ISSUES IN MUNICIPAL SOLID WASTE MANAGEMENT: GAMPAHA MUNICIPAL COUNCIL AREA

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Abstract.
Municipal Solid Waste Management (MSWM) is one of the main challenges in urban environment in most of the countries around the world. Sri Lanka is one of the examples. MSWM is an alarming aspect that needs higher attention from the central government and local government authorities in a country. The case study area of Gampaha Municipal Council (GMC), in the last three years, waste generation is about 45-50 metric tons per day and collect only about 15-20 metric tons per day. GMC collects only about 35% of wastes. Urbanization, population growth, growing economies, and the rise of living standards of people have triggered this challenge. This study is designed to identify key issues related to MSWM with special reference to GMC in Sri Lanka. This study used a mixed research method to collect data and analysis. Data collection was conducted through semi-structured in-depth interviews with key informants (07), informal interviews with residents (20), field observations and secondary data sources.

The findings of the study reveal that even, there are laws, policies concerning the effective management of solid waste in Sri Lanka, implementation and monitoring are the problematic areas. The legal systems need to be tightened and penalties need to be established for defaulters/polluters, especially for polluters and companies creating excessive waste. The next issues are a lack of proper source separation and lack of minimization of waste at the point of generation. Further, a lack of knowledge in developing technically sound and contextually relevant MSWM approaches in the Municipal Council and No proper record-keeping system in the council such as to identify the types, volume, quality of waste in lane-specific, zone-specific ways and lack of financial support for MSWM can be identified as key issues.

MSWM should be an adaptive management approach and evolved to suit the resilient urban environment. In addition, national and local level governments need to run frequent awareness campaigns. The deployment of resources and infrastructure should be aligned with the rate of urbanization and the rate of waste generation. Sustainable participation of the public and private sectors for MSWM is an unavoidable aspect that has to be enhanced for the efficiency of solid waste management. Experts need to be deployed and awareness and training need to be given to responsible parties of MSWM in the councils as well as for the general public to have an effective MSWM. These findings and suggestions facilitate the development and implementation of suitable and effective MSWM policies in Sri Lanka.

Keywords: Solid Waste, MSW, MSW Management, MSW strategies, MSW policies

1. INTRODUCTION

Solid waste management is one of the universal challenges (Abdel- Shafy & Mansour 2018) and an unavoidable aspect that needs high attention in achieving sustainable development (Karunarathne 2015; Saja et al. 2021) mainly linking to sustainable development goals (SDG) of United Nations: Goal 3-Good health and well-being, Goal 6-Clean water and sanitation, Goal 11-Sustainable cities and communities and Goal 12-Responsible consumption and production (Saja et al. 2021; United Nations 2021). Especially, one of the targets of achieving sustainable cities and communities by 2030 are through paying special attention to Municipal Solid Waste Management (United Nations 2021).

During the last few decades in Sri Lanka, Municipal Solid Waste (MSW) is an alarming aspect that needs to give high attention. According to Saja et al. (2021), out of total solid waste generation in Sri Lanka, Municipal Councils collect only 50%, Urban Councils collect 17% and Pradeshiya Sabahs collect 33%. Furthermore, around 85% of waste is ended up in open dumping sites. The case study area of Gampaha Municipal Council (GMC) also indicates the same situation where, in the last three years, waste generation in GMC is about 45-50 metric tons per day and collect only about 15-20 metric tons per day. Out of the generated wastes, GMC collects only about 35% of wastes (Gampaha Municipal Council 2018). These facts indicate that there is a huge problem in MSW management in Sri Lanka and GMC is one of the examples. With this purview, the purpose of this study is to identify key issues related to Municipal Solid Waste Management, with special reference to Gampaha Municipal Council in Sri Lanka.

2. LITERATURE REVIEW

Waste is defined as an unwanted or unusable material which are thrown away (Oxford University Press, 2021). Waste may be unwanted material for one while it may be a resource for another, which deliberate that waste is not a waste at all the time (Karunarathne 2015). Waste can be categorized into two portions, solid wastes and liquid wastes. Solid waste can be identified as a major category of waste. Solid waste includes the heterogeneous mass of throw away from the urban community as well as homogeneous accumulation of industrial, agricultural, and mineral wastes (Otchere et al. 2015). Solid waste can be recognized as MSWs, Chemical Solid Wastes, Construction Solid Wastes, and Special Solid wastes (Karunarathne 2015).

MSW is one of the main challenges faced by Municipalities, they have to provide efficient and effective systems to inhabitants, however, due to the lack of financial resources, lack of organizational abilities and complexities of MSW management, which is an ineffective function in most of the municipalities (Abdel-Shafy & Mansour 2018; Karunarathne 2015). MSW management is important due to the reasons such as increment in MSW generation rate, rapid population growth, the protection of the environment, human health risk, and diminishing of disposal site options because of urbanization (Yadev et al. 2017). Especially in Sri Lankan context, on most occasions, MSW is collected as mixed waste and wetlands, rivers, coastlines have become dumping sites, degrading the environment and risking human health (Karunarathne 2015). In this context, to promote sustainable cities and human settlements as per the United Nations, MSW management is an unforgettable aspect (United Nations 2021).

The different methods of Solid Waste Management (SWM) are practicing all over the world. SWM can be carried out in different stages such as management of waste at the point of generation, management is done in Local Authorities or private sectors and management of waste at the final stage of disposal (Truitt, 1968). As per the literature synthesis, there are different SWM methods/models. One of the methods is called Integrated Solid Waste Management (ISWM). The ISWM approach provides the opportunity to create a suitable combination of economic affordability, environmental sustainability and social acceptance via existing waste management practices. Thus, ISWM contributes to accomplishing the local requirements across the most pertinent waste management activities. The primary ISWM activities are waste prevention, recycling and composting, and combustion and disposal in properly designed, constructed, and managed landfills (USEPA 2002). Another method is the waste management

hierarchy which includes five main stages: prevention, reduction, recycling, recovery and disposal (USEPA 2002). One of the most operational methods of SWM is waste reduction, waste reuse and recycling which is called "3R concepts" or Reduce, Reuse, Recycle. The 5R is an extension of 3R concept. The 5R concept is a SWM approach that has been incorporated to zero waste. The path is arranged as five main components viz., reduce, reuse, recycle, recovery and residuals management. The reduce, reuse and recycle processes were discussed in the aforementioned 3R's concept and it is similar here. In addition to that, Recovery refers to having materials and/or energy from the solid waste as much as possible by applying technology. Residual management provides effective and safe management of residual once the solid waste has been reduced by the utilization of technology (Ministry of Environment 2017).

3. RESEARCH METHODOLOGY

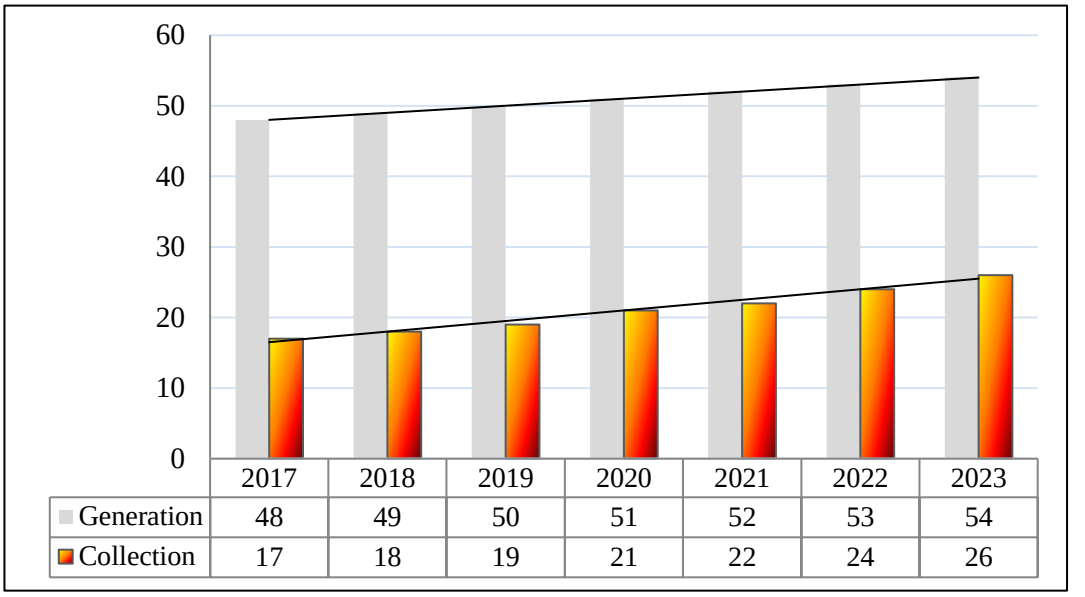
This study used a mixed research method to collect data and analysis. Data collection was conducted through semi-structured in-depth interviews with key informants, field observations and secondary data sources such as reports and official communications of Gampaha Municipal Council. The interviewees of the Municipal Council included Public Health Inspectors (02), Technical in-charge of Solid Waste Management Unit, solid waste collection supervisors (02), and laborers (02) of solid waste collection. Further, the interview was conducted with the Director of Waste Management Unit, Central Environmental Authority, Gampaha Division. In addition, informal interviews were conducted with residents (20) of Gampaha Municipal Council area.

4. RESULTS & DISCUSSION

The 13th Amendment to the Constitution (1987), the Provincial Councils Act No. 42 of 1987, the Municipal Councils Ordinance No. 16 of 1947, the Nuisance Ordinance No. 15 of 1862, the Urban Development Authority Act No. 41 of 1978, the National Environmental Act (NEA) No. 47 of 1980, National Environmental (Amendment) Act, No. 53 of 2000 and National Policy on Solid Waste Management 2019 apply to solid waste management in the GMC area. The National Environmental Act (NEA) is the most important piece of national legislation in Sri Lanka, and it is enforced by the Central Environmental Authority (CEA), which regulates all activities that have an impact on the environment. According to the Municipal Councils Ordinance, any MSW created inside the administrative boundaries of their administrative regions is their property, and they must collect and dispose of it without causing a public nuisance. Interviews revealed that even, there are laws, policies concerning effective management of solid waste in Sri Lanka, the problems are about the implementation and monitoring them, further, it is emphasized in the interviews that legal systems related to solid waste need to be tightened and penalties need to be established for defaulters/polluters, especially new legislations need to be created or existing legislations need to be tightened to manage polluters and companies creating excessive waste.

Figure 1 presents the waste generation in GMC. Accordingly, an average of 50 MT/day waste has been generated from 2017 to 2020 while it has been predicated up to 54 MT /day in 2023. Comparing waste generation and waste collection, there is a huge gap of waste that must be managed in terms of waste prevention and reduction at the source as well as by improving the effectiveness of collection and management of waste by the Municipal Council.

Figure 1: Waste Generation and Collection in Gampaha Municipal Council (Qty per day MT).



	2017	2018	2019	2020	2021	2022	2023
Generation	48	49	50	51	52	53	54
Collection	17	18	19	21	22	24	26

Source: Gampaha Municipal Council (2018)

Furthermore, GMC requires advocating source separation which is an ongoing issue related to SWM since residents do not effectively segregate waste before it is collected by the authority, as mentioned by GMC informant; residents are still adapting to the source separation mechanism. As per the interviews with residents, some of them have negative attitude towards source separation, they have taken this process as an unnecessary burden to carry out. This is the foremost point that triggers ineffective MSW management. To achieve this source separation, the public needs to be educated and made aware of the importance, the method of implementing source separation and benefits they get as individuals and as a whole society. However, there is no proper mechanism from the Municipal Council or the central government in this regard.

In addition, MSW disposal facilities require to position distant from residential areas for ecological and social acceptability. However, within the geographic boundaries of GMC, there are no dumping locations that are less ecologically and socially dangerous to residents. As a result, GMC has to rely on disposal locations outside of its territory and pay exorbitant disposal fees for waste disposal management.

A key informant of the council further demonstrated a lack of knowledge in developing technically sound and contextually relevant MSW management approach (ISWM approach) within the Municipal Council because there are no experts and/or proper programs to educate and train Municipal officers such as Public Health Inspectors, supervisors, labors who are involved in MSW management. In addition, to have a successful Solid Waste Management system, the Municipal Council needs to develop a sustainable partnership with different stakeholders such as residents, private/ public sector organizations and civil societies which is also a lacking part in the waste management as reveal through the interviews and the lack of sustainable partnership is a result of lack of education and knowledge of officers and higher authorities of the council about sustainable Solid Waste Management.

No proper record-keeping system in the council such as to identify the types, volume, quality of waste in lane-specific, zone-specific ways is one of the main issues emphasized in the interviews. That information is vital for decision-makers and planners to design disposal, recycling modes, processes and for the deployment of resources like labour and vehicles for MSW management.
Attitudinal and behavioral change of public is an imperative necessity for the effective implementation of the MSW management. As per the observations and interviews, the general public mindset of collecting, disposing and managing waste is a sole responsibility of municipalities that attitude must be changed, and that change can be achieved through awareness programs that implement from national level to local level as well as focusing younger to the older citizen of the country in regular basis.

Lack of financial support for MSW management is a huge problem that faces by the Municipal Council, thus there are no sufficient infrastructure facilities such as vehicles, equipment, machinery, skilled labour and professional staff.

5. CONCLUSION & RECOMMENDATIONS

MSW management should be an adaptive management approach where MSW management procedures, rules and regulations, resources and infrastructure need to be adapted and evolved to suit the resilient urban environment. As discussed in above section, it is understood that existing rules and regulations need to be tightened by establishing penalties for defaulters/polluters. Source separation program needs to promote while minimizing waste at generation points and proper implementation of source separation program. In addition, national and local level governments need to run frequent awareness campaigns. Ineffective administration has a significant impact on waste management. The deployment of resources and infrastructure should be aligned with urbanization and MSW generation rates. Also, experts need to be deployed in municipal councils and awareness and training need to be given to responsible parties of MSW management in the councils as well as for the general public to create an effective MSW management. These findings facilitate the development and implementation of suitable and effective MSW management policies in the future, which enhances MSW management in Sri Lanka.

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