

Risk Reduction of Improper Solid Waste Disposal Activities: A Case Study of Maruthamunai Residential Area

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Abstract

Solid waste products are economically valuable products that are produced and driven by daily human activity. These solid waste varies from country to country territory. One of the biggest problems facing the world today is the land mismatch caused by solid waste. Most areas of Kalmunai metropolitan area are due to the development of urban development, population growth, and exhaustion of increased solid waste. The area is characterized by land degradation, water logging, diminishing wetland, health risk and natural beauty disappearances. The primary for this study was obtained through samples, field studies and direct observation. Studies have been compiled, books, magazines, previous studies, weblog as secondary data. The study is aimed at clarifying the nature and sustainability of the land, making it clear to future generations and to develop proper waste management. The study is present to receive social awareness and clarity based on the purpose of the study. There are, risk reduction of solid waste disposal, minimize to zero waste with 3R system in society, using domestic wastage materials for fertilizer production, to produce the Bio gas from Sewage waste, safeguarding of regional health protection of the environment. Transfer and treatment of waste, energy from the waste and conservation of basic material. This research leads to awareness to the society development with clean and green environment.

Keywords: Solid Waste, Municipal Waste, Land Degradation, Maruthamunai, Residential Area

01. INTRODUCTION

Around the world, waste generation rates are rising. In 2012, the world's cities generated [1.3 billion tonnes](#) of solid waste per year, amounting to a footprint of 1.2 kilograms per person per day. With rapid population growth and urbanization, municipal waste generation is expected to rise to 2.2 billion tonnes by 2025. Compared to those in developed nations, residents in developing countries, especially the urban poor, are more severely impacted by unsustainably managed waste. In low and middle-income countries, waste is often disposed in unregulated dumps or openly burned. These practices create serious health, safety, and environmental consequences. Poorly managed waste serves as a breeding ground for disease vectors, contributes to global climate change through methane generation, and even [promotes urban violence](#). Managing waste properly is essential for building sustainable and livable cities, but it remains a challenge for many developing countries and cities. Effective waste management is expensive, often comprising 20-50% of municipal budgets. Operating this essential municipal service requires integrated systems that are efficient, sustainable, and socially supported. (World Bank Report: 2017)

Land is an essential natural resource, it's for the survival and prosperity of humanity and for the maintenance of all terrestrial ecosystems. Sri Lanka has significant experiences of land; it plays a major role in maintaining the natural environment setting. Today a question forwards us about environment conservation without solid waste. Solid wastes comprise all the wastes arising from human and animal activities that are normally solid, discarded as useless or unwanted. Also included are by-products of

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process lines or materials that may be required by law to be disposed. Solid waste can be classified in a number of ways, on the basis of sources, environmental risks, utility and physical property. On the basis of source, solid wastes are again classified as: Municipal Solid Wastes, Industrial Solid Wastes and Agricultural Solid Wastes.

Solid waste management means proper collection, transfer, recycling and disposal of solid wastes. In many cities the solid waste disposal is inefficient or non-existing. Even more problematic than household wastes are the industrial, hospital and institutional wastes, which often contain hazardous and toxic chemicals, not to mention viruses and bacteria. These chemicals need special care when changing, storing, transposing and disposing them. Still they are allowed to go directly the water bodies from where they can contaminate the whole water cycle. The disposal of the solid wastes is often similar than with the liquid ones. They end up to the illegal dump on streets, open spaces, wastelands, drains or rivers. Sometimes they are collected to the land sites but the protection of water bodies and groundwater is not active.

The research is design to plan the environment from the adverse consequences of solid waste discharges daily in the area. The research proposes to maintain a sustainable healthy environment and earning income through this solid waste management process. The environmental impacts due to the lack of systematic management of solid waste, defects in waste disposal and lack of knowledge among people, there are a lot of problems in the environment. The main objectives are to Permanent delivery of the problems caused by rising solid waste and provide an opportunity for economic development through proper management. This research lead to awareness to the society development with clean and green environment.

This given answer to questions that arise from solid waste and provide employment opportunities, solutions for fuel to demand, creating healthy offspring through chemical fertilization, marketing the quality vegetables and receiving fixed income solutions.

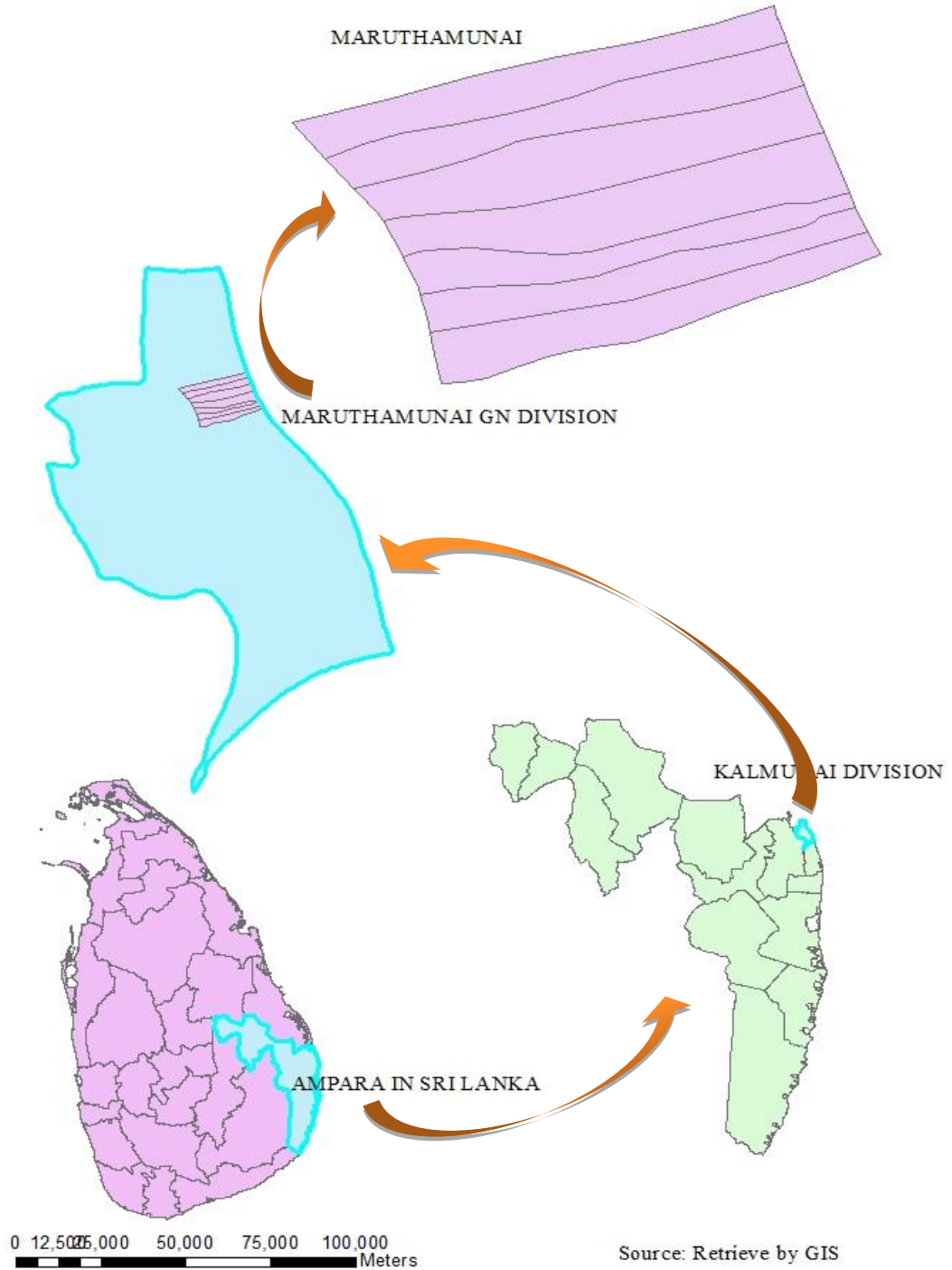
02. THE STUDY AREA

Maruthamunai seems to be South Eastern in Ampara district coastal area. The marginal boundaries are from Neelavanai in North direction, Pandirupu is in South and Indian Ocean in East, Thuraivanthiyamedu in West. It land area is about 4 sq km. High land is 9m from sea level. This area has under the Kalmunai Muslim divisional secrete and 8 Girama Nilathari Divisions. North latitude 7 ° 25" -7 ° 27" and East longitude 81° 45" – 81° 50" These are international latitude and longitude of this research area.

Topography of the research area is flat from the approximately 1 Km from the main road to coastal area. The main road is Kalmunai to Batticaloa across this study area. The regional climatic data defined: The amount of annual rainfall is 115.45 mm to 225.5 mm and high rain fall season is September to February. The region gets more rainfall from North East monsoon wind. High temperature is 28.5 c to 33 c and low temperature is 25 to 25.2 c. This region wind velocity is 5.6 to 7.9 km/h. In addition, sea level pressure is 1005.2 to 1013 mb. (Source of KMC;2015)

The project area is found to be in allocation convenient to major ethic groups as a name is Muslim lives in south east coast. The total population of study area is 16435. It has 8071 males and 8364 females. The higest population exist in GN division Maruthamunai 03, and lowest population is in Periyaneelavanai 02. These area people are doing economic activities are fishing, industrial, weaving, government jobs and foreign employments. According to this image are here,

LOCATION OF MARUTHAMUNAI



03. OBJECTIVES OF THE PROJECT

The study was aimed at reducing the adverse of the elimination of solid waste. However, the study was proposed to look at the following points,

- Minimize to zero waste with 3R system in Society
- Using domestic wastage materials for fertilizer production
- To product the Bio gas from Sewage waste
- Safeguarding of regional health protection of the environment. Transfer ant treatment of waste, energy from the waste and conservation of basic material.

04. RESEARCH METHODOLOGY

The study was obtained from primary data and secondary data to collect information for the research.

Primary Data

100 questionnaires were randomly collected to the different people from Maruthamunai region. It was allocated according to the population. It was taken by 7 models in Maruthamunai 1, 9 models in Maruthamunai 2, 39 models in Maruthamunai 3, 11 models in Maruthamunai 4, 10 models in Maruthamunai 5, 16 models in Maruthamunai 6, 12 models in Pandiruppu Muslim Division, 15 models in Periyaneelavanai Muslim Division, 11 models in Periyaneelavanai- 02, 13 models in Periyaneelavanai-02 Tamil, Muslim Division. Primary data has been collected through the samples, today 143 families randomly selected above the GN division in Maruthamunai. These models analyzed by the 3 families per 100 families. These models characterized through the population density and distribution.

- *Questionnaire for 100 households*
 - ✓ *MCQ questions*
 - ✓ *Open questions*
- *Interview with 20 people*
 - ✓ *Direct with 10 people*
 - *Discussions*
 - ✓ *Indirect with 10 people*
 - *Phone calls, e-mail*
- *Observations*
 - ✓ *Field work*
 - ✓ *Photograph*
 - ✓ *Video clips*

Secondary Data

- *Related Books of models and theories for solid waste management and municipal waste.*
- *Related articles about challenges of waste management*
- *Magazines publications of according to this research*
- *Statistical data analyzing Kalmunai (Maruthamunai)*
- *Kalmunai Municipal Council profile data of physical and human features.*
- *Newspaper articles related to municipal waste of challenges.*
- *Magazines, Journals, Democratic Gazettes and Notices*
- *Web collection and publications*

This research analysis based on data collection. Primary data analysis through the questionnaire, interviews and data has randomly collected in maruthamunai Division through the 100 questionnaire from this regional secretaries, Girama Nilathari, regional businesspersons, government and non-

government employers, social well-wishers and educated and non-educate people. And getting information through the interviews, it is also randomly selected 20 persons from GN Divisions. Moreover, get information through the direct observations and the photos and video galleries.

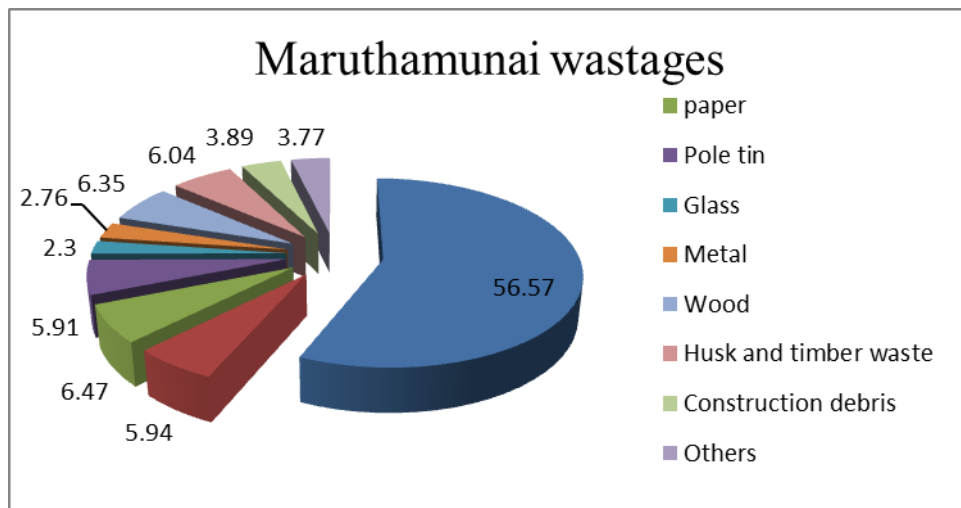
Secondary data analysis from related books, related articles of magazines, journals, published related articles, democratic gazettes and notices web page article and publications and Divisional secrete division development projects.

05. SOLID WASTE DISPOSALS

Maruthamunai regional face enormous challenges managing solid waste disposal. The collection and disposal of the solid waste, needs effective co-operation with vendors and collectors. Wastes are categorized in several ways such as,

- Organic waste
- Non organic waste
- Chemical waste
- Industrial waste
- Woolen waste
- Agriculture waste
- Commercial waste
- Foods waste

Chart- 1. Category of wastages in Maruthamunai



Source: KMC solid waste unit, 2015

Majority of the people are not taking the responsibility for the waste that we produce. Its plays an important role in managing a region in a cost effective and healthy manner. Like the Mother Nature, if you try ignoring. It will end as a catastrophe many things have changed within last 10 years. The population has risen up to almost above 15,000 with the increased consumption. There are many reasons for this enormous increase in waste quantities such as,

- Population increase
- Urbanization migration of population from the rural to the urban areas leading to much higher population densities

- Changes in lifestyles
- Economic activities
- Non proper drainage system
- Urban development activities
- Road development activities
- Natural disasters E.g.:- tsunami, floods, cyclone
- Resettlement activities
- Gardening wastages
- Livestock's wastages
- Hospital wastages
- Building and construction debris
- Day to day domestic uses
- Business activities, dais malls, rice mills
- garages
- water supply developments
- Agrarian activities

Bottlenecks of these area solid waste management activities

- Lack of health inspectors and supervisors
- Lack of labors and vehicles
- Making dustbin in suitable places
- Non proper and better drainage system
- Did not follow the ordinance of KMC
- Careless of officers
- Waste their own time
- Lack of knowledge and lack of awareness
- Low income

06. ANALYSIS OF SOLID WASTE MANAGEMENT PROBLEMS

Solid waste disposals are a common threat to environment in Maruthamunai since most of the solid waste great ended up directly in open landfill or dumps. In Maruthamunai, there is approximately above 27 tons of wastes every day and of that, only 50 % are collected. The rest of 50% are just lying around the neighborhoods of us and nobody cares. In the past solid waste disposal was not a concern because of the free availability of degraded land. However, land scarcity is now a major problem face by the municipality and therefore finding land for municipal solid waste disposal is becoming increasingly difficult. This has resulted in the spreading of various chronic diseases.

This area is affected above this bottlenecks and every day about 27 tons of disposals from this region, monthly 1000 tones wastes released through domestic uses, industrial uses and many more. Hence about 975 tone waste disposed through the municipal council and about 25 ton waste off and on in this region these balance of sediment wastes is effect the environment and decomposed waste spread the bad smell is created uncomfortable situation into the community.

Reputation: There is hope for future because the younger generation especially the school children much more sensitive to the environment impacts of this unsustainable behavior, but we need to provide them the necessary support. UNOPS is working on heavily organizing awareness programs on unless to useful especially for the school children. It is important that the children are very enthusiastic and incredibly creative about project of this nature. Many children said they wanted to live in a cleaner environment and protect the beautiful areas which the blessing of this region such as beaches, lagoon

and ponds. We can see that things are moving in the right direction with the support of the government, local authorities, provincial councils and some private participation.

Environment: Environmental impacts are due to the use of products that are used by the residents, biological waste, organic and inorganic wastes, chemical fertilizers, chemicals, exhausts from vehicles, use of radiation products, factory makers and oil, these may result in long-term or immediate impacts. In Maruthamunai, land resources are vital. Due to the increasing population and human activities in the area today, large-scale wastes are exposed to moisture and there is a threat to biodiversity and preservation of freshwater fisheries and land water resources.

Wetland: The wetland found naturally occurring in the pond, which are found in the field of pneumonia, are removed from the area from solid waste discharges. This result in damage due to the destruction of the habitats of rare species of fish, small insects, turtles, reptiles and birds. The wetlands are rare resource, but today they are filed with waste.

Nature of region: Due to the lack of sufficient land and suitable land to fill the paddy fields, the discharges are dumped in public places, roadside and unorganized lands. Furthermore, services carried out by the municipal council are not satisfactory for divisional clearing because the wastes that are evacuated into the environment are not completely removed, but they are stuck in the streets. Due to this natural beauty of the area is affected. In addition, rain fall can be seen in many parts of the Maruthamunai today as the rains are getting worse during the rainy season. It is a matter of concern that when the civilization is growing, the is lack of knowledge in the terms of about waste management. In this regard, the municipal council do not take extra attention. Solid waste is not a proper place in the area and the nature of the drug is a matter of violent punishment.

Spreading diseases: Solid waste is drained in the streets and drains. Due to this mosquito breeding is caused by diseases such as dengue, malaria, viral fever and vomiting. Also, the toxic waste is affected by fish species in the pond. Taken eat them out can cause stomach pain, skin diseases and new diseases that do not appear to be untreated.

Water: As for Maruthamunai, water resources are vital. Not only in the period of Maria, but also in the drought-prone summers, the water is unsteady. Density of housing increased due to the increasing population of the region. Due to this, it is possible to construct a toilet and sewage water tanks near the drinking water wells in this area. Solid waste discharges in the area are damaged by unused wells and trenches. Chemical effects, radiation and toxic substances are mixed in ground and affecting water resources. Also, the pitfalls are polluted by the dumping in the nearby pond.

Soil: Quality soil resources is one of the most important areas of the region. The fertile environment of Maruthamunai area is also found in its soil. Although this is not an agricultural land, it influences the landscape of the region. The disadvantages of the discharged environment here and garbage are damaged and degrade soil. Although the area is full of habitats, small plantations of horticultural housing, shade trees are likely to grow and lose its quality. Due to the deprivation of the soil, its water also degrades.

07. RECOMMENDATIONS

Today we are facing lot of challenges due to the improper waste management as socio-economic development on the account of environmental impacts. These improper solid waste management planning is encouraging to impact on environment. Therefore, we can identify the problems of solid waste management through the impact analyzing process and propose to maintain the sustainable environment for the future generation.

- The lack of awareness among the people is a cause of land morbidity through waste disposal activities. Every man can contaminate the environment in order to keep his house clean. So the need for keeping the environment clean and necessity of the stability of the pure environment can be partially prevented by social organizations and media.
- However, the recent increase in population, urbanization, industrialization and many other factors have increased the waste in the area and problems in waste management activities, this study has been found. In this way, there are several suggestions for preventing he problems of counterbalance in the area.
- Kitchen wastes, food wastes and poultry waste discharged from home every day are left in the atmosphere, causing them to stink and pollinate. It can avoid environmental pollution by utilizing these toxic products in the environment and making use of fertilizer and can provide fertilizer for the home garden. This can be avoided by avoiding chemicals fertilizers and obtaining quality vegetables.
- The natural environment of the maruthamunai has been affected by the discharge of the debris on the improper management basis. This study illustrates that the Kalmunai municipal council should take extra care. Not only that, it is best to be aware of the public. Also, garbage tanks should be set up in the streets and in the houses to clear the waste. Removable waste should be cleaned at least twice a week by municipal council cleaners. Waste can be avoided by dividing wastes and reducing excretion of wastes by recycling waste.
- The disclosure of promotions, posters, pamphlets and street dramas through the media is to make the land a real source and to understand is obligation and to preserve it.
- In the future, the adversity situation will be a major problem for the city council; this issue arises due to fiscal deficits, decrease in income, increase criticism and inefficient management. It can question the quality of the municipal council. Therefore, one of the reasons for the elimination of waste is a lack of vehicles and staff. The Municipal council may be able to some extent reimbursement of income deficit by way of tax refinancing and issuing public support for purchasing new vehicles, promoting of employees and service delivery.
- Biogas production from the sewage waste collection of poultry (Chicken manure, Cow dung and kitchen waste), Fertilizer production from domestic de-composite waste (Food waste, Kitchen waste and other de-composite waste).
- Processing and recovery from Plastic, Rubber, Metals, iron, Paper and etc like these; Bottles, Buckets, Pots and shell, Create little handmade for the accompaniment and small business (Soft drink bottles, waste color papers, rubber and other plastic bottles).
- The Municipal council is find to be on competitive basis, as well as the state administrative center and as a part of increased education, health and infrastructure. In such a way, it is necessary to keep the area under its boundaries clean.

- Home remedies can also reduce the inorganic resource in the garden, by reducing the amount of waste discharged from the house by producing natural fertilizers through the simple method of warehouse, poultry waste, perennials, powder and molasses, etc.
- The waste can be avoided by the use of waste, posters, handicrafts are display of the students and public through the schools. With the help of community organizations, you can build a clean and healthy environment once a week or month by conducting complicated events.
- Medical officers, health inspectors and general public are engaged in maintaining environment with the most active interest in the period of illness. During the time officers also supervising. Besides, if you supervise the authorities at least once a month, you can avoid spreading the disease and garbage.
- Various government and non-governmental organizations focus on issues such as environmental protection, health care and waste management. Municipal council officials need to take extra care in this regard by providing them with formal access and submission of proposals and their capital assistance, field training and counseling.
- If area has its means of 3R system, it will generate new type of income through waste. There has now been a technological development that reinforces solid waste. Many private companies have encouraged this action. I have to take steps to get the recycling to be done till the end of my life.
- We can reduce amount of waste disposals in day to day through the proper management system, and analyze through the 3R system. 3R system is reusable, reduce, recycle, today most of the developed and developing counties use this system for better solid waste management.
- **Functional Elements of the Waste Management System.** There are six functional components of the waste management system as outlined below:
 1. **Waste generation** refers to activities involved in identifying materials which are no longer usable and are either gathered for systematic disposal or thrown away.
 2. **Onsite handling, storage, and processing** are the activities at the point of waste generation which facilitate easier collection. For example, waste bins are placed at the sites which generate sufficient waste.
 3. **Waste collection**, a crucial phase of waste management, includes activities such as placing waste collection bins, collecting waste from those bins and accumulating trash in the location where the collection vehicles are emptied. Although the collection phase involves transportation, this is typically not the main stage of waste transportation.
 4. **Waste transfer and transport** are the activities involved in moving waste from the local waste collection locations to the regional waste disposal site in large waste transport vehicles.
 5. **Waste processing and recovery** refer to the facilities, equipment, and techniques employed both to recover reusable or recyclable materials from the waste stream and to improve the effectiveness of other functional elements of waste management.

6. **Disposal** is the final stage of waste management. It involves the activities aimed at the systematic disposal of waste materials in locations such as landfills or [waste-to-energy facilities](#).
- Proper management of solid waste can be given a permanent solution to the problems arising out of the waste in the future. This analytical diagram is below,

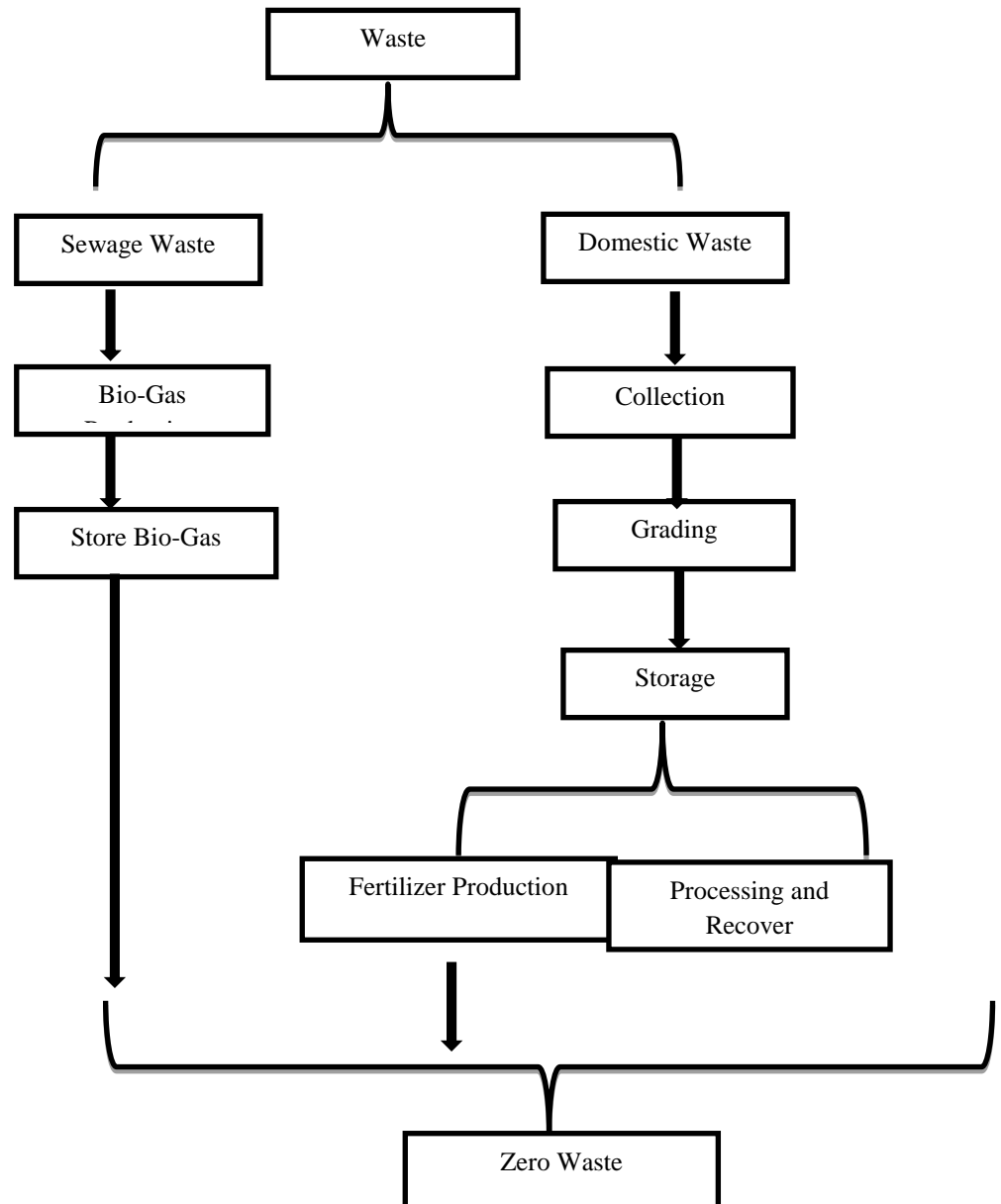


Figure.1: Process of Solid Waste Management

Source: Retrieved by Author.2017

CONCLUSION

Inadequate removal of the land in the area is heavily influenced by the degradation of resources such as land, water and environment. In addition, social, economic and cultural backwardness. The study is aimed at identifying the problems caused by improper solid waste and providing awareness to the community.

The purity of a region is the essential wealth of the region. In this area, more than liquid waste is obtained, liquid waste can be removed through proper drainage and can be avoided by rain water harvesting programs. Water can be avoided watering the home waste by feeding the home garden. The first is to categorize solid waste to eliminate the wastes, reduce places and ways to assign categorized waste. Types of waste can be earned by selling paper, plastic or metal containers, glass bottles, plastic products and steels at old purchasing stores while maintaining the purity of the environment.

The municipally should not only stop providing awareness to the public, but also provide proper plans for better removal of waste. Employees should have appointed and supervised to properly maintain garbage tanks in the places where there is a need to live. Ensure the health, cleanliness and income of the area by ensuring that the timely removal of the waste at regular intervals in

Public places ensured. Issues are increasingly by increasing the waste in the area. Therefore, it is necessary to introduce waste management with proper planning. Reduction in waste, especially when eliminating waste. The municipal council should ensure that the deductions are performed daily. Removal of solid, liquid waste through a proper planning structure is essential, it is necessary to maintain the stability of the drainage.

Finally, the study was presented to receive social awareness and clarity based on the purpose of the study. There are, risk reduction of solid waste disposal, minimize to zero waste with 3R system in society, using domestic wastage materials for fertilizer production, to product the Bio gas from Sewage waste, safeguarding of regional health protection of the environment. Transfer ant treatment of waste, energy from the waste and conservation of basic material.

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