sanitary inspectors to inspect, regulate and control public nuisances, in particular inappropriate garbage disposal. Several key functions of the Ordinance are still in force, where powers are enforced by the Public Health Inspector (PHI). The remainder of the legislations were introduced in 1939 and 1947 through the Urban Council Act and Municipal Council Act, respectively. However, during the establishment of Provincial Councils in 1987,

most of the political administrative legislations were amended and reformed.

At present in Sri Lanka, the basic legal framework required for municipal solid waste management (MSWM) is provided under an umbrella of Central Government, Provincial Council (PC) and Local Authority (LA) regulations and legislations. The 13th Amendment to the constitution (1987) and the Provincial Councils Act No. 42 of 1987, Sections 129, 130 and 131 of the Municipal Councils Ordinance (1980), Sections 118, 119 and 120 of the Urban Councils Ordinance, No. 61 of 1989, Sections 41 and 93 to 95 of the Pradeshiya Saba Act, No. 15 of 1987 are the key pieces of legislation pertaining to waste management in local authorities (Karunarathana et al., 2019).

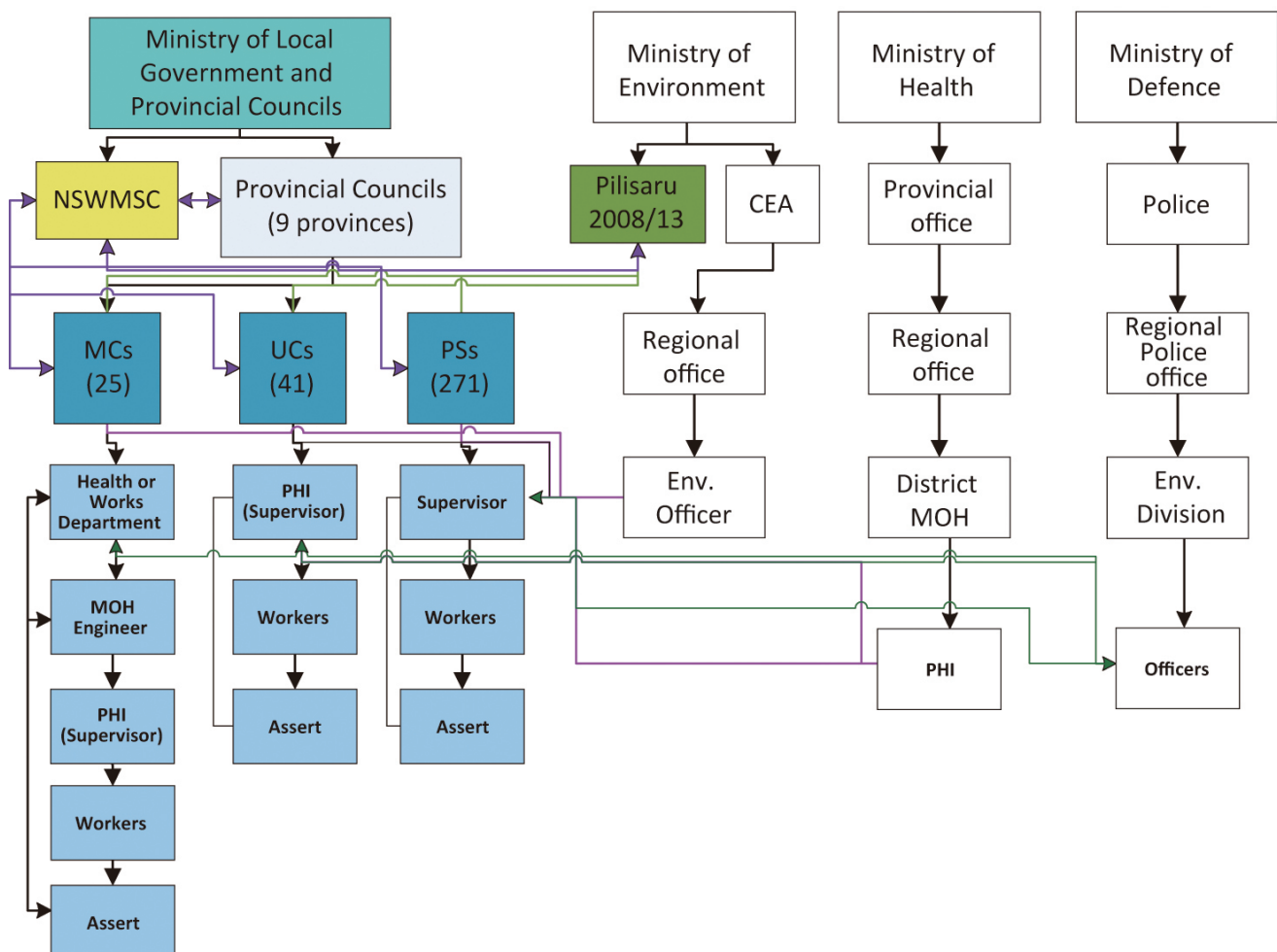


Figure 7: Institutional framework for MSW management in Sri Lanka

According to the MC Ordinance, the Urban Councils Ordinance and the Pradeshiya Sabha Act, all MSW generated within the boundary of LAs is their property, and they are mandated to remove and dispose of such waste materials without causing any nuisance to the public. These government enactments provided the provisions and regulations for selecting suitable sites for the waste processing and disposal and providing development assistance within the legal and regulatory framework.

The MC Ordinance specified that it is the responsibility of the MC to ensure that streets are kept clean, hygienic and free of curbside refuse. It further states that the MC is responsible for collecting waste disposed from residences, and emphasises that the waste collected needs to be disposed of in a suitable manner. Therefore, it is vital for the NMC to collect all solid waste at the household level in an organised manner with a comprehensive waste collection plan to include households that do not receive waste collection services currently. MCs are also mandated to remove and dispose of such waste materials without causing any nuisance to the public. These government enactments provide the provisions and regulations for selecting suitable sites for waste processing and disposal and assisting with development within the legal and regulatory framework.

At national level, the Ministry of Internal & Home Affairs and Provincial Councils & Local Government is responsible for policies and implementation of plans concerning LAs. The Ministry of Environment and Wildlife Resources (MoE&WL) is responsible for formulation of national-level policies for solid waste management whereas practical regulatory control and management are undertaken by the CEA. The Ministry of Megapolis and Western Development (MoMWD) is a new ministry appointed by the Cabinet of Sri Lanka after August 2015 elections and it is responsible for planning for the megapolis development. Likewise, Ministry of Health, Nutrition, and Indigenous Medicine (MoH) is responsible for providing and leading the

administrative guidance from the perspective of health and sanitation.

Institutional setup in NMC

The Health Department of NMC is responsible for waste management in Negombo City. Specific responsibilities include:

- Collection of MSW within NMC, including planning of collection routes and daily scheduling of garbage collection vehicles
- Cleaning and garbage removal from public markets and public places
- Septic tank and toilet emptying services (public places, households, commercial, institutions, etc.)
- Street and drain cleaning
- Collection of any SWM fees levied for services provided
- Enforcement of local ordinances and national laws related to SWM
- Implementation of policies relating to waste minimisation, recycling, public education/awareness, etc.
- Transportation of collected MSW to final disposal site
- Operation and management of existing final disposal site at Ovitiyawatta

Since 2002, waste collection and transportation from Thalahena and Kochchikade zones as well as overall management of the Ovitiyawatta disposal site have been transferred to a private company. However, since January 2019 the private company has limited the area for collection to Thalahena.

The waste management organisational structure (as of February 2019) is described below:

- The Council, Mayor, and deputy Mayor make up the governing authority of the municipality. The Commissioner and Deputy Commissioner are responsible for execution of policies, actions and overall administration of council revenue, properties and human resources.

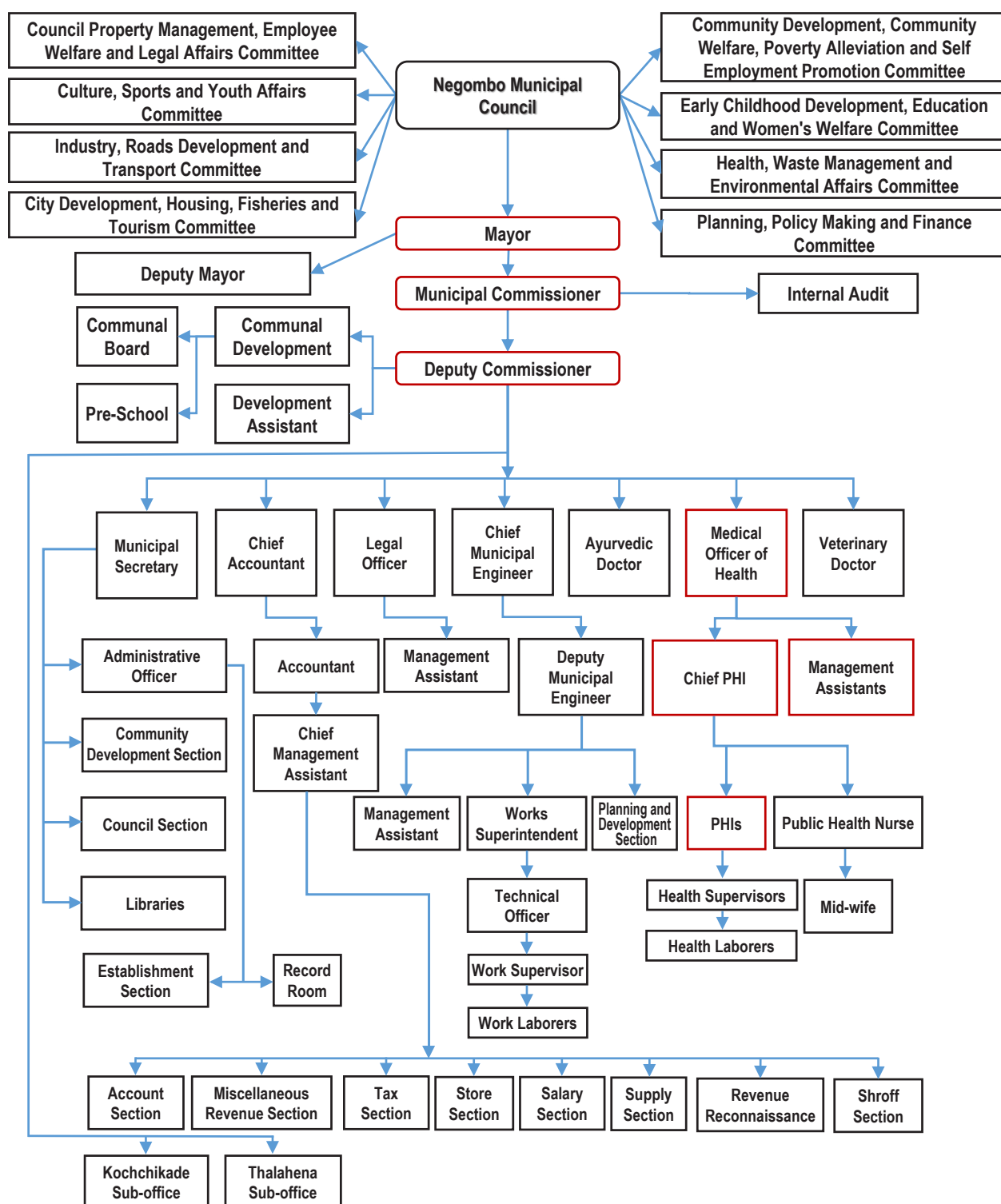


Figure 8: Organisation chart of Negombo Municipal Council

- The Chairman and Health Committee serve as an advisory committee to the Council, dealing with all health issues, including SWM. It comprises six Council members, while the Medical Officer of Health (MOH) and PHIs also usually attend the meeting.
- The Chief Executive Officer of the health department is the Chief Medical Officer of Health (CMOH), a position held by an officer of the Government Medical Service (Medical

Doctors). The Chief Public Health Inspector (CPHI) has overall responsibility for all waste management activities of NMC, including SWM. At the next organisational level are 12 Public Health Inspectors, each responsible for different waste management activities and areas of the city, as shown in Figure 8. Beneath them are 20 supervisors, 33 drivers and 340 labourers (197 permanent, 143 temporary), who are assigned to different areas, as well as three administrative staff (Chief Clerk and two Clerks). However, tasks related to SWM form only a part of their duties, as maintenance of health and sanitation in the city, disease prevention, public awareness on health related issues, operation of health clinics and safeguarding of worker health also come under the health department responsibilities.

The waste collection and all related works are administrated under the health department of the municipality, which is structured in terms of command chain as shown in Figure 8.

3.4. Overview of major challenges

Following are the key problems and associated issues related to SWM as currently experienced by the citizens, officials, elected councillors and workers of NMC, as identified during the consultations and studies (Negombo Municipal Council, 2018; Negombo Municipal Council, 2019 Japan International Cooperation Agency, 2016) and Consulting Engineers and Architects Associated (Pvt.) Ltd., 2016.

3.4.1. Increment in waste volume and type of waste

Due to growing population, urbanisation and tourism, the waste volume and type of waste is increasing in Negombo city with time. As shown in figure 6, more than 60% of generated waste in Negombo is organic waste where most of the organic waste is dumped into the landfill site except about 6-8 MT per day is used for compost making. Further, the city also

generates various hazardous waste, electronic waste, medical waste and Construction and Demolition (C&D) waste. Negombo city is one of the tourist destination and it also have fishing community. Followings are some specific waste management issues the city is facing:

- Lack of segregation of waste at source
- No available solution for hazardous waste and electronic waste
- No proper solution for fish waste from market and processing industries, and fibre waste from boat yards
- Increment of waste volume and littering due to floating population of 100,000 daily
- Lack of collection strategy for waste such as Construction and Demolition (C&D) waste

3.4.2. Inefficient operations of existing resource recovery facilities (composting and recyclable collection)

NMC operates a resource recovery centre where a proportion of the recyclable material such as plastics, paper and metal are separated. It serves as a resource recovery station and the separated material is sold to recyclers. The existing composting facility, located in a dense residential area, has limited capacity for expansion or processing of problematic waste such as food & market waste. Gap analysis of these resource recovery operations revealed that the source segregation has low efficacy, meaning many of the recoverable resources end up at the dumpsite. Specific issues identified related to this are as follows:

- Lack of information on informal collection of recyclable materials
- Sorting operations at the resource recovery centre carried out by hand, which is time/labour inefficient
- Potential for health problems among workers due to manual sorting
- Established in a residential area
- Limited capacity for expansion

- Lack of information on informal recycling flows

3.4.3. Lack of environmentally sound final disposal facilities

The final disposal system used by the NMC is an open dumping on private land. The site has been used for many years and its remaining capacity is limited to approximately 2.5 acres (about 0.1 square kilometre), which is considered to cover the next 3–5 years in a best-case scenario. The NMC is challenged in terms of expansion and development as the land is leased from a private owner, and there is a lack of land necessary for developing the landfill facility. Specific issues identified related to this are as follows:

- Difficulties in processing problematic wastes such as food & market waste
- Unsanitary nature of open dumping, given its close proximity to a fresh water source
- Dumpsite almost at maximum capacity, presenting the challenge of securing sufficient alternative land for disposal in the near future
- Contamination of groundwater table and adjoining river, due to outflow of leachate
- Odour in the surrounding area
- Dumpsite provides breeding ground for mosquitos and other harmful insects
- Severely degraded eco system due to open dumping (e.g., dying trees)
- Challenges regarding expansion and development due to leased land from private sector
- Lack of proper strategy/solutions for hazardous wastes such as batteries and electronics

3.4.4. Shortage of physical resources to engage in waste collection

Four-wheel tractors and hand carts are mostly used by the NMC for primary collection of solid waste at present. There are 26 tractors, 20 hand carts, 4 compactors and a beach cleaning machine as physical resources available for primary waste collection in the NMC. Frequent repairs of these vehicles hinder the collection of waste, and proper transfer

station facilities are not available, causing delays in transferring the waste to the final disposal site. As per the Gap Analysis report, the waste collection operations are planned according to availability of the vehicles rather than scientifically pre-determined routes. This shortage of physical resources is the main hindrance to waste collection operations within the NMC. Specific issues identified related to this are as follows:

- Incomplete coverage of waste collection areas
- Shortage of transport vehicles and labours in the municipal service
- Frequent machinery breakdowns
- Improper functioning of bell collection system in wards
- Delays in transporting waste, especially in Thalahena zone, due to lack of transfer stations
- Inefficient manual sorting of recyclables at the resource recovery centre (in terms of time and labour resources)

3.4.5. Poor labour management and labour related issues

Both male and female workers from health department are engaged in MSWM. The highest administrative officer at NMC, the commissioner is a female. Of the 400 staff engaged in SWM, mainly for primary collection of waste across the city, about 90% are classified as sanitary workers and 35% (143) as temporary staff, as they are directly hired and paid by the NMC. Sweeping of streets and public places, waste sorting at recycling facility, general cleaning works in public places are the major duties allocated to female laborers. Generally, NMC does not assign heavy duties such as waste loading, unloading, machine operation, and travel on collection to female workers. However, both male and female workers in contract crew and permanent cadre are equally paid and entitle for all other job benefits irrespective of their gender. Nevertheless, human resource management of the sanitary workers is often challenging for the NMC as supervisors often lack the necessary managerial skills.

Specific issues identified related to this are as follows:

- Poor labour management, with absenteeism at around 15–20%; some labours suffer from poor health and/or work under the influence of alcohol
- Low daily wage for collectors and low job motivation, which creates recruitment challenge
- Potential for generating health issues among workers due to manual sorting
- High male labour absenteeism during the fishing season due to availability of better paid daily works during fishing season in fish market (*Lellama*) and associated activities.
- Poor attendance among female contract workers during festive seasons such as Christmas, church ceremonies, New Year due to their involvement in many households and community activities.

3.4.6. Lack of long term approaches for addressing SWM

At present, the NMC lacks both a long-term plan and approach to address SWM issues. The elected council of the NMC, which is vested with the mandate of delivering solid waste management services in the city, adopts a ‘fire–fighting’ approach in waste management, meaning it addresses the urgent issues affecting collection for final disposal of waste collected daily. The NMC leadership, although displaying a high level of interest and commitment in long term plans for SWM, lacks the necessary visionary approach needed to address SWM due to limitations in knowledge and skills.

3.4.7. Weak organisational capacity for effective planning and execution of solid waste management

At present, the Health Department of NMC is responsible for waste management in Negombo city, which is headed by the Medical Officer of Health, and waste management operations are directed by the Chief Public Health Inspector. A team of about 400 members is directly engaged in waste management,

mainly waste collection operations in NMC. Some specific issues that can be linked with weak organisational capacity are listed below:

- Significance of SWM within NMC not reflected in current SWM management structure
- Shortage of senior staff dedicated to SWM works; due to the inter-disciplinary nature of SWM, this presents a challenge for handling solely by one person
- Unsafe work environment, due to usage of inappropriate waste handling methods and equipment by workers
- Lack of monitoring mechanisms for managing waste, including recycling programmes

3.4.8. Insufficient financial planning capacities to support effective SWM

Of the revenue generated by the NMC over the last three years, 17–24%, or around Rs 110 Million for solid waste management in addition to about Rs 20 Million from a Central Government fund, is allocated to salaries for permanent staff engaged in SWM. Most of the recurrent expenditures by the NMC in terms of capital requirements are not covered by the revenue stream currently in operation. This situation could worsen if the Central government fund allocated for the permanent staff is reduced further. Problems are exacerbated by the traditional methods of accounting, data collection and data management practiced by the NMC due to which expenditure related to SWM cannot be accurately determined for efficient future financial planning on SWM.

3.4.9. Weak regulatory environment for SWM

It is clear that the mandate of NMC to regulate solid waste management in the city needs to be enforced through proper policies and regulations. Creating and passing of bylaws by the NMC is a crucial first step towards enforcing effective regulations related to better SWM in the city. Though the Western Province

Waste Management Authority passed a statute on SWM and clauses can be enforced by every LA in the province, NMC needs to prepare bylaws regarding many specific requirements not covered by the Statute or any other standard bylaws issued by the Province. Some of the bylaws the NMC could prepare and enforce are listed below:

- Empowering the Green Committees for effective NMC-citizen collaboration
- Managing the waste in the NMC and affiliated offices
- Promoting resource recovery through segregation at source and recycling
- Enforcing regulations in new constructions for better SWM
- Coordinated efforts with stakeholders of SWM at national, provincial and local levels

3.4.10. Improper practices of waste handling by citizens and institutions

Citizens of the NMC engage in illegal dumping and non-segregation of perishable and non-perishable wastes, which creates difficulties for proper collection and transportation of waste. Though the younger generation receives education from schools on good practices in SWM, the majority of the community needs to have a higher level of awareness to reduce illegal dumping and increase segregation of waste at source. Specific issues identified related to this are as follows:

- Much garden and building waste is discharged at the roadside, collection points or on vacant land; burning of garden waste is also prevalent
- Degradation of the lagoon and sea, valuable assets for Negombo, due to illegal dumping
- Blocked drains due to garbage in drain water; generation of bad odour from drains, which also act as breeding grounds for mosquitoes and other insects
- Illegal waste dumping on roads and surroundings from non-residents, which pollutes the environment

- Waste placed for collection outside after collection vehicle times
- Garbage disposed of at graveyard, beach and sea locations
- Garbage being scattered in streets due to feral dogs
- Requests to PHI to provide common bins with covers
- Disposal of waste on roads by butchers
- The need to prioritise mangrove tree protection due to the volume of garbage washed into the lagoon through canals
- High proportion of recoverable resources left remaining at the dumpsite due to inadequate source segregation

3.4.11. Lack of awareness among citizens on good waste management practices

Due to a lack of awareness, citizens engage in improper waste management practices, as evidenced in the Gap Analysis report. Some of the relevant issues are listed below:

- Despite availability of collection services in the morning, people were unaware of collection times as collection tractors lack horns or sirens to notify of their presence, thus requests have been made for collection vehicles to be equipped with such
- The tendency for people to receive plastic bags while shopping
- Inadequate public awareness and public participation/cooperation in ensuring better service
- Poor planning of training programmes such as in setting objectives, adult training principles
- Inappropriate design and development of training materials
- Low usage of mass/electronic media in information dissemination
- Lack of proper recordings of training programmes conducted

4. Moving Forward – A Waste Management Strategy

4.1. Development of Waste Management Strategy and Action Plan

In order to address the above challenges, NMC has developed a WMSAP 2020–2030 for Negombo, to establish a resource recycling, financially sustainable and environmentally sound waste management system in Negombo City. WMSAP includes short-term targets to be achieved during the period of 2020–2022, mid-term targets by 2023–2025 and long-term targets by 2026–2030. In addition, WMSAP includes a comprehensive list of actions, goals and implementation directives based on the quick study and series of workshops and meetings on strategy development.

4.2. Guiding principles

The development of a solid waste management strategy should embed with proven and innovative concepts and such can be considered as guiding principles for formulating the strategy for solid waste management in the NMC. Following are the guiding principles for consideration as the cornerstones of the strategy.

4.2.1. Waste management hierarchy

The waste management hierarchy as shown in Figure 9 is widely referred to in promoting the 3Rs concept, or Reduce – Reuse – Recycle. Accordingly, the most preferred option in the waste hierarchy is to prevent the waste being generated at the outset, and the next preferred option is to reduce amounts generated. Likewise, the least preferred option is the final disposal, which should be practiced only after attempting to implement the other preferred strategies, as shown in the following diagram.

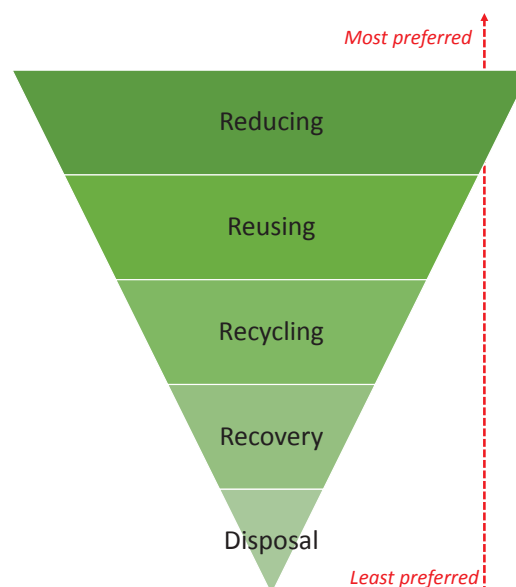


Figure 9: Waste management hierarchy

Source: UNEP (2011)

At present, the lower three least preferred options represent the solid waste management practices of NMC; in particular, over 80% of the average monthly collected waste, or around 1,500 ~ 2,000 MT, ends up with disposal without undergoing much resource recovery. Therefore, the SWM strategy for NMC should consider the Waste Management Hierarchy to plan and execute appropriate interventions.

4.2.2. Focusing the physical and governance aspects of SWM

UN-Habitat makes use of the “two triangles” analytical framework for Integrated Sustainable Waste Management in cities across the world. This framework considers not only the processing and treatment aspects but also governance aspects influencing solid waste management.

The framework covers the following components under the physical and governance aspects of waste management:

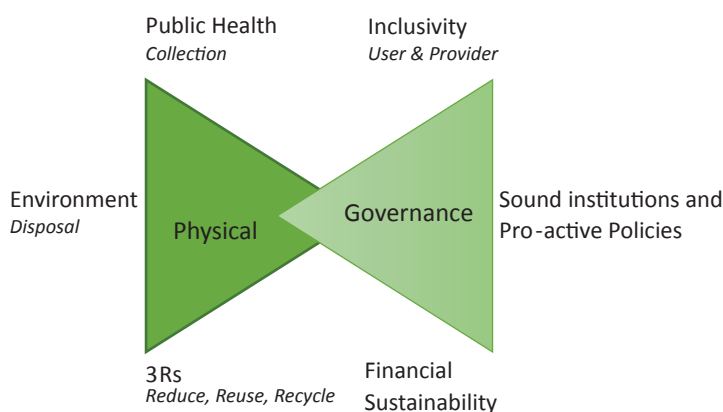


Figure 10: Physical and Governance aspects of SWM

Source: A. Scheinberg et al., 2010

Table 4: Components under the physical and governance aspects of waste management

| Physical Aspects |
|---|
| <ul style="list-style-type: none"> • Waste collection services critical for maintaining public health • Environmentally sound disposal to safeguard environmental concerns • Concept of waste hierarchy to address economic value of resources and resource depletion concerns |
| Governance Aspects |
| <ul style="list-style-type: none"> • Inclusivity, covering users and providers of services • Financial sustainability of institutions engaged in SWM services • Sound institutions and proactive policies |

4.2.3. Maximising the potential of Local Authorities

The Local Authorities (LAs) of Sri Lanka are vested with the mandate of ensuring public health and convenience of citizens and are the responsible authority for public health under prevailing laws. The responsibility of solid waste management lies with the LAs, all 341 of which engage in waste management in Sri Lanka, although the amount of waste handled differs vastly across the LAs. While the current political economy of devolution in Sri Lanka undermines the functions of LAs, it is critical to engage with a DO NO HARM approach in developing the strategy for SWM in NMC. In relation to this, some of the factors to be considered are listed below:

- Engagement of political leadership of the NMC and acknowledgement of their legitimate role in SWM, especially in a multi-stakeholder environment
- Effective use of revenue of the NMC for SWM should be promoted by analysing past trends in finances for SWM. This could be used to educate the political leadership to take decisions on the extent of revenue contributing to implementing the SWM strategy
- Provincial authorities, especially the Department of Local Government of Western Province play

a major role in guiding and supervising LAs. Engagement of the relevant staff from the Provincial authorities is crucial for successful implementation of the strategy

4.2.4. Collaborative stakeholder engagement

Stakeholders at the National, Provincial and Local levels should be engaged in developing the strategy, and the roles and responsibilities of these stakeholders in implementation of the strategy should be clearly defined. With this reason, all key stakeholders, including community groups, are identified and engaged in the planning phase of this strategy development. It is important to engage women as a key stakeholders as their role is very crucial for development of practical waste management strategy and implementation plan. The implementation plan will assign roles and responsibilities of these stakeholders during the implementation of the programmes in line with the strategy. It is the duty of the NMC to encourage participation from the private sector for effective SWM in the city; in particular, the tourism sector (hoteliers, local guides, etc.) can play a definite role in assisting the NMC to create a conducive environment for tourism.

5. Setting Strategic Goals, Objectives and Targets – Moving towards a Zero Waste City

5.1. Vision

The vision and mission statement for SWM are given below:

Clean environment – Healthy green city

5.2. Mission

Providing a better service to the people of Negombo city by conserving the natural beauty and historical value of the city, by adopting optimum solid waste management practices through public participation, mobilisation and conforming to the rules and regulations.

5.3. Goals

Considering the above-mentioned key problems described in Section 3.4, following are the goals anticipated to be achieved through the Strategy of SWM in NMC.

- Goal 1: Improve the collection of all types of wastes to keep the environment clean and green
- Goal 2: Ensure all types of solid wastes generated are disposed of in environmentally sound and socially acceptable manner
- Goal 3: Maximise resource recovery of wastes generated while promoting 3R principles across the city
- Goal 4: Ensure citizen engagement for waste prevention and effective solid waste management through public outreach

programmes and creating opportunities for engagement

- Goal 5: Enhance financial sustainability of NMC to manage solid waste effectively
- Goal 6: Improve organisational capacity with appropriate regulations for managing solid waste in NMC

The proposed actions under the Strategy of SWM in the NMC will focus on six thematic areas corresponding to the Goals this strategy intends to achieve and which are crucial for improving the solid waste management situation in NMC. Below are the six pillars of core intervention areas as formulated in the strategy.

5.4. Targets

The strategy for SWM in NMC is aimed at achieving the following targets under each of the Goals during the period of 2020–2030. The rationale for deciding the timeline for the strategy is given under Section 5.5.1.



Figure 11: Six pillars considered during strategy formulation.

Table 5: Targets to be achieved under each goals during the period of 2020-2030

| Goal | End Target | Target | | |
|---|--|--|--|--|
| | | Short Term (2020–2022) | Medium Term (2023–2025) | Long Term (2026–2030) |
| 1. Improving collection of all types of waste to keep the environment clean and green as well as improve the state of public health | <ul style="list-style-type: none"> 100% segregation of waste at source 100% waste collection coverage, including poor and marginalised communities | 3 wards 70% | 15 wards 90% | 29 wards 100% |
| 2. Ensure all types of solid wastes generated are disposed of in environmentally sound, economically viable and socially acceptable manner to protect environment and reduce climate change impacts | <ul style="list-style-type: none"> 100% safe disposal of all collected waste 100% cessation of open burning and open dumping | 3 wards 3 wards | 15 wards 15 wards | 29 wards 29 wards |
| 3. Maximising the resource recovery of waste generated while promoting 3R (reduce, reuse and recycling) principles across the city | <ul style="list-style-type: none"> Maximum resource recovery from organic and dry/ recyclable waste | 35% (Organic waste: 15%, Inorganic waste: 20%) | 60% (Organic waste: 35%, Inorganic waste: 25%) | 90% (Organic waste: 60%, Inorganic waste: 30%) |
| 4. Ensure citizen engagement for waste prevention and effective solid waste management through public outreach programmes and creating opportunities for engagement | <ul style="list-style-type: none"> Maximum engagement of citizens for SWM Maximum level of waste reduction from the collection of waste by 2030 (baseline 2020) Reduction of waste related crimes to zero compared to 2020 (illegal dumping, etc.) | 50% 10% 50% | 80% 15% 75% | 100% 25% 100% |
| 5. Enhance the financial sustainability of the NMC to manage solid waste effectively | <ul style="list-style-type: none"> At least 25% reduction in unit cost for waste collection by 2030 (baseline 2020) About 50% of the cost of SWM is covered by revenue from SWM in 2030 (baseline 2020) Introduce Polluter-Pays-Principle/Extended Producer Responsibility (EPR) Introduce Public-Private and Community Partnership models | 10% 20% 2 cases 1 model | 15% 40% 5 cases 3 models | 25% 50% 10 cases 6 models |
| 6. Improve organisational capacity with appropriate regulations for managing solid waste in NMC | <ul style="list-style-type: none"> Approval of at least 10 bylaws and regulations Adoption of at least 5 SMW related internal policies Zero complaints on SWM from citizens Zero complaints from sanitary workers | 2 1 Reduction by 40% Reduction by 40% | 5 3 Reduction by 75% Reduction by 75% | 10 5 Reduction by 100% Reduction by 75% |

5.5. Proposed actions

5.5.1. Timeframe and its rationale

The actions proposed under the strategy for SWM in the NMC will be implemented during the period of

2020–2030, as per the consensus of the stakeholders engaged in the strategy formulation. The actions will be categorised under the timelines shown in the diagram;



Figure 12: Timelines for short-term, medium-term and long-term actions under the strategy

Rationale for proposing the timelines:

- Long term actions will focus on the increasing trends of waste generation along with the rising population, both residential and floating, in line with urbanisation due to the impact of major projects such as Western Megapolis Development Plan (Urban Development Authority, 2018).
- The timeline of the Western Province Solid Waste Management Master Plan of the Waste Management Authority of the Western Province ends in 2022, so the priority activities identified by this action plan can be complemented to the Western Province Solid Waste Management Master Plan (Negombo Municipal Council and Waste Management Authority of Western Province, 2018).
- The official duration of the existing elected council of the NMC ends in 2022, which will allow the existing council to lead the short term activities. The newly elected council to assume duties by 2022 could then review the strategy with a view to it being updated with new medium- and long-term actions.
- The proposed time period allows the medium- and long-term actions to be revised in light of potential new innovations in the future after assessing the performance of implementation of short-term actions up to 2022.
- Addressing the issues related to solid waste management is crucial for successful achievement of the sustainable development goals (SDGs) by 2030. As most of the 17 SDGs are directly linked to solid waste management, waste properly managed by cities facilitates successful achievement of SDGs. Some examples of SDGs linked to solid waste management are listed below:
 - SDG 12 focuses on responsible consumption patterns by citizens, which favours environmentally friendly disposal.
 - SDG 14 advocates for conservation and sustainable use of the oceans, seas and marine resources for sustainable development. This is only possible if the solid waste is properly disposed of hence does not reach the oceans.
 - SDG 15 aims to protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss. This cannot be achieved if inappropriate solid waste management leads to pollution of land and forest areas.
 - SDG 3 and SDG 13 focus on good health and wellbeing, and climate action respectively.

The impact of methane and CO₂ from open waste dumps contributes to manmade greenhouse gasses hence influences both of these SDGs.

5.5.2. Strategic goals, key activity and actions

Goal 1: Improving collection of all types of waste to keep the environment clean and green

Key Activity

1.1 Design and carry out a Waste Generation and Generator study

Actions

- Develop Terms of Reference for the study
- Finalise the TOR through a stakeholder consultation
- Council decision on securing the services for the study
- Selection of a service provider
- Finalise the contract
- Mobilise the team to carry out the study
- Share the findings of the study with key stakeholders
- Finalise the study

Key Activity

1.2 Introduce Waste Collection based on waste composition

Actions

- Study the findings of the Waste Generation study
- Develop a waste collection strategy based on waste composition and generators
 - Organic
 - Recyclables
 - Construction and Demolition (C&D)
 - Clinical
 - Others
- Develop a strategy for collection of Special Wastes in the NMC
 - Fish waste from markets and processing industries
 - Fibre waste from boat yards
 - Household hazardous waste

- Electronic waste
- General hazardous waste

- Prepare specific tasks for collection of different wastes as per the strategy
- Carry out a waste generation and generator study
- Segregation of waste at source in all wards
- Introduce metal, paper, plastics, bottles and hazardous waste segregated collection in all wards
- Consultation with the staff of NMC on the strategy for collection of MSW

Key Activity

1.3 Strengthening the collection fleet

Actions

- Introduce periodic fleet maintenance programme
- Repair or discard vehicles
- Assess vehicle requirements

Key Activity

1.4 Improving the waste collection systems

Actions

- Study the existing waste collection routes, especially within the divisions
- Introduce optimised collection routes
- Introduce a tracking system for collection vehicles
- Introduce a mobile Application for sharing waste collection schedules and tracking collection vehicles

Implementation and Monitoring Plan

The implementation plan for the proposed actions under this strategy is shown below with potential timeline for execution of such actions.

Table 6: Implementation plan for the proposed actions under Goal 1

| Key Activity | Specific Task | Short Term | Medium Term | Long Term | Responsible Agencies |
|---|--|------------|-------------|-----------|---|
| 1.1 Design and carry out a Waste Generation and Generator study | Develop Terms of Reference (TOR) for the study | | | | NMC |
| | Finalise the study | | | | |
| | Finalise TOR through stakeholder consultation | | | | NMC |
| | Council decision on securing services for the study | | | | NMC |
| | Selection of a service provider | | | | NMC |
| | Finalise the contract | | | | NMC |
| | Mobilise the team to carry out the study | | | | NMC and relevant institution |
| | Share the findings of the study with key stakeholders | | | | NMC |
| 1.2 Introduce waste collection based on waste composition | Finalise the study | | | | NMC and relevant institution |
| | Study the findings of the Waste Generation study | | | | NMC and relevant institution |
| | Develop a waste collection strategy based on waste composition and generators | | | | NMC and relevant institution/ organisations |
| | Develop a strategy for collection of Special Wastes in the NMC | | | | NMC and relevant institution |
| | Prepare specific tasks for collection of different wastes as per the strategy | | | | NMC |
| | Carry out a waste generation and generator study | | | | NMC and relevant institution/ organisations |
| | Segregation of waste at source in all wards | | | | NMC and ward leaders |
| | Introduce metal, paper, plastics, bottles and hazardous waste segregated collection in all wards | | | | NMC and ward leaders |
| 1.3 Strengthening the collection fleet | Consultation with the staff of NMC on the strategy for collection | | | | Ward leaders |
| | Introduce periodic fleet maintenance programme | | | | NMC |
| | Repair or discard the vehicles | | | | NMC |
| | Assess the vehicle requirements | | | | NMC |

| Key Activity | Specific Task | Short Term | Medium Term | Long Term | Responsible Agencies |
|--|---|------------|-------------|-----------|---|
| 1.4 Improving the waste collection systems | Study the existing waste collection routes | | | | NMC and relevant institution/ organisations |
| | Introduce Optimised Collection Routes | | | | NMC |
| | Introduce Tracking System for collection vehicles | | | | NMC |
| | Introduce a mobile application sharing waste collection schedule and tracking the collection vehicles | | | | NMC |

Goal 2: Ensure all types of solid wastes generated are disposed of in an environmentally sound and socially acceptable manner

Key Activity

2.1 Improving the existing final disposal facility

Actions

- Carry out a social-environmental assessment on the existing disposal site
- Identify and carry out immediate control measures for the site to reduce environmental damage
- Develop a Closure Plan for the existing site, with a monitoring mechanism
- Identify existing options for disposal of hazardous waste

Key Activity

2.2 Feasibility study for long term solutions

Actions

- Prepare a cost-benefit analysis for transporting waste to the Aruvakkallu disposal site and/or constructing a new control or sanitary landfill
- Feasibility study for an incinerator with or without waste to energy facility
- Prepare food waste reduction plan/strategy
- Coordinate with Waste Management Authority (WMA)-Western Province (WP) on preparation and implementation of strategy in line with Master plan for WP.

Implementation and Monitoring Plan

The implementation plan for the proposed actions under this strategy is shown below with potential timeline for execution of such actions.

Table 7: Implementation plan for the proposed actions under Goal 2

| Key Activity | Specific Task | Short Term | Medium Term | Long Term | Responsible Agencies |
|--|---|------------|-------------|-----------|--|
| 2.1 Improving the existing final disposal facility | Carry out a social and environmental assessment on existing disposal site | | | | NMC and relevant institutions/ organisations |
| | Identify and carry out immediate modifications to the site | | | | NMC and relevant institutions/ organisations |
| | Develop a Closure Plan for existing site with monitoring mechanism | | | | NMC and relevant institutions/ organisations |

| Key Activity | Specific Task | Short Term | Medium Term | Long Term | Responsible Agencies |
|---|---|------------|-------------|-----------|----------------------|
| 2.2 Feasibility study for long term solutions | Prepare a cost-benefit analysis for transporting waste to Aruvakkallu disposal site | | | | NMC and WMA |
| | Feasibility study for an incinerator with waste to energy facility | | | | NMC and WMA |
| | Prepare food waste reduction plan/strategy | | | | NMC |

Goal 3: Maximising the resource recovery of waste generated while promoting 3R principles across the city

Key Activity

3.1 Strengthening composting operations

Actions

- Study the operations using cost-benefit analysis for existing composting plant
- Identify a site and develop an implementation plan for setting up the Kawashima composting machine in coordination with WMA-WP
- Study the cost-benefits of bio-gas plants as a solution for managing biodegradable wastes
- Coordinate with WMA-WP and finalise the plan for setting up the biogas plant proposed under the Nationally Appropriate Mitigation Actions (NAMA) Project
- Develop a plan for improving the quality, sales and marketing of compost manufactured, including use of city parks and green areas
- Provide safety kits to workers at the compost site
- Study the feasibility of expanding composting operations at the existing plant and/or adding new composting plants
- Promote home gardens by providing home compost bins to selected households
- Regularise the use of either compost bins or biogas pits to use organic waste for households with premises that are larger than 10 perch (1 perch equals to 25 square meters)

- Study the composting initiatives in the schools at Ja-ela and provide support for implementation in other schools
- Special composting projects for apartments and high-rise buildings should be introduced

Key Activity

3.2 Setting up Resource Recovery Centres

Actions

- Develop a business plan for Resource Recovery Centres to operate as PPP model
- Set up new Resource Centres for purchasing recyclables

Key Activity

3.3 Building partnerships for resource recovery

Actions

- Identify the recyclers for partnering with
- Establish a partnership with the private sector for managing fish waste
- Establish partnership agreements with the recyclers
- Setting up own recycling plant for recyclables through Public Private Partnership (PPP)

Implementation and Monitoring Plan

The implementation plan for the proposed actions under this strategy is shown below with potential timeline for execution of such actions.

Table 8: Implementation plan for the proposed actions under Goal 3

| Key Activity | Specific Task | Short Term | Medium Term | Long Term | Responsible Agencies |
|---|---|------------|-------------|-----------|---|
| 3.1 Strengthening composting operations | Study the operations with cost-benefit analysis for existing composting plant | | | | NMC and University of Peradeniya or other expert organisation |
| | Develop a plan to improve quality and marketing of compost manufactured | | | | NMC and University of Peradeniya or other expert organisation |
| | Provide safety-kits to workers at compost site | | | | NMC |
| | Promote home gardens by providing home compost bins to selected households | | | | NMC and Green Committees |
| | Capacity expansion of existing composting plant | | | | NMC and University of Peradeniya or other expert organisation |
| 3.2 Set up Resource Recovery Centres | Develop a business plan for Resource Recovery Centres | | | | NMC and relevant institutions/ organisations |
| | Set up Resource Centres for purchasing recyclables | | | | NMC |
| 3.3 Building partnerships for resource recovery | Identify the recyclers for partnering with | | | | NMC |
| | Establish partnerships with private sector to manage fish waste | | | | NMC and relevant institutions/ organisations |
| | Establish partnership agreements with the recyclers | | | | NMC |
| | Set up recycling plant for recyclables through Public Private Partnership | | | | NMC |

Goal 4: Ensure citizen engagement for effective solid waste management through public outreach programmes and create opportunities for engagement

Key Activity

4.1 Community awareness creation programmes

Actions

- Engage community leaders including Grama Niladris (Village Officers), teachers, parents, and clergy to create awareness
- Create awareness among elected councillors

and staff on the intended state of SWM to be achieved gap in between by and 2025 in view of creating necessary political will and enthusiasm for implementation of the SWM strategy

- Develop a plan for community awareness campaigns covering all key segments
- Organise print and electronic media campaigns
- Organise folk-arts campaigns
- Organise social-media campaigns
- Organise awareness campaigns through educational institutions including pre-schools and religious classes with support from stakeholders
- Organise exclusive awareness programmes for

fisherfolk on reducing plastic wastes and ocean pollution

- Design an awareness programme for promoting responsible consumption practices, mainly to reduce packaging wastes
- Place display boards with appropriate messages to create awareness on SWM
- Introduce environmental education, including waste management, 3Rs, SDGs and climate change issues into school programmes Committee

Key Activity

4.2 Strengthening community–LA partnerships for SWM

Actions

- Develop a plan for formulating and strengthening Green Committees
- Assess the current status of Green Committees
- Develop and conduct training/capacity building for Green Committee members to play a facilitatory role in new waste management strategy at the community level
- Introduce exclusive feedback mechanism for handling waste-related issues
- Introduce new award system (Mayors Award)

to select outstanding Green Committee/Green leaders and households annually, through partnership with hotel associations or support from other businesses (CSR)

- Formulate a partnership with fishermen, especially multi-day board owners and dried-fish processors to effectively manage plastic and fish residual waste

Key Activity

4.3 Introducing mechanisms within NMC for LA – community interactions

Actions

- Prepare a scope of work for statutory committee on public health
- Prepare a capacity building plan for the Public Health Committee
- Introduce a new award system (Mayor's Award) to select outstanding field staff of the city annually with through partnership with hotel associations or support from other businesses (CSR)

Implementation and Monitoring Plan

The implementation plan for the proposed actions under this strategy is shown below with potential timeline for execution of such actions.

Table 9: Implementation plan for the proposed actions under Goal 4

| Key Activity | Specific Task | Short Term | Medium Term | Long Term | Responsible Agencies |
|---|---|------------|-------------|-----------|--|
| 4.1 Community awareness creation programmes | Create awareness among elected councilors and staff on the intended state of SWM to be achieved by 2025 | | | | NMC |
| | Develop a plan for community awareness campaigns covering all key segments | | | | NMC and relevant institutions/ organisations |
| | Organise print and electronic media campaigns | | | | NMC |
| | Organise folk-arts campaigns | | | | NMC |
| | Organise social-media campaigns | | | | NMC |
| | Place display boards with appropriate messages to create awareness of SWM | | | | NMC |

| Key Activity | Specific Task | Short Term | Medium Term | Long Term | Responsible Agencies |
|---|---|------------|-------------|-----------|--|
| 4.2 Strengthening community – LA partnerships for SWM | Develop a plan for formulating and strengthening the Green Committees | | | | NMC and relevant institutions/ organisations |
| | Assess the current status of Green Committees | | | | NMC and relevant institutions/ organisations |
| 4.3 Introducing mechanisms within NMC for LA – community interactions | Introduce an exclusive feedback mechanism for handling waste related issues | | | | NMC |
| | Prepare a scope of work for statutory committee on public health | | | | NMC |
| | Prepare a capacity building plan for Public Health Committee | | | | NMC and relevant institutions/ organisations |

Goal 5: Enhance financial sustainability of NMC to manage solid waste effectively

Key Activity

5.1 Improving the existing fee-based waste collection system in NMC

Actions

- Improve the existing criteria for fee-based waste collection for commercial establishments
- Carry out a survey to assess potential institutions falling under this fee
- Study the legal requirements for enforcing Pay-As-You-Throw mechanisms
- Study the cost benefit analysis of current SWM practices
- Introduce Pay-As-You-Throw mechanisms as financial incentives to reduce waste and encourage waste separation
- Promote PPP and encourage private sector participation as necessary with strong monitoring mechanisms

Key Activity

5.2 Introducing Solid Waste Management Information System (SWMIS) for tracking efficiency in SWM

Actions

- Prepare scope for developing SWMIS
- Introduce necessary changes to LG accounting practices to reflect true cost of SWM
- Introduce data collection through ICT based system at critical points
- Introduce mobile weigh bridge to effectively monitor the weight of waste handled by NMC and properly estimate the waste to determine payments from commercial entities

Implementation and Monitoring Plan

The implementation plan for the proposed actions under this strategy is shown below with potential timeline for execution of such actions.

Table 10: Implementation plan for the proposed actions under Goal 5

| Key Activity | Specific Task | Short Term | Medium Term | Long Term | Responsible Agencies |
|---|--|------------|-------------|-----------|---|
| 5.1 Improving the existing waste collection for fee system in NMC | Improve the existing criteria for waste collection for fee | | | | NMC |
| | Carry out a survey to assess the potential institutions falling under this fee | | | | NMC and relevant institution/ organisations |
| | Study the cost benefit analysis of the current SWM practices | | | | NMC and relevant institution/ organisations |
| 5.2 Introducing SWMIS for tracking the efficiency in SWM | Prepare the scope for developing a SW Management Information System | | | | NMC |
| | Introduce necessary changes to the LG accounting practices to reflect the true cost of SWM | | | | NMC |
| | Introduce data collection through ICT based system at critical points | | | | NMC and relevant institution/ organisations |

Goal 6: Improve organisational capacity with appropriate regulations for managing solid waste in NMC

Key Activity

6.1 Formulate and enforce bylaws and internal policies for waste management (to introduce waste hierarchy)

Actions

- Assess existing bylaws facilitating SWM in NMC
- Develop bylaws for streamlining collection, resource recovery, final disposal, waste reduction and avoidance of waste
- Enforce necessary legal requirements to introduce Pay-As-You-Throw mechanisms and spot-fines for illegal garbage dumpers
- Prepare or modify bylaws with specific guidelines for handling food waste generators
- Develop Service level benchmark for SWM in NMC
- Develop an internal policy on Waste Reduction for NMC
- Develop regulations for new house construction with compost bins and biogas units

- Prepare regulations to incentivise sanitary workers and staff to engage in resource recovery initiatives
- Prepare a bylaw for empowering Green Committees
- Enforcement of fines for illegal dumping

Key Activity

6.2 Strengthen SWM staff human resource management plan for NMC

Actions

- Develop a programme to support sanitary workers
- Provide necessary facilities to sanitary workers
- Provide training for sanitary workers
- Develop a Human Resources Management Plan for SWM
- Develop incentive mechanisms, salary hikes and promotions based on performance for staff of SWM
- Introduce medical inspection, insurance and scholarships for children of SWM workers as immediate solutions in recognition of their hard work

Key Activity

6.3 Create institutional arrangements for advocating reforms with other stakeholders, and guide and monitor implementation of SWM strategy

Actions

- Study the proposed actions for improving SWM for NMC by different institutions (WMA of WP, CEA, MEEPA, etc.) to assess the current status of implementation of such actions to incorporate under relevant interventions under this SWM strategy
- Establish an LA level committee to guide and supervise implementation
- Establish an Advisory Committee with wider stakeholder participation under the joint leadership of NMC and WMA or any other relevant institution
- Develop specific TORs for the committees
- Consult with NMC to agree on a coordination mechanism and formal invitation to the members
- Schedule meetings for continuous follow-up and review of the implementation
- Share/update the progress of implementation

of city strategy with WMA and Ministry of Environment and Mahaweli Development to link with regional and national waste management plans and policies

Key Activity

6.4 Establish SWM Support Centre for R&D in SWM for NMC

Actions

- Develop scope of work for SWM Support Centre
- Identify staff and volunteers for the SWMSC
- Identify critical areas for research to support evidence-based decision making on SWM in NMC (e.g. understand the gap between policies related to SWM and impact on the ground)
- Prepare SWM Plans for each ward
- Engage in regular data collection, analysis and sharing of critical results with the NMC

Implementation and Monitoring Plan

The implementation plan for the proposed actions under this strategy is shown below with potential timeline for execution of such actions.

Table 11: Implementation plan for the proposed actions under Goal 6

| Key Activity | Specific Task | Short Term | Medium Term | Long Term | Responsible Agencies |
|--|---|------------|-------------|-----------|---|
| 6.1 Formulate and enforce bylaws and internal policies for waste management (to introduce waste hierarchy) | Assess existing bylaws that facilitate SWM in NMC | | | | NMC |
| | Develop bylaws for streamlining the collection, resource recovery, final disposal, waste reduction and avoidance of waste | | | | NMC |
| | Develop Service level benchmark for SWM in NMC | | | | NMC and University of Peradeniya or other expert organisation |
| | Develop an internal policy on waste reduction for the NMC | | | | |
| | Develop regulations for new house construction with compost bins and biogas units | | | | NMC and WMA |
| | Prepare regulations to incentivise the sanitary workers and staff to engage in resource recovery initiatives | | | | NMC and WMA |

| Key Activity | Specific Task | Short Term | Medium Term | Long Term | Responsible Agencies |
|---|--|------------|-------------|-----------|----------------------|
| | Prepare a bylaw for empowering the Green Committees | | | | NMC and WMA |
| | Enforcement of fines for illegal dumping | | | | NMC and WMA |
| 6.2 Strengthen the SWM staff human resource management plan for NMC | Develop a programme to support the sanitary workers | | | | NMC |
| | Provide necessary facilities for the sanitary workers | | | | NMC |
| | Provide training for the sanitary workers | | | | NMC |
| | Develop a Human Resources Management Plan for SWM | | | | NMC |
| 6.3 Create an institutional arrangement for advocating the reforms with other stakeholders and guide and monitor the implementation of SWM strategy | Establish LA-level executive committee to guide and supervise the implementation | | | | NMC |
| | Establish an Advisory Committee with wider stakeholder participation under the joint leadership of NMC and WMA or any other relevant institution | | | | NMC |
| | Develop specific TORs for the committees | | | | NMC |
| | Consult with NMC to agree on coordination mechanism and formal invitation to members | | | | NMC |
| | Schedule meetings for continuous follow up and review of the implementation | | | | NMC |
| | | | | | |
| 6.4 Establish SWM Support Centre for R & D in SWM for NMC | Develop scope of work for the SWM Support Centre | | | | NMC and WMA |
| | Identify the staff and volunteers for the SWMSC | | | | NMC |
| | Identify critical areas for research to support evidence-based decision making on SWM in NMC | | | | NMC and WMA |
| | Prepare SWM Plans for each ward | | | | NMC |
| | Engage in regular data collection, analysis and sharing of critical results with NMC | | | | NMC |

6. Proposed Institutional and Monitoring Arrangement

At present, the Health Department of NMC, headed by the Medical Officer of Health, is responsible for waste management in Negombo City. The proposed

institutional arrangement for implementation of this strategy is shown below:

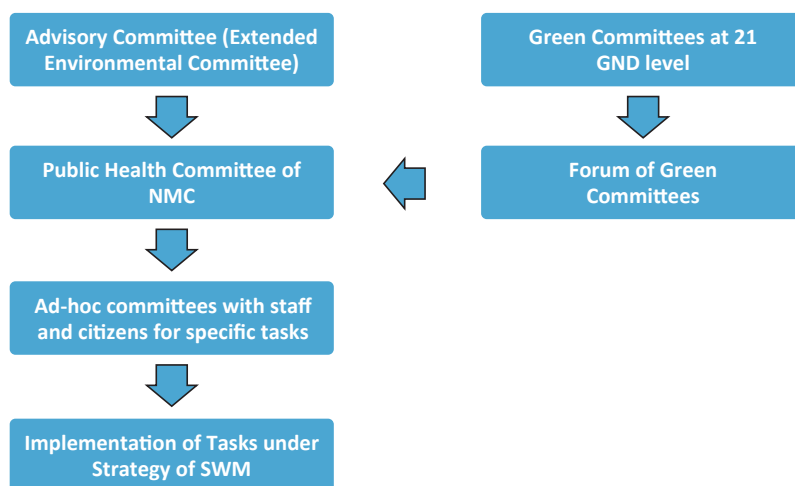


Figure 13: Proposed institutional and monitoring arrangement

Green Committees will be formulated for each Grama Niladhari Division (GND) to interact with the citizens and NMC. Potential members for these committees are as below:

- Ward member of the NMC
- Grama Niladhari
- Health Supervisor
- PHI
- Samurdhi Officer
- Heads of Community Centres or CBOs
- Representatives of Youth Clubs

The existing Public Health Committee will function as the main LA body with the responsibility of implementing the SWM strategy for NMC. It will function with the necessary technical inputs from the Advisory Committee and Green Committees. In addition, the Public Health Committee will formulate

ad-hoc committees with elected members, staff of NMC and other relevant institutions and citizens (mainly from the Green Committees) to facilitate the implementation of monitoring of specific activities stipulated under the SWM strategy.

A Forum of Green Committees will be formulated with the heads of the Green Committees set up at the GND level. This Forum will be the official linkage between the Green Committees and the NMC

An Advisory Committee will be formulated by adding more technical expertise on SWM to the existing Environmental Committee of the NMC to interact with wider stakeholders for participation under the joint leadership of NMC and WMA or any other relevant institution and support the Public Health Committee to implement the SWM strategy for the NMC to achieve the expected outcomes.

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