

ROLE & CHALLENGES OF SOLID WASTE MANAGEMENT SYSTEM IN KALMUNAI MUNICIPAL COUNCIL

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Abstract

Municipal Solid Waste (MSW) is a rising problem in Sri Lanka's urban areas which is aggravated due to the absence of proper solid waste management systems in the country. Solid Waste Management System (SWMS) is the one thing just about every city government provides for its residents. SWM is arguably the most important municipal service and serves as a requirement for other municipal actions. In the SWM of Kalmunai Municipal Council, the Municipal Council (MC) faces a variety of issues, both economically and environmentally. The purpose of this study is to analyze the role of the Kalmunai MC in SWMS and the issues that the management system faces in SWM practice. In this research, qualitative models were used for data collection purposes. Six key informant interviews were held with stakeholders in the SWM unit of Kalmunai MC to have wide knowledge about the challenges faced by the SWMS in Kalmunai MC. The observation was done on the compost yard located in Periya Neelavana and the recycle center in Maruthamunai. Through the study, the role of Kalmunai SWMS was evaluated which are financial facilities and financial revenue, human resources, mechanical resources, the administrative structure of SWMS in Kalmunai MC. Some challenges were analyzed through the study which is facing Kalmunai MC in waste management and practices. As a finding shows that, the social, economic and environment based challenges were evaluated within Kalmunai SWMS. Accordingly, the study proposed some recommendations to reduce and maintain the SWMS in Kalmunai municipal region.

Keywords: Municipal Solid Waste, Solid Waste Management System (SWMS), Municipal Council (MC)

1. Introduction

The modern economy's rising amount and complexity of garbage are posing a severe threat to ecosystems and human health. Every year, an estimated 11.2 billion tons of solid waste are collected around the world, with organic garbage degradation accounting for around 5% of global greenhouse gas emissions. An estimated 11.2 billion tons of solid trash are collected each year around the world. Electrical and electronic equipment waste, which contains novel and complicated hazardous compounds, is the fastest-growing waste stream in both industrialized and developing countries (United Nations Environment Programme, 2020).

Solid Waste Management (SWM) is a service provided by almost every municipality to its residents. Solid waste management is perhaps the most significant municipal service and serves as a requirement for other municipal actions, even though service levels, environmental implications, and costs vary dramatically. As the world hurtles toward its urban future, the amount of Municipal Solid Waste (MSW), one of the most important by-products of an urban lifestyle is that it is growing at a faster

rate than urbanization. There were 2.9 billion urban dwellers ten years ago who generated 0.64 kilograms of MSW per person each day (0.68 billion tons per year). According to the report, today's population is estimated to be around 3 billion people, generating 1.2 kilograms per person per day (1.3 billion tons per year). The rate of waste generation is increasing all across the world. In 2016, the world's cities generated 2.01 billion tons of solid waste, amounting to a footprint of 0.74 kilograms per person per day. With rapid population growth and urbanization, annual waste generation is expected to increase by 70% from 2016 levels to 3.40 billion tons in 2050 (World Bank, 2019).

Compared to those in developed nations, residents in developing countries, especially the urban poor, are more severely impacted by unsustainably managed waste. In low-income countries, over 90% of waste is often disposed of in unregulated dumps or openly burned. These practices create serious health, safety, and environmental consequences. Waste that is not properly handled acts as a breeding ground for disease vectors, contributes to global climate change by generating methane, and can even fuel urban violence. Traditional loans, results-based financing, development policy financing, and technical consulting are among the goods and services used by the World Bank to finance and advise on solid waste management projects. As a result, the World Bank has invested over \$4.7 billion in over 340 solid waste management programs throughout all six of its engagement zones since 2000. The World Bank forecasted in September 2018 that unless we take immediate action, the global waste output will increase by 70% by 2050. Between 7.6 billion people, humanity creates two billion tons of waste per year. Although population growth is a factor, it is the high levels of consumption and waste management in a few wealthy countries that have resulted in this environmental disaster. The United States produces the most waste per capita in the world, with each individual producing an average of 808 kilos each year, nearly a ton, more than double that of Japanese inhabitants (World Bank, 2018).

Inadvertently, as a developing country, it is anticipated to rise from 3.5 to 6 metric tons per day if current trends continue, with each generating roughly 0.64 kilogram waste per day in Sri Lanka, with an estimated 4.8 billion metric tons of waste collected each year. Solid waste management, particularly in metropolitan areas, is a concern in Sri Lanka, according to this report. Colombo is the worst-affected area, with a serious shortage of solid waste disposal capacity of roughly 1500 tons per day. Organic waste, such as food and garden waste, accounts for 80-85 percent of municipal home solid trash produced in Sri Lanka. The balance, 15% to 20% consists of paper, plastics, glass, metals and other inorganic materials. The organic fraction has a strong impact on the environment and can be hazardous (Amasuomo & Baird, 2016).

Various groups of people generate different amounts of solid waste per capita. According to AIT (2004), per capita, trash generation in Colombo Municipal Council was 0.85 kg per day, 0.75 kg in other Municipal Councils, 0.60 kg in Urban Councils, and 0.4 kg in Pradeshiya Shabhas. Households, markets, and commercial facilities are the principal sources of municipal solid trash in the country, while industries and hospitals are secondary contributors (AIT, 2004). Sri Lankan municipal solid waste typically has a high percentage of perishable organic material (about 65–66%), moderate levels of plastics and paper, and low amounts of metal and glass. On a wet weight basis, the moisture content of MSW is likewise relatively high, ranging from 70 to 80 percent. The typical calorific value is modest, ranging between 600 and 1000 kcal/kg. Colombo is the most impacted area, with a serious problem disposing of roughly 1500 tons of solid garbage every day (Kumanayaka, 2013). The Kalmunai Municipal Council manages the solid waste in a large geographic area and serves a population of 116220 people with few resources (Kalmunai Municipal Council, 2020). The objectives of this study are to assess the role of the Kalmunai Municipal Council in solid waste management and to investigate the challenges faced by the Municipal council solid waste management system in the waste management practice.

2.2 Data collection

Relevant data for this study were gathered by qualitative methods. Both primary and secondary data were collected to achieve the objectives of the study. For the primary data collection, the following techniques were used.

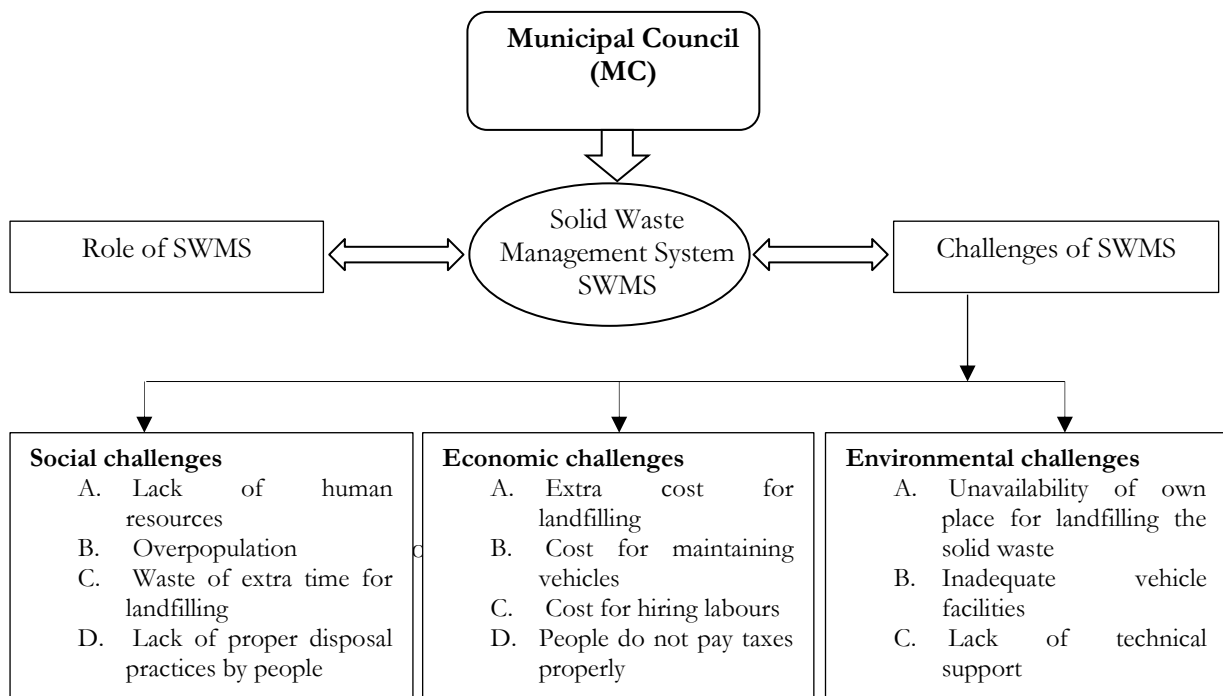
Key informant interview (KII): Key informant interview was conducted with stakeholders of the solid waste management unit of Kalmunai MC. Unstructured interviews were conducted with the stakeholders in the SWM unit of the Municipal Council. This interview was conducted with one chief management service officer, one chief medical officer of health, two supervisors in the SWM unit, supervisor of composting yard located in Periya Neelavanai, and supervisor of recycling center located in Maruthamunai.

Therefore, to analyse these the researcher conducted with the 6 stakeholders of the solid waste management unit of Kalmunai Municipal Council from the KII technique. To get vast knowledge on the topic the composted yard, recycle centre, vehicle yard of Kalmunai MC were visited for observation.

Observation: For observation, the researcher observed the waste management centers (composed yard located in Periya Neelavanai, recycle center located in Maruthamunai, and vehicle yard located in Kalmunai).

Secondary data were collected from Kalmunai MC Reports, books, journals, e-sources, magazines, articles and websites analyzed by descriptive method.

2.3 The study approach



The above figure 2 illustrates the current study approach, the objectives of this study are: To assess the role of the Kalmunai Municipal Council in solid waste management and to investigate the challenges faced by the Municipal council solid waste management system. Accordingly, the model of study approach was used to find the role and challenges (social, economic, environmental) of SWMS.

3. Results and Discussion

As human activity creates waste every day, and it is the way this waste is handled, stored, collected, and disposed of, many countries faces so many challenges in the collection, transportation, composting, recycling and landfilling of solid waste in this current over-populated urbanized world. The study was undertaken to understand the role of Kalmunai Municipal Council in solid waste management practices which are collection, transportation, composting, recycling and landfilling.

3.1 Role of the Municipal Council in solid waste management practices

Kalmunai MC plays an important role in solid waste management practices. The SWM unit of Kalmunai municipal provides many services in SWM by using its available resources. It has an SWM unit as a separate unit in the MC management body to deal with solid waste collected from 8 villages in the municipal area. As the role of MC, the following everyday practices are provided by the SWM unit to the people in the study area. The solid waste management system divided its members into the organized method to manage Kalmunai municipal council wastes (figure 3).

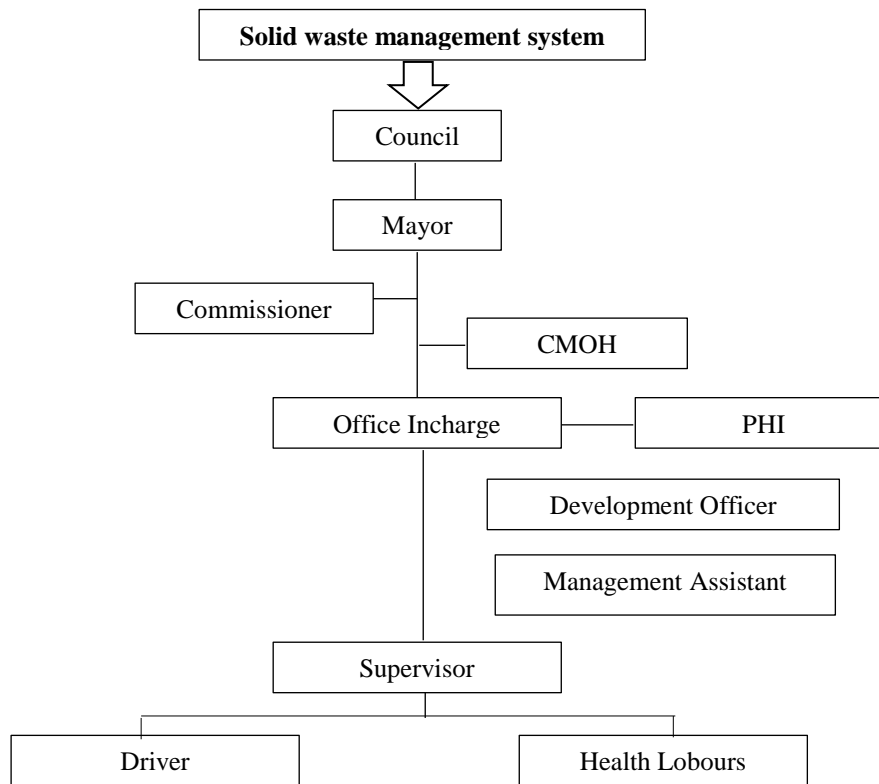


Figure 3: Solid waste management system organization
Source: Kalmunail municipal council, 2020

3.1.1 Collection of solid waste

Waste collection is a fundamental element of a municipal SWM system. The solid waste should be collected from the people of every municipal area because without collection the activity of every society will be impacted a lot socially, environmentally. Therefore, the main goal of a waste collection strategy is to collect in a timely and economical manner, as much correctly source separate waste as possible, to ease the subsequent waste sorting and treatment stage to maximize re-use and recycling.

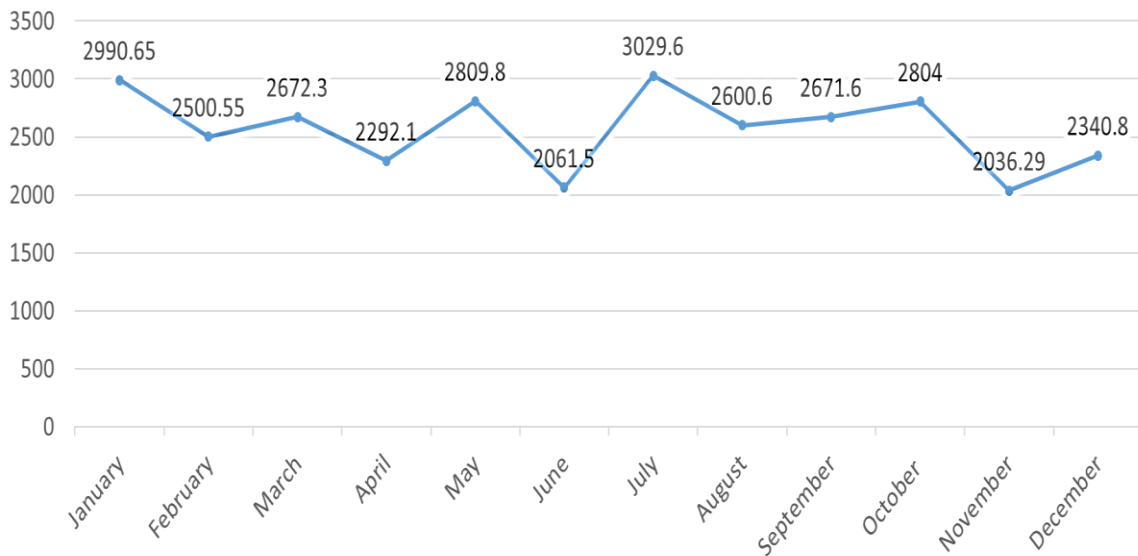


Figure 4: Monthly waste collection -2020 (in Tons)
Source: Kalmunai municipal council, 2020

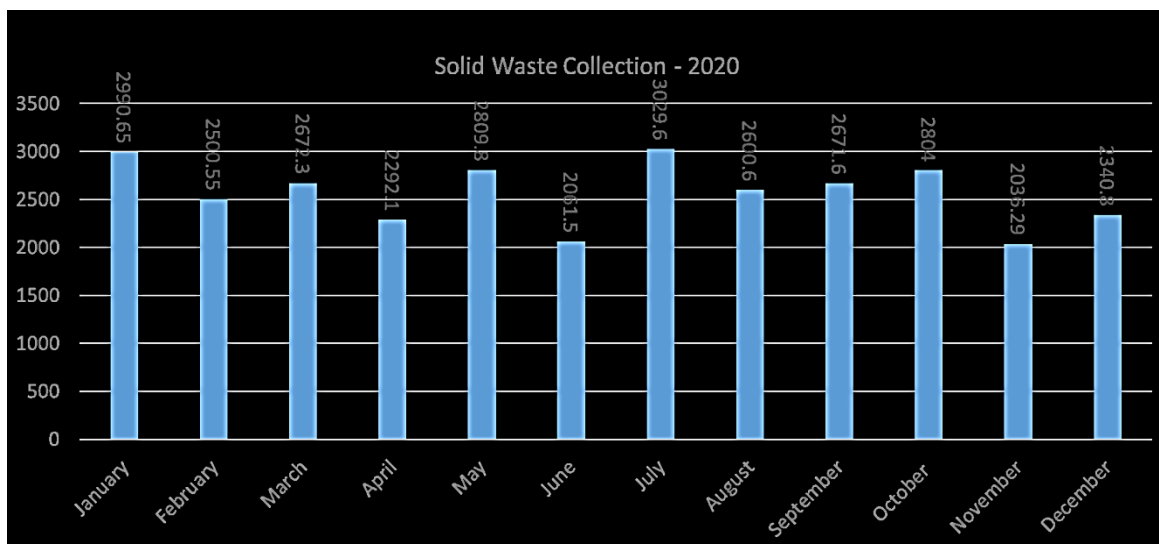


Figure 5: Monthly trend of Waste Collection – 2020 (in Tons)
Source: Kalmunai municipal council, 2020

Best practices municipal solid waste collections are typically implemented by Kalmunai Municipal Council via door-to-door or curbside collection rounds from households and businesses. The collection rounds are typically provided for the most voluminous municipal solid waste fractions, with municipal waste collection centers that accept a wider range of waste streams, including waste of electrical and electronic equipment. For other waste fractions, complementary systems can be used, for example, bring systems that target specific waste fractions such as glass.

3.1.2 Segregation and composting of solid waste

Composting is a sustainable waste management practice in the Kalmunai Municipal Council solid waste management unit that converts any volume of accumulated organic waste into a usable product. When organic wastes are broken down by microorganisms in a heat-generating environment, waste volume is reduced, many harmful organisms are destroyed, and a useful, potentially marketable, product is

produced. Organic wastes may include manure from livestock operations, animal bedding, and yard wastes, such as leaves and grass clippings, and even kitchen scraps. In the state, it is required by the Kalmunai Municipal Council for only market waste that can be composted. For composing Kalmunai Municipal Council created a composting yard in Periya Neelavana within the Kalmunai municipal area. It has 8 labours and an available amount of machines Composting is a process by which organic wastes are broken down by microorganisms, generally bacteria and fungi, into simpler forms. The microorganisms use the carbon in the waste as an energy source.

The degradation of the nitrogen-containing materials results in the breakdown of the original materials into a much more uniform product which can be used as a soil amendment. The heat generated during the process kills many unwanted organisms such as weed seeds and pathogens. Advantages of composting include reduction of waste volume, elimination of heat-killed pests, and the generation of beneficial and marketable material. Adding compost to soil increases organic matter content. This, in turn, improves many soil characteristics and allows for the slow release of nutrients for crop use in subsequent years.

3.1.3 Recycling the solid waste

Kalmunai Municipal Council has recycled Centre in Maruthamunai for recycling wastes collected from the study area. As recycle Centre has not had enough labours it deals with only wastes collected from the beach area. Kalmunai Municipal Council reuses and recycles the manufactured goods from which resources such as steel, copper, or plastics can be recovered and reused. Recycling and recovery is only one phase of an integrated approach to solid waste management that also includes reducing the amount of waste produced, composting, incinerating, and landfilling in the study area.

From the supervisor (Maruthamunai- recycle center), Kalmunai municipal council has not had enough labours to deal with waste. Also, it has not enough labourers for recycling waste. Only a few labourers work in the recycling Centre, but they retired from their work. This situation created the dysfunction of the solid waste management Centre of the municipal council (Key informant interview, 2021).

3.1.4 Landfilling the solid waste

Land disposal is the most common management strategy for municipal solid waste. Refuse can be safely deposited in a sanitary landfill, a disposal site that is carefully selected, designed, constructed, and operated to protect the environment and public health. As Kalmunai Municipal Council has no enough land for landfilling it dispose of the waste in Pallakkadu, Addalaichenei pradeshiya sabha. For landfilling there Kalmunai Municipal Council pays money from their municipal income.

3.2 Challenges faced by Kalmunai municipal management body in solid waste management

Under this topic, the researcher pointed out many challenges that the Kalmunai Municipal Council management unit faces in solid waste management practices. As solid waste management is an important task connected with people, stakeholders and resources it faces so many challenges to be completed. The followings are the main challenges that Kalmunai Municipal Council faces.

3.2.1 Social challenges

Under this sub-heading, the social challenges faced by Kalmunai municipal management body were discussed clearly with the clarification of stakeholders by key informant interview.

A. Lack of human resources

Human resource is very important in Municipal Council because development in solid waste management is mostly dependent upon human resources. They are a vital element for solid waste management as they are the resources that ensure the smooth and coherent functioning of the different resources to generate productivity, efficient and effective solid waste collection, segregation, recycling, composting and landfilling. Some kinds of employments deal with solid waste management practices. The following table will show that.

Table 1: Human resources of Kalmunai Municipal Council

Type of employments	Number of employees
Supervisor	02
Act. Supervisor	06
Add hop supervisor	02
Drivers	15
Add hop drivers	07
Health labours	33
watcher	01
Add hop labours	42

Source: Kalmunail Municipal Council, 2020

As the human resource is an important part of solid waste management Kalmunai Municipal Council have not had an adequate human resource. The Chief management service officer (Kalmunai Municipal Council) said that “Kalmunai Municipal Council has not adequate human resources in waste collection and disposal activities. Even though Kalmunai Municipal Council deals with 55000 households it has only 65 permanent labours for waste collection practices. So we hire some casual labourers with payment. Also, we spend more money to pay for them from the municipal income. So the lack of human resource is the biggest challenge in Kalmunai municipal solid waste management unit.” (Key informant interview, 2021).

Another interview also shows that there are shortages in human resources in kalmunai Municipal Council. So there are not enough labourers in the recycling centre of Kalmunai Municipal Council located in Periyaneelavanai. According to the interview with the supervisor (Maruthamunai- recycle centre) said that “We have not adequate labours to recycle the all wastes collected from 8 villages every day. So we recycle only the waste which is collected from the beach. If we have adequate labour, we can recycle the waste collected from all wards. From that, we can change waste to resources and money” (Key informant interview, 2021). Accordingly, there is a problem in the number of human resources in Kalmunai Municipal Council in solid waste management practices. This situation creates a threat to effective and efficient waste handling.

B. Overpopulation

As overpopulation leads to further demand for limited resources Kalmunai Municipal Council has 55000 houses and 116220 populations but shortages in human and non-human resources. So The Kalmunai Municipal Council face trouble in managing these all population. This overpopulation creates unavailability of land within the municipal area for landfilling also.

Table 2: Zone population

No of zone	Population	Ward
A: Sainthamaruthu	30439	18,19,20,21,22,23
B: Kalmunaikudy	21594	13,14,15,16,17
C: Kalmunai	17052	11, 12
D: Pandiruppu Natpattimunai Chenaikkudiyiruppu	21211	06, 07 08, 09, 10
E: Maruthamunai	14446	03, 04, 05
F: Periyaneelavanai	11478	01, 02
Total	116220	23

Source: Kalmunai municipal council, 2020

The following interview with the chief management service officer shows the trouble of overpopulation and the relationship between overpopulation and the land use for landfilling the collected waste within the Kalmunai municipal area. The Chief management service officer (Kalmunai Municipal Council) said that “There are 55000 houses in 22.9 s km Kalmunai Municipal Council area. This geographical area is enough only for living not for the final disposal of waste. We cannot dispose of all waste in this over-populated area.” (Key Informant Interview, 2021).

C. Waste of extra time for landfilling

Time is a much-needed thing to the effective and efficient work of every institution. Accordingly, Kalmunai Municipal Council spends a lot of extra time on waste disposal in landfill areas. The supervisor (Kalmunai Municipal Council) said that “We carry one load of waste for disposal to Pallakkadu landfilling side of Addalaichanai municipal area per day. If the landfilling site is located in the Kalmunai Municipal Council area, we can carry 3 loads of waste per day for the final disposal.” (Key informant interview, 2021).

According to the interview, Kalmunai Municipal Council spends more time for the final disposal of waste in landfilling area where it is located in Pallakkadu of Addalaichenei Pradeshiya Sabha. This creates a problem in the effective and efficient management of waste.

D. Lack of proper disposal practices by people

As solid waste management is one such activity, where public participation is key to success. The local body can never be successful in solid waste management without proper community participation, whatever may be the investments made from the municipal or Government funds. Furthermore, Kalmunai Municipal Council has not experience proper people’s participation in solid waste disposal. The following interview shows that clearly.

The Chief management service officer (Kalmunai Municipal Council) said that “Solid waste management of Kalmunai Municipal Council is responsible only for kitchen waste and household waste. But people throw their waste from the tree and commercial waste on the roadside. Instead, they should pay for that kind of a waste to the Municipal Council. People do not segregate the waste and dispose of them so it creates many difficulties to the labours in their health and work” (key informant interview, 2021)

The supervisor (Periya Neelavanai-compose yard) said that “People do not participate properly in solid waste disposal. They mix all kinds of waste and do not segregate them. If they segregate and dispose

we can easily compose them” (unstructured interview, 2021). So in sum, people’s proper participation in solid waste disposal is a very important key factor but in Kalmunai Municipal Council people do not participate properly in solid waste disposal.

3.2.2 Economical challenges

The economy is an important part of every institution to run their work, Kalmunai Municipal Council faces economic challenges in the management practices of municipal solid waste. Therefore, this part investigates the challenges faced by the Kalmunai Municipal Council management body economically in solid waste management.

A. Extra cost for landfilling

Kalmunai Municipal Council has not had enough land within the municipal area for landfilling the collected solid waste from all 8 villages under the municipality. So the Kalmunai Municipal Council takes the solid to Pallakkadu, Addalaichenai Pradeshya Sabha for landfilling and pay for disposed of solid waste per every ton. This is the most challenging situation for the Municipal Council to handle its income for other needs as development activities in the municipal area.

The Chief management service officer (Kalmunai Municipal Council) said that “We have not landfilled place in our Municipal Council. So we take them to Pallakkadu landfilling area and pay the amount of 4,032,812.00 rupees to Addalaichanai Municipal Council annually. This is the main economic issue for us. If we have land within Kalmunai Municipal Council extra costs will not waste. Waste as a resource we give the resource and pay for that. If we have a landfilling area within the Kalmunai municipal area, we change waste into use full resources” (Unstructured interview, 2021).

B. Cost for maintaining vehicles

Kalmunai Municipal Council spends more money on vehicle maintenance. This is because in Kalmunai Municipal Council there are many vehicles are old. So the Municipal Council needs to repair these vehicles to get ready for waste collection. Therefore, the Municipal Council spend more money on that every month. This is one kind of economical challenge to the Municipal Council. The following interview shows that clearly.

The Chief management service officer (Kalmunai Municipal Council) said that “Most of the vehicles of the municipality are old. It is being used for 20-30years. This situation creates the cost of maintaining and repairing them. The Municipal Council spent 50 lacks on vehicle maintenance in 2019 and spent 10 lacks this year. So this problem is avoidable. If the vehicles are good we can use the money for other needs” (Key informant interview, 2021). Accordingly, Kalmunai Municipal Council spent around ten lacks for marinating vehicles in previous years. So this problem is a most challengeable one to the function of the Municipal Council.

C. Cost for hiring labours

Kalmunai Municipal Council has not had enough labourers to practice solid waste management in the municipal area. So the Municipal Council getting some casual labourers for hiring with payment. Therefore, the Municipal Council pay for them from the income of the municipal budget.

The supervisor (Kalmunai Municipal Council) said that “Solid waste management unit has only 67 permanent labours. As well as they are not enough for waste collection, the solid waste management unit hares more than 40-50 casual labourers and spent 1000-1200 rupees per person every day from Municipal Council income. This situation also creates extra costs in the Municipal Council income. So if

the Municipal Council provided adequate labours we can save the extra cost and use that for the development activities in Municipal Council” (Unstructured interview, 2021).

D. People do not pay taxes properly

The taxes from the people is a basic income in the Municipal Council. These taxes are the input of every management work of the Municipal Council. Without the taxes from the people, the Municipal Council could not work effectively and efficiently. Accordingly, the Kalmunai Municipal Council does not get the taxes from the people properly. This situation impacts the function of the Municipal Council.

The Chief management service officer (Kalmunai Municipal Council) said that “People under the Kalmunai Municipal Council do not pay their taxes properly. It is one kind of economical challenge faced by Kalmunai Municipal Council” (Unstructured interview, 2021). According to this interview, the people in the Kalmunai Municipal Council area do not pay their taxes properly. This situation creates economic challenges to the function of the Kalmunai Municipal Council.

3.2.3 Environmental challenges

The environment should be corporate to the human being as well as to the institution to play their work properly. If the environment does not cope with the people or institution, they will face many challenges in their work. This chapter includes environmental challenges faced by municipal management bodies in solid waste management practices.

A. Unavailability of own place for landfilling the solid waste

One of the challenges faced by the Kalmunai Municipal Council is the unavailability of own landfilling place for collected solid waste in the Municipal Council area. It has not any suitable places for landfilling because the population of the municipality is very cluster. So there are any suitable places for final disposal of all wastes collected from 8 villages.

There are some centres in Kalmunai municipal council for composting, recycling, and landfilling of solid waste which is collected in the Kalmunai municipal council area. From those centres, some of them are under the area of Kalmunai municipal council. But some centres are located in another municipal area so the Kalmunai Municipal Council pays some money for the service given by another municipal council. We will discuss it in the following chapters. The following table will show the numbers of centres of the Kalmunai municipal council.

Table 3: Number of solid waste management centres of the study area

Number of centres	Location
Compost yard	Periya Neelavanei
Recycle centre	Maruthamunai
Vehicle yard	Kalmunai
Landfilling side	Palakkadu

Source: Kalmunai municipal council, 2020

The supervisor, Kalmunai Municipal Council said, “There are so many problems to select the landfilling area within Kalmunai municipality. There are so many socio-environmental issues to select the landfilling area within the Kalmunai municipality” (Unstructured Interview, 2021).

B. Inadequate vehicle facilities

Vehicles are a very fundamental need for waste management. These are important for the collection and transportation of solid waste in every municipality. Inadequate vehicle facilities create some troubles in the function of the Municipal Council toward solid waste collection and transportation. Accordingly, Kalmunai Municipal Council faces the challenge of inadequate vehicle facilities for waste collection and transportation of wastes.

There is some amount of vehicles used for the collection and disposal of solid waste in the Kalmunai municipal council area. The following table will show the numbers and the types of vehicles used for the solid waste management cycle.

Table 4: Non-human resources of the study area

Types of vehicles	Numbers of vehicles
Land master	03
Tractor	12
Compactor	03
Truck	04
Backhoe loader	01
Gully bowser tailor	01
Fogging machine	01
Higher pressure machine	04

Source: Kalmunail Municipal Council, 2020

The Chief management service officer (Kalmunai Municipal Council) said that “Kalmunai Municipal Council has 23 wards but has only 12 own vehicles. They cannot cover all wards in a day and We have not enough vehicles. It is a problem when any vehicle is damaged and taken for repairing, we have no alternative vehicles for waste collection” (Key informant interview, 2021).

According to the above interviews, even though Kalmunai Municipal Council collects waste from 23 wards it has only 12 own vehicles for solid waste collection from the municipal area. And most of the vehicles are old and need to be repaired and maintained. Therefore, this situation is the most challenging to the work of the Municipal Council toward waste collection and transportation.

C. Lack of technical support

Modern technological improvement is an important thing to the improvements level of every institution. Kalmunai Municipal Council has no improvement in technology as Colombo city of this country.

The Chief management service officer (Kalmunai Municipal Council) said that “Kalmunai Municipal Council have not modern technical improvements as developed cities like Colombo. If the government provides these facilities, the Municipal Council work better than before” (Key informant interview, 2021).

In this manner, the fourth chapter included the analysis and discussion gained by the collected data from the study area. In connection with all challenges based by the Kalmunai Municipal Council, all theories discussed in chapter two can be applicable in this study. This sociological study can be connected to the theories formally. Structural functionalism can be applied to understand the connection of the Municipal Council management body and its uncompleted function toward waste management. Because

there are some shortages in human and non-human resources in Kalmunai Municipal Council. The problem in the Municipal Council structure affects the function of solid waste management practice in the study area.

The challenges faced by labourers can be understood through the collective action theory. The labourers in Kalmunai Municipal Council face physical challenges as an injury during waste collection. Because the people in the municipal area do not practice the proper waste disposal activities. According to the collective action theory, all parts of society should cooperate with the institutions collectively. Otherwise, the function of that institution can be affected. Therefore, the labourers face physical challenges because people do not participate properly in waste disposal with segregation in Kalmunai Municipal Council.

4. Conclusion & recommendation

Kalmunai Municipal council plays a wide role in the Collection of solid waste, Segregation and composting, Recycling and Landfilling the solid waste. Although it plays an important role in solid waste management it faces various challenges in managing solid waste in its municipal area. These challenges find out social, economic, physical and environmental basis.

Another main problem faced by Kalmunai municipal council solid waste management body is inadequate labour for solid waste management practices. The Kalmunai municipal council have only 65 permanent labours in the solid waste management unit. This amount of labour is not enough to deal with 55000 households and recycling and composting practices. So the Kalmunai municipal council spent its own money for taking casual labour and also it faces so many problems in effective and efficient service in solid waste management.

The biggest problem faced by Kalmunai municipal council is the lack of landfilling area within the municipal council area. It spent more than 4 million rupees annually for landfilling the waste in Pallakkadu, Addalaichenei predheshya sabha. Waste is not waste, but rather it is a resource in the management process. Kalmunai Municipal council dispose of the recyclable and reusable waste in Pallakkadu and pay for that. It disposes of all waste there because it has not had enough labour to recycle or compost the waste.

Another problem faced by Kalmunai municipal council is it has not adequate vehicles for waste collection. They cannot collect waste from 24wards (8 villages) by minimum vehicles in a day. And also most of the vehicles are very old and it spends its budget for repairing them every year. The following recommendation should be helpful to the organization:

- Awareness-raising activities about solid waste disposal should be practised at a community level and in every institution.
- People should be educated about solid waste disposal and It should be started at the school level. This can be creating an effective change in society on solid waste disposal.
- The safety of labourers should be considered by the Municipal Council. And safety instruments as the jacket, boots, mask, hand covers should be provided to all permanent and casual labours equally to avoid physical problems.
- Strong tax policies should be practices by the Municipal Council and taxes should be collected every month from people.

- Municipal Council should reward people who provide recycling materials. As Colombia Recycling Solution (Colombia Recycling Solution: they give coupons and movie tickets for transference plastic bottles).
- Municipal Council should make competition and give awards to people who segregate the waste. This situation creates developments in solid waste recycling if people segregate recyclable waste when they dispose of them.
- The private partnership should take place in waste recycling and composting.
- Where the funds are not available to buy the required infrastructure, there is a need to apply from donors or non-governmental organizations who are interested to work as a volunteer in proper waste solid waste management programmes.

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