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The Practice of Household and Small-Scale Industry Solid Waste Disposal Management Services in Mettu Town Municipality, South-West Ethiopia

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Approval sheet

The Practices Of household and small-scale industry solid waste disposal management service in Metu town municipality.

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Declaration

I declare that this thesis work entitled “***The Practices household and small-scale industry solid waste disposal management service in Metu Town Municipality***” is my original work, has not been presented earlier for an award of any degree to any other university and that all sources and materials used for the thesis have been duly acknowledged. I have produced it independently except from the guidance and suggestions of my research advisors.

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Abstract

The study is conducted to investigate the practices of household and small-scale industries' solid waste disposal practices in the context of Metu town. An explanatory type of study design was employed, and data were collected from 106 respondents from selected through a simple random sampling method from four "kebeles," responsible staff members and private participants using questionnaires, Observation, FGDs and interviews. Despite having temporary storage space in their homes, the majority of households and private small scale industry owners did not store their waste according to its type. In Metu town, it is common for households to dispose of their solid waste in unapproved locations. Major obstacles to effective household solid waste management in the study area include households' lack of awareness of solid waste management, their location far away from the main road, their access to private waste collectors' services, family size, and willingness to pay for solid waste collection service. This finding is supported by empirical analyses. Furthermore, the qualitative analysis conducted through the use of interviews and FGDs reveals that budgetary constraints, a lack of personnel, and access to facilities such as sufficient containers, vehicles, gowns and gloves for sanitation workers are other significant obstacles to effective solid waste management practices at the household level. Everybody should be aware of the subject of improper household solid waste management, even though there are bodies and stakeholders that are concerned. Thus, raising everyone's knowledge and figuring out how to give stakeholders in solid waste management more financial power is the advised course of action.

Key words: Household, small-scale industry, solid waste, improper solid waste disposal, Metu town

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Abbreviations

COB _ Community Based Organizations

FDRE_ Federal Democratic Republic of Ethiopia

FGD_ Focus Group Discussion

HHs_ House Holds

NGOs_ Non-Governmental Organizations

SW _ Solid Waste

SWDM_ Solid Waste Disposal Management

SWM _Solid Waste Management

UNDP _United Nation Development Program

UNDEP_ United Nation Environmental Program

MSW _ Municipal Solid Waste

MSWM_ Municipal Solid Waste Management

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CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

Municipal Solid Waste Management affects several spheres including; environmental, social, and economic activity. According to a study by the World Bank(2012), the economic development of sub-Saharan African countries is growing as fast as population growth and urbanization. Meanwhile, Ethiopia is one of the fastest-growing countries in sub-Saharan, and the second country in terms of population among all African countries. As a result, municipal solid waste management problems, such as an increasing generation rate of solid waste and open burning and dumping in sub-Saharan African countries, are found at an alarming rate (Lemesa & Chunho Yem, 2021).

Waste generation is calculated as the total amount of waste, from different sources at a specific time and place. Sub-Saharan African countries generated approximately 174 million tons of solid waste in 2016 at a rate of 0.46 kilograms daily. This is, expected to triple by 2050(world bank,2012). By contrast, the World Bank, estimated the municipal solid waste generation rate in Ethiopia, to be 6 million tons/year in 2015, and is predicted to rise to 10 million tons/year by 2030 and 18 million tons/year by 2050. Moreover, studies conducted in Ethiopian towns and cities, showed that the average rate of solid waste generated by households ranged from 0.23 to 2. Kg/capital/day. A study conducted in 10 cities of the Amhara, Oromia, Tigray, and South Nations and Nationalities regions of Ethiopia indicated that the overall solid waste generation rate was 0.32 kg/capital/day. This shows the high contribution of households to solid waste generation in Ethiopia. (World Bank, 2012)

On the other hand, the Ethiopian government has previously adopted SMWM policies and legal frameworks to reduce and eradicate the environmental and human health impacts caused by improper waste management practices. Some of these municipal solid waste management policies and legal frameworks formulated by the Federal Democratic Republic of Ethiopia (FDRE) and the international waste conventions are the 1995 Constitution of the Federal Democratic Republic of Ethiopia is the cornerstone of all policies in the country, including

environmental policies, and has highlighted some environmental issues in the country. Article 44 addresses environmental rights in Sub-article 1: “All persons have the right to a clean and healthy environment”, while Article 92 addresses the government’s environmental objectives in Sub-article1: “The government shall endeavour to ensure that all Ethiopians live in a clean and healthy environment”, and Sub-article 4 indicates that “government and citizens shall have the duty to protect the environment”. These provide all Ethiopian people with the right to live in a clean and healthy environment and the responsibility imposed on the government and citizens to protect the environment. Current Ethiopian MSWM is mainly focused on the collection, transport, and disposal of solid waste. The implementation of the functional elements is, however, still weak. This indicates that sustainable solid waste management strategies, such as prevention, reduction, reuse, recycling, and final disposal in many Ethiopian towns and cities, require attention from the government, because the solid waste handling, recycling, and performance of disposal systems remain very poor. Hence, the whole MSWM system should be improved and replaced by sustainable MSWM. The SWM service is provided mainly by the government and the rest is covered by individual households and small-industry owners and the town or city administration (Nebiyu, 2020)

Solid waste disposal management service in Metu town is not sufficient and need awareness both for each household and small-industry runner as well as street vendors. The town municipal administration is weak in its internal organizational capacity/skills and low stakeholder participation in waste management. Individuals, householders, small-industry waste materials, and dead animals are simply overthrown on main streets and residential areas. Low access to door-to-door solid waste collection, irregular, and low solid waste collection frequency, and illegal waste dumping are among the problems observed by the researcher. The aforementioned general background stimulates me to study the existing household and small-industry on human and residential area. Furthermore, in line within this research evaluated law enforcement and poor administration in case of waste disposal in the city.

1.2 Statement of the Problem

Sustainable SWM needs positive attitude and practice of the community, the local administration commitment, and the participation different stakeholders to generate economic benefit (Biruk, et al, 2020). Solid waste management such as household and industrial solid waste management is one of the major challenges confronting global governments. Several internationally and locally designed initiatives have been implemented to curb the impact of improper management of solid wastes. In Africa waste disposal is becoming problematic as every 9 out of every 10 African cities are facing serious waste disposal problems (Seth et al. 2014 noted in Richard et al 2021). This situation has often been attributed to improper planning, financial constraints, lack of motivation, and lack of enforcement of legislation to protect the environment and the people (Richard et al, 2021). Through the developing countries like Ethiopia, urban area waste disposal management problems are compressing the issues such as,

The low-income populations living in corner of urban areas are often people remaining without solid waste collection services. Lack of financial resources to cope with the increasing amount of solid waste produced by the rapid population growth causes this incapability. Improper SW disposal services are also caused by inefficient institutional structures, organizational procedures and management capacity of the government institutions and stakeholder. Moreover, inappropriate technologies, like the use of second hand or old vehicles to dispose the generating waste contribute for this inability to manage. SWM options needed to be effective, efficient, safe and appropriate in order to protect people from harming exposure. Handling solid waste stream stages in its generation, reuse, storage, collection, transportation, recycling, treatment and final disposal has relevance.

Weakness of law enforcement and the implementation procedures and strategies are contributing for improper solid waste management in developing cities. In addition, the development of urbanization and flow of people from rural to cities increase human settlements adds the potential to produce a large amount of solid waste in the cities. The municipal administration in the developed world has duties in collection, transfer and disposal off that solid waste. Solid waste management has become a major issue of concern for many developing nations, as a result of population increase. Developing countries like ours are unable to manage the generating solid

waste because weakness of institutions and lack of awareness by urban habitats. Within developing countries like Ethiopia, formalizing informal waste collectors and providing proper recognition will ensure better efficiency of SWM since the town. Metu town municipal administration is one of the growing urban centers among the national regional state of Oromia. The solid wastes, and the mechanism solid wastes were handled, stored, collected, transported and disposed is disorganized because of low legal enforcement and lacks of places for disposal.

Small-scale industries like coffee processing, metal works, wood works, and varieties of constructions are carried out in the city which generates solid waste daily. Moreover, Metu town dwellers lack awareness about the impacts of inappropriate solid waste disposal by administration and health workers effectively. The internal roads which interconnect its urban kebeles' in some places are not fully appropriate for the vehicles which collect solid waste. Because of this each household dump their solid waste everywhere on the road and even if it is collected there is no permanent container for habitats nearest to their home commonly. Few researches have been done on the solid waste management in Metu town previously. The existing study was concerned on the status of SWM from the view of environmental discipline.

For instance, Biruk et al (2020) study identified that the solid waste management service in Metu town is very weak and by far below standard. But this study examined the improper SWM by focusing solid waste produced by households and small-scale industry inline legal policies and law enforcement. Therefore, my research aims to identify the problems of improper solid waste in the case of Metu town Municipality.

1.3 Research Objective

1.3.1 General Objective

This research aims to examine the impact of improper household and small-scale industry solid waste management on the community of Metu town.

1.3.2 Specific objective

The specific objectives of this study were linked to the following issue

- To describe the stockholders' participation in solid waste disposal in Metu town Municipal administration.
- To state the status of solid waste disposal management service in Metu town Municipal administration.
- To identify the causes of inappropriate solid waste disposal management service in Metu town Municipal administration.
- To explain the social effects of inadequate solid waste disposal management service on Metu town dwellers.

1.4 Research Question

The research questions were as follows:

- How the stockholders contribute in solid waste disposal service in Metu town municipal administration?
- What is the status of the solid waste disposal service in Metu town Municipal administration?
- What are the causes for inappropriate solid waste disposal service in Metu town Municipal administration?
- What are the socioeconomic impacts contributed by improper solid waste disposal service in Metu town municipal administration?

1.5 Significance of the Study

The study has a significant role in identifying the success and failure of the Mettu town SWD sector. It will create awareness about the importance of stake holders' participation in solid waste disposal management for governmental and non-governmental actors. The research finding has the potential to provide a way to improve the management of MSW in selected kebeles of the town. Moreover, this study will be a base for further studies by other researchers and provide a relevant ground for policy formulation and implementation. Lastly, it will initiate the government bodies to plan, implement, and manage service deliverance in sector MSW in Mettu town.

1.6 The Scope of the Study

Thematically, this study is limited to examining the remarkable environmental, health and socio-economic impacts of improper household and small-scale industry, solid waste disposal management, in Metu town municipal which covers the four kebeles of the town namely; *Sor, Abba Saya, Abba Mole, and Gadisa Oda*. In addition, Metu town environmental and beatification office and the urban municipal administration officials and experts were involved as participants. Further community members from the four selected kebeles were included under the scope of the study.

1.7 Limitations of the Study

The researcher has faced different challenges that may have a possible impact on the findings of the study. Among them lack of attention and workload on respondents, the officials disregarded the questions and interview, the respondents' low interest in providing information, and the officials were not transparent in expressing what happened. Even though these limitations were faced, the researcher has managed to overcome them by expanding all his efforts and, by the contentious technical support from advisers.

1.8 Organization of the Study

This paper has five chapters, the first discusses the research introduction consisting of the study background, statement of the problem, the objective of the study, Research question, significance of the study scope of the study, limitations of the study, and organization of the study. The second chapter deals about literature review, and finally, the fourth and fifth chapters' deals with data analysis or interpretation, conclusion and recommendations of the study respectively

CHAPTER TWO

LITRUTURE REVIEW

2 Introduction

The rapid increase in population coupled with the expansion of the industry is producing large volumes of waste, whose management demands greater infrastructure, institutional setup, and community participation. This massive generation of waste coupled with unbalanced waste management is a major challenge faced by developing countries, particularly the sub-Saharan African countries. This Chapter discusses the empirical, theoretical & conceptual framework of municipal solid waste; generation, treatment and disposal service. The socioeconomic impacts of improper solid waste disposal, the role stake holders, policies and strategies that are enacted to promote waste disposal management and its challenges with the growing volume of solid waste in towns of developing countries.

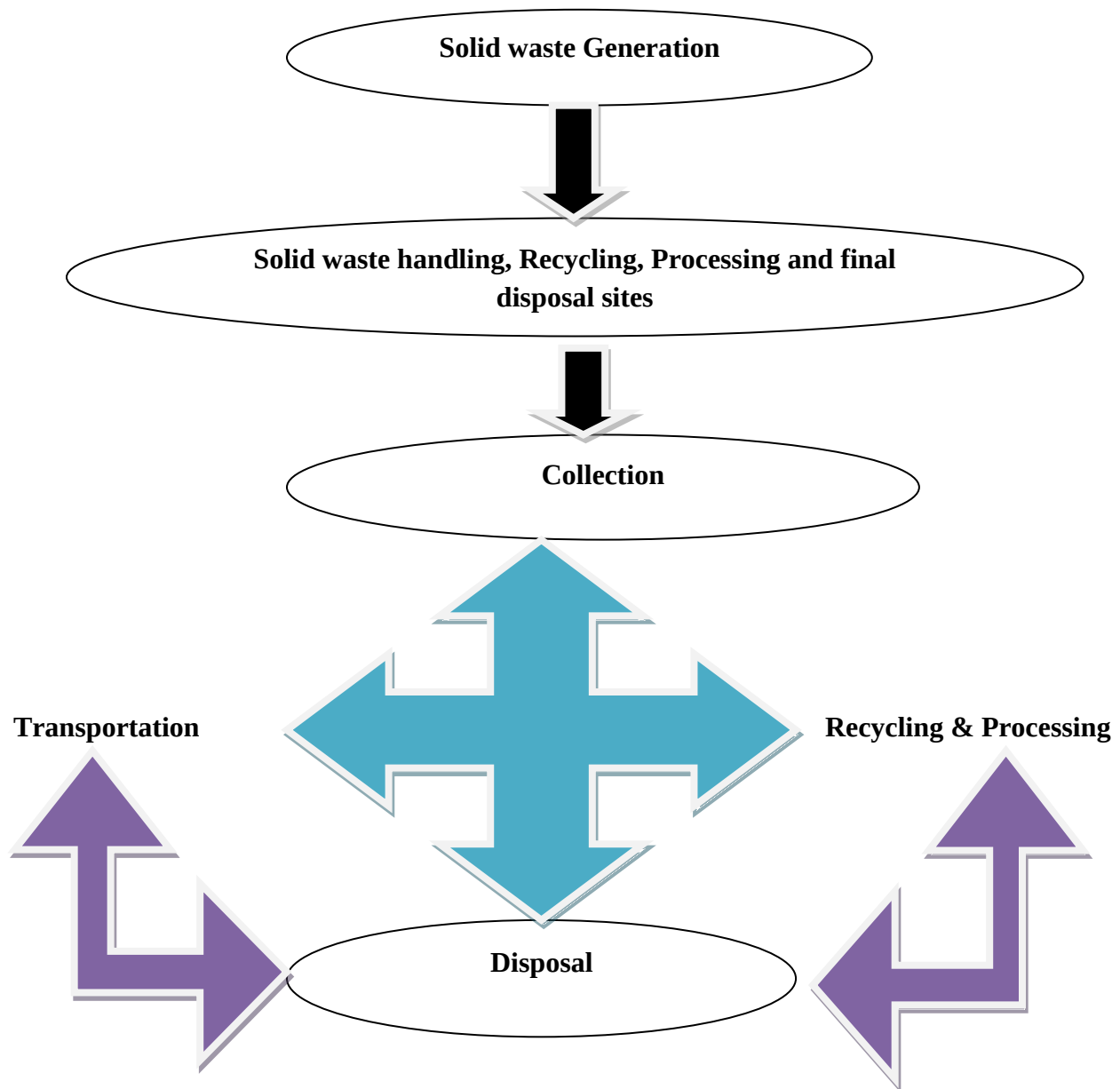
2.1 Theoretical and Conceptual Framework

2.1.1 The Theoretical Framework

Social Network Theory- has a crucial importance in informal solid waste collection and it considers the correlation between various actors and organizations. This theory helps to understand the interactions between partner in solid waste collection and disposal value. This employed the social network theory the levels of partnership and networks between government institution and other stakeholders in solid waste collection and disposal. **Organization Theory** helped to study the hierarchical roles between an organization and individual actors within boundary of provided rules and regulations (Mohammed, 2018). So, this theory was implemented to analyze the particular roles government organizations, community and other stakeholders in the disposal and management of solid wastes

2.1.2 Conceptual Framework

The use conceptual framework provides useful information for the management of solid waste disposal and challenge to manage the key factors explain more precisely what will be considered during the solid waste management and challenge process in terms of their impacts.



Source: Researcher's own 2024

2.2 Waste Generation

Waste generation is calculated as the total amount of waste from different sources at a specific time and place. Sub-Saharan African countries generated approximately 174 million tons of solid waste in 2016 at a rate of 0.46 kilograms per capita per day, which is expected to triple by 2050 (World Bank, 2021). However, the amount of solid waste generated may be directly affected by the health of society. By contrast, the World Bank estimated the municipal solid waste generation rate in Ethiopia to be 6 million tons/year in 2015 and is predicted to rise to 10 million tons/year by 2030 and 18 million tons/year by 2050. A previous study World Bank projected a total municipal solid waste generation rate in Ethiopia by 2025 at about 0.65 kg/Ca-pita/day (19,690 tons/day, or about 7.18 million tons/year). Moreover, studies conducted in Ethiopian towns and cities showed that the average rate of solid waste generated by households ranged from 0.23 to 2.03 kg/capita/day USAD (2015). A study conducted in 10 cities of the Amhara, Oromia, Tigray, and South Nations and Nationalities regions of Ethiopia indicated that the overall solid waste generation rate was 0.32 kg/capita/day (Molla et al, 2021). This shows the high contribution of households to solid waste generation in Ethiopia, akin to many other countries. Hirpo & Yoom (2021) study identified that municipal solid waste generation in Dilla (0.475), Chiro (0.30), Burayu (0.29), Robe(0.26), Addis Ababa (0.45), Mekelle (0.27), Bahir Dar (0.45), Walaita Sodo (0.47), Jimma (0.34), Laga Tafo (0.41), Debre Berhan (0.25), Jigjiga (0.49), Hawasa (0.43) and Dassie (0.45) kg/capita/day.

According to Table 1 the municipal solid waste generation in different cities and towns of Ethiopia shows an average municipal solid waste generation rate ranging from 0.25 to 0.49 kg/capita/day. Furthermore, residents, commercials, institutions, industries, hotels, and street sweepings are the major sources of solid waste generation in urban areas of Ethiopia. However, the amount of waste generated was different from each source. For example, among the total municipal solid waste generation of Addis Ababa, households account for 70%, commercial institutions 9%, industries 6%, hotels 3%, hospitals 1%, street sweepings 10%, and other sources account for 1% (Tassie et al 2019). This shows that the majority of municipal solid waste generation comes from households.

In Ethiopia, there are no effective strategies, such as a volume-based waste fee system that help minimize waste generation at sources. However, according to Kim (Seoul, Korea 2017), the volume-based waste fee system was introduced in South Korea in 1995 to reduce waste generation, encourage waste recycling, and successfully improve municipal solid waste generation and collection practices.

Girma Regassa's (2021) study indicated that Metu town is plagued by challenges caused by a poor solid waste management system. Each house produces an average of 0.2263kg/cap/day amount of waste held and every day. In Metu town 2.2 tons of waste is produced every day out of this, Food waste accounted for 41.03% of waste generated followed by dust & ashes at 31.67% & yard waste at 16.87%.

Even though the least amount of waste is being generated in Metu town, compared with other emerging towns in Ethiopia, the amount of waste generation is considerable. As, the total population of Metu town is raising, many institutions are emerging, and small-scale industries are diversifying, solid waste is too much and become one of the challenges of the town municipal administration.

2.3 Waste Composition

Africa, in recent times, has seen not only an increase in solid waste but also a change in waste composition (Sandra & Wehmann, 2001). As economic development and industrialization increase, the percentage of organic waste decreases, particularly in developed countries. However, the waste generated by sub-Saharan African countries consist of a high percentage of organic waste due to the preparation of fresh food and the use of less packaging on goods that are sold in the markets; hence, the waste composition in these cities is characterized by food and green waste at 43%, plastics at 8.6%, paper and cardboard 10%, metal 5%, glass 3%, wood less than 1%, and other waste at 30% (World Bank, 2021). Similarly, the systematic literature review of existing studies from various towns and cities revealed that the majority of the solid waste composition in Ethiopia is organic.

2.4 The Concept of Solid Waste

Solid waste refers to a non-liquid waste. Amasuomo & Baird (2016) stated that some common characteristics used in waste classification are its physical states, physical properties, reusable potentials, biodegradable potentials, source of production, and the degree of environmental impact. Wastes are classified broadly into three main types according to their physical states; these are liquid, solid, and gaseous waste. In the context of this study, attention is given to solid waste types in town areas. The solid waste consists of several types of waste, such as municipal solid waste, construction solid waste, industrial solid waste, commercial solid waste, and agricultural solid waste.

Solid waste is classified into different groups, depending on the source (origin) and property. Based on the origin, solid waste includes household waste, institutional waste, agricultural waste, biomedical waste, municipal waste, and industrial waste (Abdel-Shafy and Mansour, 2018; Rajendran et al., 2021). However, according to their property, solid waste could be organic waste, inorganic waste, biodegradable waste, non-biodegradable waste, hazardous waste, and non-hazardous waste (Varjani et al., 2021). Other forms of solid waste include plastic waste, radioactive waste, sewage waste, mining waste, and garbage ashes waste (Prajapati et al., 2021)

2.5 Classification of Solid Waste

2.5.1 Household (Residential) Waste

Depending on the daily activities of human beings, the economic level and the rate of income are among the main factors in generation of disposal of household (residential) waste. Residential waste constitutes the largest proportion of solid waste in urban areas, as it constitutes 55%–65% of solid waste. Food residues constitute the main component of household waste, as well as varying proportions of food waste, paper, glass, plastic, leather, metals, and spent electronic devices (Weldeyohanis et al, 2012).

2.5.2 Industrial Waste

Industrial waste is that which is generated by various industries and that is thrown into the environment is a solid, liquid, or gaseous state. They are of a continuous and diversified nature with the diversity of industries such as chemical industries, metals and leather industries, food industries, and other by-products that lag behind manufactured materials such as peels of fruits and vegetables, small quantities of hazardous waste, such as electric light bulbs, batteries, automotive parts and discarded medicines and chemicals. Solid waste management is a critical issue that affects both households and small-scale industries. Industrial wastes are waste materials generated before, during, or after production processes, or as by-products from a variety of industries such as poultry processing industry, edible oil industry, dairy industry, pulp and paper industry, abattoirs, sugar industry, fish processing industry, fruit and vegetable processing plants, etc. (Abdel-Shafy and Mansour, 2018). The waste materials are produced during handling, cutting, processing, thermal treatment, transportation, packaging, or due to discolouration, microbial invasion, and biochemical reactions (Sharma et al., 2020). Conventionally, the industrial waste is usually dumped, incinerated, land filled, composted, or anaerobically digested into bio fertilizers, thereby minimizing environmental pollution and boosts soil nutrition (Sharma et al., 2022).

In addition, these wastes possess huge potential for utilization as a raw material for production of valuable products such as bio-fuel, organic acids, enzymes, etc. (Abu Yazid et al., 2017). For instance, slaughter house waste such as hairs, skin, feathers, horns, and hooves have high amounts of organic matter, animal fat, and protein (Singh et al., 2014; Arya et al., 2022).

2.5.3 Solid commercial waste

It is commercial waste that is generated from commercial centers; such as offices, restaurants, markets, and hotels. It is very similar to household waste in terms of waste quality, except that it differs in terms of the proportion of components and the amount of waste produced. Commercial waste resulting from office work includes large quantities of paper, warehouse waste, and large

quantities of cartons and packaging boxes, while restaurants and markets contain a large proportion of food waste.

2.5.4 Municipal Services Waste

Municipal solid waste (MSW) is generated from households, offices, hotels, shops, schools and other institutions like small-scale industry. The major components are food waste, paper, plastic, rags, metal and glass, although demolition and construction debris are often included in collected waste, as are small quantities of hazardous waste, such as electric light bulbs, batteries, automotive parts and discarded medicines and chemicals. Solid waste management is a critical issue that affects both households and small-scale industries. (Umer,N.Shimalis,G. Ahimed,Misera 2019)

2.5.5 Construction and Demolition Waste

These waste materials resulting from the demolition and construction of facilities and buildings. They are inert materials and do not pose a danger to human health. Therefore, it can be used in back filling, road construction and others. But if it is thrown randomly, it leads to a distortion of the general view of the area, and if it is placed on agricultural lands, it will lead to the loss of these lands. The rubble resulting from construction, restoration, and demolition operations constitutes the constituents of construction waste. (Umer, Shimalis & Ahimed, 2019)

2.5.6 Medical Waste

It is defined by the World Health Organization (WHO) as clinical waste resulting from the treatment of patients in research centres and medical facilities. It is classified as hazardous waste and accounts for approximately 10–25% of the total waste based on its source, type, and risk factors associated with its handling, storage, transportation, and disposal. Contaminated waste includes pathogenic agents, sharp equipment, surgical waste, chemicals, and radioactive waste. (Weldeyohanis et al, 2012). The most prominent waste product of medical hospitals is plastic. This includes paws, syringes, plastic tubes, feeder bags, blood bags, and others. Second, glass: It includes glass containers and bottles used in the preservation of pharmaceutical materials, as well as all-glass instruments used in analytical laboratories.

2.5.7 Hazardous Waste

Hazardous waste is that usually industrial or medical and has negative effects on human health and the environment due to its chemical, physical, and biological properties. This includes clinical waste from therapeutic activities and waste resulting from the manufacture of any pharmaceutical preparations, medicines, organic solvents, inks, dyes, paints, pesticides, and fertilizer. (*World Bank, 2021*). It can be said that hazardous wastes (solid, liquid, and gaseous) are those that are legally allowed to be treated in waste complexes and treated in classified unities approved by local authorities.

2.5.8 Agricultural Waste

Agricultural wastes are waste materials that are generated from agricultural field and mainly consist vegetable waste, fruit waste (e.g., fruit peels, sugar-cane), and crop residues (Cusenza et al., 2021; Yaashikaa et al., 2022). The fruit peels are obtained from banana, orange, mangoes, papaya, pineapple, etc....fruit wastes as well as vegetable wastes are transformed into animal feed (Sahoo et al., 2021; Kumar et al., 2022; Rojas et al., 2022). Sugar-cane bagasse is a dry fibre obtained after extraction of juice from sugar-cane. The crop residues are inexpensive and readily available waste materials that are immediately obtained from farms. They include corn straw, rice straw, wheat straw, seed pods, leaves, etc... and form a promising and value-added biomass for the production of biobased products ,(Campuzano and González-Martínez, 2016; Biruntha et al., 2020). The quantity and components of agricultural waste are influenced by the operation type, raw material characteristics, processing steps, as well as the nature and type of products formed (Nayak and Bhushan, 2010).

2.6 Municipal Solid Waste Management Practices

The overall goal of Processing and disposal of solid waste is to reduce and eliminate the adverse impacts of waste on human health and the environment and to support economic development and quality of life (Chandak, 2010). Hence, effective MSWM plays a significant role in improving the quality of the environment, human health, and socioeconomic activities of local communities. However, according to the United Nations Environment Program (UNEP), MSWM is a major environmental problem and a public health concern. The negative

environmental, social, and economic impacts of solid waste are more severe in developing than in the developed countries (Mondak & Mohnty, 2010). Similarly, this municipal solid waste problem is worse in urban areas, where enormous industrial and other activities widely occur. Simultaneously, various MSWM activities in developing countries are performed by public sectors, and these sectors alone are unable to deliver solid waste management services effectively, with the limited enforcement of MSWM policies Le Courtois A (2012). Thus, the illegal open burning and dumping of solid waste are common practices in many developing countries (Weldeyohanis et al, 2012). Additionally, the rapid increase in population coupled with the expansion of the industry is producing large volumes of waste, whose management demands greater infrastructure, institutional set-up, and community participation (Scherten leib R.2012). This massive generation of waste coupled with unbalanced waste management is a major challenge faced by developing countries, particularly the sub-Saharan African countries.

In most developing countries open dumps and open burning are continued to be used as the primary MSW disposal method (Chandak, 2010). One of the basic factors for poor waste management in developing countries is a service delivery system for which local administration bodies are usually responsible. Although the most important task of these authorities is to manage the waste properly, municipal services in most cities and towns are already overburdened and cannot cope with the growing demand owing to inadequate financial capacity, insufficient manpower, and facilities Madinah N (2016). “In developing countries, 20-50 per cent of the recurring budget of municipalities is often spent on solid waste management, although often only 50 per cent of the urban population is covered by these services. In developing countries, collection of solid waste alone drains 80-90 percent of total waste management budgets.” (modak P, Mohanty CR. (2010). Around \$48 billion is spent by developing countries on municipal solid waste management and it is envisaged that this amount needs to double to repair the commonly encountered service delivery gap Le Courtois (2013). Moreover, considering the projected increase in municipal solid waste generation due to an increase in population and economic growth, financing needs may grow to \$150 million yearly by 2025 Bhanda .Tta H (2012).

In many cities of developing countries, the waste collection rates remain low and the quality of collection services are poor. Municipal solid waste management (MSWM) services in most cities and towns are already over-burdened, as cities and municipalities cannot cope with the speed-ed pace of waste production provided that inadequate financial capacity, insufficient manpower, and facilities.

The municipal solid waste generated in Metu town dumped haphazardly on streets or in drains, thus causing floods, serves as breeding grounds for insects and rodents which further facilitate the spread of diseases, (Biruk et al, 2020). The collected waste is generally dumped on land in uncontrolled manner where they may be burnt. Such uncontrolled and inadequate waste disposal creates serious environmental problems, affects human and animal health, and causes serious financial and socioeconomic losses. This condition can get worse by increasing urban population growth, high urbanization, economic growth rates, poverty, weak governmental institutions, lack of implementation and enforcement of policies, and insufficient public finances UNEP (2002)

2.7 Policy and Legal Frameworks for Municipal Solid Waste Management in Ethiopia

Ethiopia has several policies and legal frameworks that support the enforcement of the MSWM system in the country (EFCC, 2012). Moreover, Ethiopia has ratified a few international waste management conventions. Some of these municipal solid waste management policies and legal frameworks are formulated by the Federal Democratic Republic of Ethiopia (FDRE) and the international waste conventions.

The 1995 Constitution of the Federal Democratic Republic of Ethiopia is the cornerstone of all policies in the country, including environmental policies, and has highlighted some environmental issues in the country. Article 44 addresses environmental rights in Sub-article 1: “all persons have the right to a clean and healthy environment”, while Article 92 addresses the government’s environmental objectives in Sub-article 1: “the government shall endeavour to ensure that all Ethiopians live in a clean and healthy environment”, and Sub-article 4 indicates that “government and citizens shall have the duty to protect the environment” (FDRE constitution of 1995). These provide all Ethiopian people with the right to live in a clean and

healthy environment and the responsibility imposed on the government and citizens to protect the environment.

The Environmental Policy of Ethiopia was adopted in 1997, and its overall goal is to improve and enhance the health and quality of life for all Ethiopians and promote sustainable social and economic development through sound management of environmental resources. This policy addressed the concept of waste management in the next three sub-articles. Article 3(7) Human Settlement, Urban Environment, and Environmental Health indicated waste collection services, recycling of solid waste, safe disposal, and the essence of scientific studies to identify suitable sanitary landfills. In addition, Article 3(8) Hazardous Materials and Pollution from Industrial Waste explained safe sanitary landfill sites, formulation of guidelines and regulations to control waste from different sectors, as well as waste minimization and recycling, handling, and storage of hazardous and dangerous materials, and monitoring of waste management implementation.

Public Health Protection Proclamation No. 200/2000: Article 12 of this proclamation states that “any person shall collect waste at an especially designated place and in a manner, which does not affect the health of the society”. It prohibits the disposal of solid, liquid, or any other waste in a manner that affects the environment and public health. In addition, this proclamation indicates that any waste generated from hospitals should be handled through disposal procedures that meet public health and environmental standards. (FDRE public health promotion no.200/2000)

Environmental Impact Assessment Proclamation No. 299/2002: The EIA proclamation enforces project proponents to undertake an EIA for projects considered to have significant environmental and social impact. Waste disposal facilities, such as waste incineration and landfill sites, require an EIA before implementation. Therefore, EIA is very significant in the municipal solid waste management system.(FDRE Environmental Assessment no.299/2002)

Environmental Pollution Control proclamation covered the management of hazardous and non-hazardous wastes, specifically Article 5 of the proclamation. Sub-article 1 of Article 5 states, “all urban administrations shall ensure the collection, transportation, recycling, treatment or safe disposal of municipal waste through the institution of an integrated municipal waste management

system” (FDRE Environmental pollution control no.300/20.) The proclamation also addressed the importance of cooperation between municipal solid waste management and relevant environmental authorities to monitor and evaluate the municipal solid waste management systems and to ensure the effectiveness of their implementation.

Ratified International Waste Conventions: Ethiopia has ratified two international conventions and the Basel Convention via proclamation No. 357/2003, which have an essential role in the improvement of the solid waste management systems in the country. The Rotterdam Convention promotes shared responsibility and cooperation among parties in the international trade of hazardous chemicals to protect the environment and human health (Rotterdam convention ratification no 278/2002). Concurrently, the Basel Convention is an international treaty on the control of the trans- boundary movement of hazardous waste and its disposal. The main goal of the latter convention is to protect human health and the environment from the adverse effects of hazardous and other kinds of waste and to control its movement between countries. Thus, the ratification of these conventions by the Ethiopian government has a significant role in the development of municipal solid waste management systems in the country and at the international level.

Solid Waste Management Proclamation No. 513/2007: This proclamation is the first national policy on solid waste management in Ethiopia and its main objective is to enhance the capacity to prevent adverse impacts of solid waste at all social levels while creating economically and socially beneficial assets from solid waste. This policy mainly covers the general obligations of urban administration, solid waste management planning, the inter-regional movement of solid waste, the management of household solid waste, waste collection and storage, transportation, recycling, incineration, disposal, and auditing of solid waste disposal sites. It also addresses the significance of community participation in its mission. The solid waste management actions plan designed by and implemented at local urban administrative levels help ensure community participation. The main drawback of this policy is its lack of supporting guidelines, which is highly important to implement solid waste management laws and proclamations. Additionally,

sustainable solid waste management strategies, such as waste prevention and reduction, solid waste segregation at source, and waste collection fee systems have not got attention.

Electrical and Electronic Waste Management and Disposal Regulation No. 425/2018: It was the first national regulation on electrical and electronic waste management and disposal in Ethiopia. It addresses the hierarchy of waste management to minimize the environmental and social impacts of electrical and electronic waste by reducing waste generation, refurbishing, reuse, recycling, and disposal of such waste. It also implements the extended producer responsibility principle for electrical and electronic waste management, the first of its kind in Ethiopia.

Hazardous Waste Management and Disposal Control Proclamation No. 1090/2018: This proclamation aims to create a system for environmentally sound management and disposal of hazardous waste and to prevent damage to human or animal health, the environment, biodiversity, and/or property due to the mismanagement of such waste. It is the primary national hazardous waste management and disposal control proclamation, which identifies the categories of waste to control, chemical constituents, and the characteristics of hazardous waste. The proclamation contains 24 basic articles covering clean production principles, the responsibilities of hazardous waste generators and hazardous-waste labeling, storage, reuse, treatment, and recycling, as well as the handling and disposal of hazardous waste. It also addressed trans boundary movement, illegal transactions, and the inter-state movement of hazardous waste.

2.8 The Process of Solid Waste Collection

Solid waste collection is one of the main components of municipal solid waste management (Tassie Endalew, & Mulugeta, 2017). In urban areas of Ethiopia, formal solid waste collection is mostly conducted by micro and small enterprises that collect waste door-to-door and transport the waste to facilities and disposal sites. Additionally, informal groups, called street boys and scavengers, collect solid waste in many urban areas of Ethiopia (Cheru, 2021). They also collect recyclable solid waste from households, temporary waste containers, and visiting open dumpsites. A previous study assessing solid waste management in 28 Ethiopian cities and towns found that 88% of households use sacks to collect solid waste (USAID, 2021). This indicates that the

majority of households store solid waste in containers that do not meet municipal standards. Moreover, low-income countries such as Ethiopia still face major challenges in ensuring solid waste collection services, eliminating uncontrolled solid waste disposal, open burning, and moving towards sustainable management for all solid waste (UNEP, 2021). This may be even more difficult in the future in major cities of low-income countries with to the likelihood of population increase over the next few years, which also leads to prioritizing waste issues in these cities waste transfer stations are intermediate places where solid waste is deposited and stored until they are transported to the processing and final disposal sites. (Mohammed & Elias, 2017).

Hence, transfer and transport activities for municipal solid waste include those related to transferring the waste from the collection areas to temporary storage places and transporting it to the processing facilities and final disposal sites. A previous study conducted on MSWM in Addis Ababa states that the municipality is responsible for the transportation of municipal solid waste to waste-to-energy plants and final disposal sites, and the role of micro and small enterprises is limited in the transportation of solid waste (Tassie, Endalew, & Mulugeta, 2017). However, the towns and cities of developing countries have insufficient transfer and transport facilities for solid waste. Similarly, in many Ethiopian towns and cities, the collected waste is stored on the roadside, in the open, and exposed to rain and sun, which creates a bad odour and attracts pests (Hayal, Hailu, & aramade 2014). This directly affects the quality of the environment and public health around the solid waste transfer stations. The collection processes are practiced in most of the underdeveloped countries requires vehicles and labor. The basic collection systems classified into four categories: communal collection, block collection, Curbside collection and Door-to-door collection (Masakilija, 2010). Collection efficiency of the existing solid waste systems in Metu town is very low due to a lack of storage bins and improper management system. Open dumping, open burning and in-engineered sanitary landfills are common practice throughout the town (Biruk &Yohannis, 2020).

2.9 Methods of Solid Waste Disposal

Waste disposal is the final step in municipal solid waste management to protect the environment and people from solid waste impacts. (Birahanu, 2015) The quality of the waste disposal facility

may depend on the availability of technology, skilled workers, and the financial resources of each country. Open dumping (unplanned dumping of waste without consideration for environmental protection and public health) is the most common method of waste disposal in Africa, with open burning coming close as another regularly used mechanism to eliminate waste (Sandra & Wehmann, 2001).

Thus, the unplanned and unmanaged solid waste disposal practices severely harm the environment and public health around disposal areas and also affect the lives of future generations by increasing greenhouse gases that contribute to climate change. (UNEP, 2021).

According to the Open WASH report UK/World Vision Ethiopia/UNICEF; The Open University: Hong Kong, China, 2016), the two main waste disposal methods in Ethiopia are landfills (including waste burial pits and communal open dumping) and thermal processing, which includes the burning and incineration of solid waste. However, there are no standardized waste disposal sites for most towns and cities in Ethiopia. Moreover, Mohammed (2016) stated that most urban areas in Ethiopia use open for waste disposal, which pollutes the surface and groundwater, soil, and natural environment as a whole.

In developing countries, less attention has been paid to waste minimization strategies that result in the sending of wastes to dump-sites for final disposal (De Medina Salas, 2020). Openly burning solid waste is another common practice, while incineration is mostly used to treat health care waste in Ethiopia. According to the African Development Bank Report in 2019, the final disposal systems of solid waste in Ethiopian cities are not environmentally friendly because over 50% of the urban population practices open burning. This indicates that solid waste management systems in Ethiopia have several constraints that affect their implementation.

According to Masakilija (2010) the selection of a disposal method depends up on the capability to afford disposal costs according to local circumstances. Common methods for solid waste disposal include; Sanitary landfill, Incineration, composting, ocean dumping and open dumping.

2.10 Contributing Factors for Improper Solid waste management

The disposal of solid waste is a very challenging task in every part of the world due to linked health risks and potential impacts on the environment. This study gives an emphasis on different technologies for converting solid waste into energy. Waste to energy (WTE) or energy from waste technique is a proven viable friendly solution for the solid waste management issues with controlled emissions and it also finds helpful in generating revenues from discarded waste materials 18. Human characteristics affected solid waste service. The study of the characteristics of the human study area is an important part when studying any phenomenon in the geography of cities, which are as follows (Nebiyu, 2020).

Population size: overpopulation is more dangerous than pollution in itself because it is its source. As it contributes to the deterioration of services and service facilities and has an impact on natural resources identified through solid waste from them, Knowing the number of the population is a basis for knowing the extent of its compatibility with the service provided and the nature of the continuous demand for the service, with an understanding of the behavior of the solid waste service phenomenon, so that the planning process is based on scientific foundations to achieve efficiency and adequacy of the service provided. The population increase is also one of the most important factors affecting the increase in solid waste, as it is directly proportional to the increase in the quality and quantity of solid waste presented by the population. This is related to the amount of solid waste that the individual raises daily, which varies according to the economic level, their number, and their cultural level.

Because of the economic reality and the circumstances that Iraq has gone through, some housing units are inhabited by more than one family. The number of households was adopted as one of the factors affecting the solid waste collection service. Population density is crude: it is the simplest type of measure used in population studies and simply means the total number of people in an area unit.

The area of the municipal unit: the area of the municipal unit is one of the factors that affect services, and the relationship between the city's area and the need for infrastructure services is

complex and determined by several factors. The larger the area of the city, the greater the potential for savings in many types of services, which leads to a reduction in the cost of the unit provided. Two main factors stand out in the area of the municipal unit and its relationship to waste collection: The first factor is in calculating the time taken to collect waste, which affects the number of mechanisms and the cost of collection.

The standard of living of the family: The standard of living of the family is one of the important human factors affecting the quantity and quality of solid waste. The increase in economic growth rates and the rise in the average income of the individual and the family lead to an increase in the demand for infrastructure services, as the ability of the family to own goods that they were unable to own at a low level of income increases. The higher the standard of living can cause the higher the rate of waste generation. The level of income affects two aspects: the first aspect is direct, as with an increase in income results and increase in the volume of waste that is thrown up, while the other aspect is the decrease in income, which means the family's ability to acquire containers or waste bags, which causes them to be thrown in the open. The educational level of the family: The study of the educational structure is of great importance in demographic and urban studies within the city, where the educational structure data reveals the degree of development and scientific progress experienced by the society.

There are other factors, including (Teshome, F.B, 2020)]: The distance between the container and the house: The distance of the container from the house is one of the factors affecting the accumulation of waste and hurts the process of collecting it. In general, the greater the distance between the house and the container, the less the citizen throws waste into the container, and the closer the container is to the house, the more the citizen is inclined to throw his waste there.

Solid waste sorting, the waste management process is affected by citizen sorting of solid waste into many components, as the majority of the population deals with waste as a single mass. This process has great risks, as this stage is one of the most important in reducing the volume of solid household waste. This step affects the mixing of organic household waste with each other and

provides it with an opportunity for fermentation, which results in many problems, such as unpleasant odors and the spread of rodents, which are a cause of disease transmission to the population and directly to the workers in collecting and transporting waste.

Natural factors affect municipal solid waste service. The following is a review of the most important natural factors affecting municipal solid waste service location and location: The city's geographical location is of great importance when studying the municipal solid waste service, because, by knowing its characteristics, it can know the most appropriate ways to manage these services with the least effort and cost. The location differs from the location, as it is an area, not a point, and it is the justification for the existence and continuity of the city. The site is specific to the city, while the village and the city share the same geographical position. It is one of the most important elements of the natural environment that has a pioneering effect in shaping the characteristics of any region and giving it character. There are other reasons leading to improper solid waste management; Lack of awareness, insufficient allocation of resources, absence of a national policy for the SWMS, lack access or inadequate regulatory framework inaccessibility of options and their benefits are some of contributing factors of improper solid waste management (Masakilija, 2010).

2.11 Impacts of Solid Waste

Solid waste management systems constitute all practices to manage its impacts on health, environment and economy. Developing countries cities are extremely facing the difficulties in collection, transportation and disposal of communal solid waste (Naeem et al, 2010). Inhabitants are forced to live with harmful and unclean conditions. So, an improper solid waste management system may contribute to a worsening environmental degradation of the community. Furthermore, illegal dumping of communal solid waste is responsible for a number of diseases. In connection to this Metu town municipal solid waste management system and collection procedure is inappropriate for healthy life of the population.

The outcome of improper solid waste management encompasses environmental impacts by contaminating soils and water streams, and produce air pollution through emissions. Economic

impact appears when the government and society are unable to manage the classical economic mechanism of supply and demand controlling the flow of goods and services. Health impacts are negative impacts both on environment and public health due to diverse handling and disposal activities resulting in health problems (Mesfin and Birhanu, 2020).

In households, solid waste management is primarily the responsibility of individuals. However, lack of awareness and negligence often result in improper waste disposal. Improper disposal methods such as open burning or dumping waste in water bodies contribute to air and water pollution. According to a study by (Smith et al. 2018), improper household waste management can lead to the spread of diseases and pose a threat to public health. On the other hand, small scale industries generate a significant amount of waste, including hazardous materials. Improper disposal of industrial waste can have severe consequences on the environment and human health. For instance, the release of toxic chemicals into water bodies can contaminate drinking water sources and harm aquatic life. A study conducted by Johnson and Brown (2019) found that small scale industries often lack the necessary infrastructure and knowledge to manage their waste effectively.

2.12 Municipal Solid Waste Management Practices in Ethiopia

Over the last few decades, several studies have been conducted on MSWM in Ethiopian towns and cities. Since 2001, most municipalities in Ethiopia have become aware of the negative consequences of poor solid waste management that affects the environment, human health, and municipal services (Hailemariam & Ajeme, 2014). This has led to MSWM practices in many Ethiopian towns and cities. However, some studies have shown that MSWM practices vary among all urban centers in Ethiopia (Kelly & Bjorn, 2021), depending on the municipalities and their capacity for solid waste management. Similarly, a study conducted in Malaysia showed that MSWM practices through the basic hierarchical components varied greatly across different towns and cities, even though MSWM systems are designed to protect the environment and improve conditions in all cities (Khan, I.N.G.; Dahalan, W.S.A.W; (Nopiah, 2018). Additionally, a study conducted in Zimbabwe stated that MSWM practices could differ for residential and

industrial producers, urban and rural areas, and developed and developing nations; in particular, many developing countries are characterized by poor solid waste management due to unbalanced systems. In sub-Saharan African countries, such as Ethiopia, the solid waste management systems are varied and weak, particularly the status of waste prevention, reduction, reuse, recycling, and energy recovery is very low.

Current Ethiopian MSWM is mainly focused on the collection, transport, and disposal of solid waste; the implementation of the functional elements is, however, still weak (Teshome, 2020). Similarly, to most developing countries, waste is collected from generation sources and transferred to ultimate disposal sites. This indicates that sustainable solid waste management strategies, such as prevention, reduction, reuse, recycling, and final disposal in many Ethiopian towns and cities, require attention from the government because the solid waste handling, recycling, and performance of disposal systems remain very poor in Ethiopia]. In short, the implementation of the basic functional elements of a solid waste management system in Ethiopia is weak, (Teshome, 2020). Hence, the whole MSWM system in Ethiopia should be improved and replaced by sustainable MSWM; however, open burning and dumping, waste collection, and final disposal require critical attention from the government.

2.13 Community Participation in Solid Waste Management

Most cities in developing countries face urban environmental problems and these are partly caused by inadequate provision of basic services such as water supply, sanitation facilities, transport infrastructure and waste collection. Due to lack of financial, human and technical resources, municipalities are not able to provide basic services to all neighborhood within the city (Moningka, 2005). These limitations of municipality call for community participation.

Community participation is a process by which individuals and families assume responsibility for their own health and welfare and for those of communities and develop the capacities to contribute theirs and the communities' developments (Moningka, 2005). For instance, to keep any solid waste management systems running at a minimum participation of the communities is required in putting the garbage at the street in a proper way at the right time. At the individual

level residents are responsible as users. This evolves actions like storing waste in a proper way in bag or bin, separate recyclable or organic materials from other waste, offering waste at the right place at the proper time for collection and cleaning the area around the house. Apart from individual responsibilities, people can be collectively responsible in more or less organized activities, like meetings, clean –up campaigns and awareness“ rising activities (Subash, 2009).

2.14 Community-Based Enterprises

Primary collection of solid waste is an important stage within waste management systems. Household wish their waste to be removed by means of reliable and affordable systems. Municipal authorities usually provide the primary collection service in areas where a local authority cannot provide the service household may pay for it, the informal sector provide the service and collects the payments. Informal sector can take many forms such as individual waste collectors, community groups, micro and small-scale enterprises (Ellis et al, 1996).

2.15 Challenges of Municipal Solid Waste Management in Ethiopia

Municipal solid waste is a major environmental problem affecting the daily lives of people, particularly in urban areas. This systematic literature review of the existing literature on MSWM in Ethiopia identified the main challenges in the area. Solid waste management is a cross-cutting issue that impacts many social and environmental aspects (including the economy) of the country (UNEP, 2021). It has a strong relationship with global challenges such as environmental pollution, climate change, public health, and sustainable production and consumption.

According to some studies, increasing waste generation, budget issues, lack of cross-selectors linkages, and waste handling systems were the challenges faced in MSWM in several developing countries. Similarly, the EFCCC State and Outlook of the Environment (EFCC, 2012) ,revealed that the main challenges of MSWM in Ethiopia stem from unplanned historical patterns in several towns and cities, little public awareness of solid waste management, inappropriate waste disposal methods affecting the environment and human health, limited access to waste collection services, limited awareness about and application of formal waste recycling, and limited public and private investment in solid waste management. Additionally, the lack of effective

enforcement of policies and legislation, fewer financial resources, inadequate infrastructure, a lack of skilled workers, and few managerial commitments are the other major challenges faced by MSWM in Ethiopian towns and cities (Kibrekidusan, 2017). Moreover, at the community level, the country lacks proper awareness and education regarding waste prevention, reduction, reuse, and recycling, and there is little information on composting and energy recovery from solid waste (Edward, 2021).

However, despite some legal frameworks in place, several cities in Ethiopia continue to face municipal solid waste management challenges (Teko, 2021), these challenges may range from generating a large amount of waste to an inappropriate waste disposal system. The solid waste management has become a great concern in several countries due to its diverse constituents. Solid waste generation rates are imposing incredible pressure on environment and hurdles in achieving sustainable goals; thus, nowadays it is one of the global key issues. It directly or indirectly affects aesthetic, environmental, social, and economical aspects.

Solid waste management (SWM) is a crucial collective approach for solid waste generation rates, collection, storage, segregation or sorting of waste, transportation, recycling, recovery and disposal methods of remaining leftover residues of solid wastes. The inadequate, improper and inefficient waste management systems are responsible for contributing toxic elements into various dimensions of the environment, hence affecting human health and triggering additional environmental crisis. Population size: overpopulation is more dangerous than pollution in itself because it is its source. As it contributes to the deterioration of services and service facilities and has an impact on natural resources identified through solid waste from them, Knowing the number of the population is a basis for knowing the extent of its compatibility with the service provided and the nature of the continuous demand for the service, with understanding of the behaviour of the solid waste service phenomenon, so that the planning process is based on scientific foundations to achieve efficiency and adequacy of the service.

CHAPTER THREE

RESEARCH METHODOLOGY

3 Introduction

Effective and efficient solid waste management in Metu town needs in-depth study to develop a strategic plan by the municipal administration. This research examined the way dwellers disposed of solid waste and its impacts. The methodologies applied comprise qualitative, quantitative, opinion, archival, and direct observation. The qualitative method includes observation, key informant interviews, and focus group discussions. The qualitative research is carried out through the investigation of the existing phenomenon and involves the gathering of factual information. The quantitative data was collected through questionnaires to support the qualitative information. Furthermore, archival records were used as data for this study.

3.1 Description of the Study Area

Ilu Abba Boor zone found in Oromia Regional states, south-west of Ethiopia. This zone is characterized by their ever-green tropical forest and most of rainy months. The area is also renowned for their coffee forest production, bee keeping, livestock rearing and others. The Natural environment, the wild lives and presence of abundant natural resources make the areas one of the potential tourist attraction areas of the country (ECSA, 2007).

The majority of the population is Oromo, an ethnic group with the largest number in the country, and other ethnic groups from different angles of the country. Diversity in religion, ethnicity and others is common in the area as it is common for Ethiopia. Above all, the people of the zones are warm, friendly and easy to familiarize with each other. Giving respect for the people from other area has been the value and culture of the region.

Geographically, Metu town is located 542Km South West of Addis Ababa. It has latitude of 8° 18' 0" N and longitude 35° 34' 60" E at an altitude of 1605 meters. The town is divided into ten (10) administrative units with recently classified kebeles. More than 52,000 people constitute to

Metu town administration today. Agriculture and trade are sources of income for habitats. Christianity and Islam are the two-leading religion of Metu town dwellers. Coffee is the most leading cash crop in the town. Various federal and regional institutions, NGOs and Civic society organizations are found in the town. Oromo people constitute the largest portion of Metu town population. The proposed study area kebeles are located in the center of the town. The zonal government institutions, Universities and Colleges, Schools, NGOs offices, Hotels and Motels, Bus stations, Weekend market places and others are mostly found in the specified study areas.

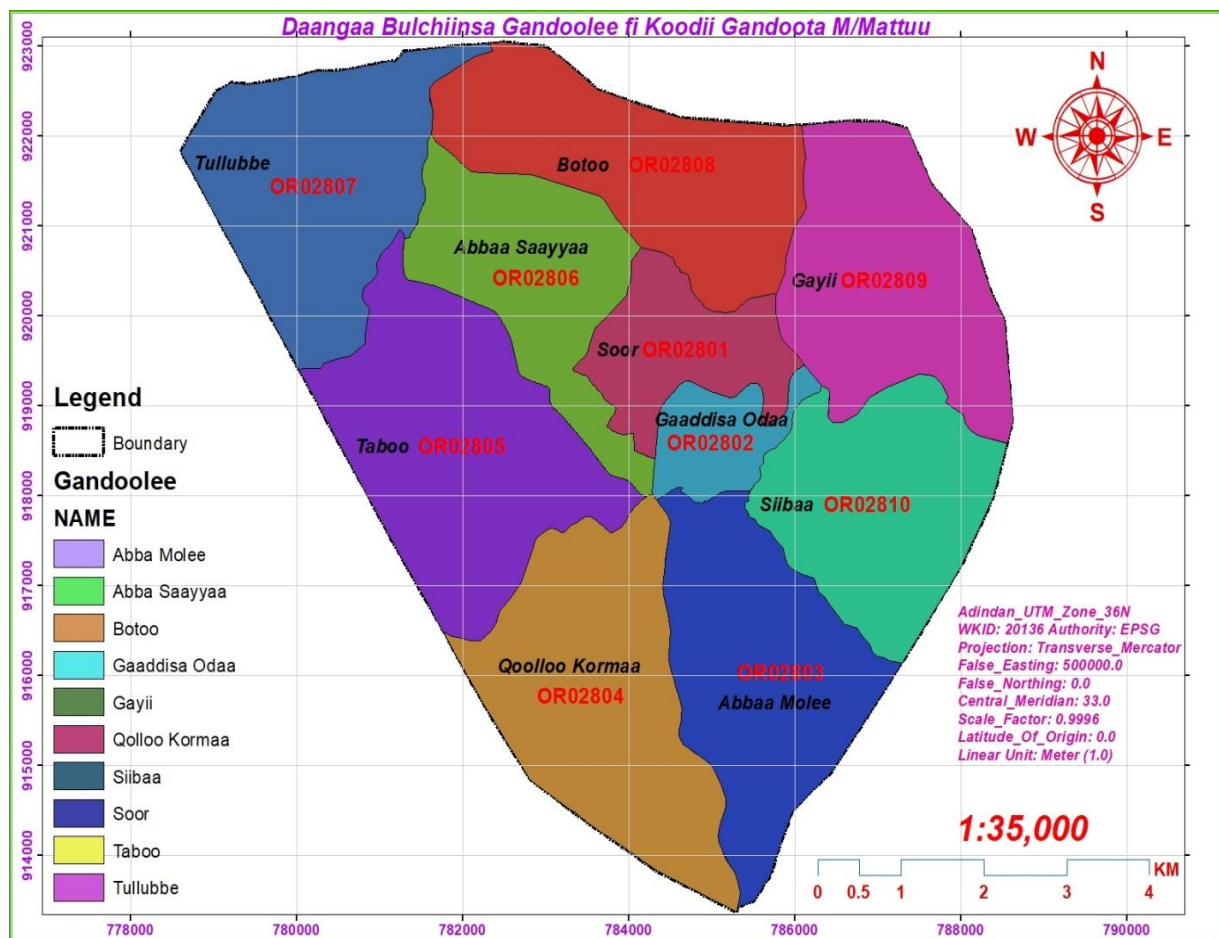


Figure 2 Newly Restructured Metu town Administration Kebeles

Source: Metu town land Office (2024)

3.2 Research Design

The research design is a blueprint that specifies the methods and procedures for gathering, processing, and interpreting the study's area and data. In order to achieve the objectives of the study, a descriptive research design is used to describe the characteristics of the sample population and the extent of the relationship between variables in order to make a specific prediction, and then it examines and evaluates the existing solid waste management activities in order to identify the challenges and formulate solutions.

3.3 Research Approach

The researcher employed mixed research approach with descriptive cross-sectional study to collect data from different respondents on specific issues. Researcher examined the existing solid waste disposal service, success, failures and what has been done to improve the situation by Metu municipality.

3.4 Types or Sources of Data

To achieve the aim and objectives of the study, the researcher was used both qualitative and quantitative data collection methods. The researcher made a direct site observation and administers questionnaires to the respondents in order to obtain the primary data. Other information was obtained from the Metu town plans and reports as means of secondary data.

3.5 Sampling Techniques and procedures

Simple random sampling techniques was employed to determine the number of samples within 4 (four) kebele households, government sectors and small-scale manufacture owners and their institution. Selected informants, HHs and small-scale industries interviewed about SWM and its impacts both on human and aesthetics appearance of the town. The structured questionnaire also used to assess the SWM service delivery system of the town. The representative households of the study's target demographic were chosen using a straightforward random selection technique. To find out how household and industrial solid waste is disposed of and managed in the research area, it is crucial to apply this sample technique. Additionally, each kebeles home and private

business area had an equal chance of being chosen for the study using simple random sampling. There are **six** kebeles in Metu Town, the research location that was chosen.

3.5.1 Sample Size

The study was carried out in **four** randomly selected sample kebeles (Gadisa Oda, Abba Mole, Abba Sayya, and Sor) based on severity of solid waste disposal problems. There are 5990 total households in *Gadisa Oda*, 5750 total households in *Abba Mole*, 5300 total households in *Abba Sayya*, and 5088 total households in *Sor* kebele. Thus, 22,128 households make up the entire number of the four Kebele according to a survey I was conducted per each kebele. For the study, a total of 106 sample participants/respondents were selected from the four kebeles using the simple lottery methods. Each kebeles' participants were selected based on their affection and knowledge they have towards the impacts imposed by waste in the research site.

S.N.	Selected kebeles	Total HHs	Represented HHs
1	Gadisa Oda	5990	30
2	Abba Mole	5750	23
3	Abba Sayya	5300	25
4	Sor	5088	28
Total		22,128	106

Table 3.1 *Total Number of Selected Participants*

Source: *Metu town Municipal administration*

3.5.2 Sampling Technique

The sampling techniques of this study were a combination of purposive sampling and simple random sampling. Purposive sampling was used for representing small-scale industry owner (10 informants) as only ten of them found in the town, Sanitation workers group leaders (5 informants) and Key informant from Metu town administration (1 informant) who do have in depth know how about the study issue. In addition, simple random sampling was used to select 90 informants from Male Headed House Households and Female headed households from the sample frame of 22,128 households by using lottery system.

3.6 Methods and Instruments of Data Collection

Different data collecting tools under qualitative methods such as interviews, focus group discussion, and participant observation and field work employed. Quantitative structured questionnaires administered to collect quantitative data from a sample population to acquire the data for this study.

3.6.1 Interviews

Interview was taken place with key informants selected from private industry owners (5 informants, officials (2), sanitation workers leaders (3) and office of the municipal sanitation leader (1) with the use of guiding interview question. I have used interviews due it helps to get people's perceptions towards taking responsibility of solid waste disposal management. This direct interview was used me to get accurate information and level of their understanding about the impacts of SWDM

3.6.2 Focus Group Discussions

FGD is used the research to gather data by discussing issues under investigation with sampled members of community. The discussion was conducted with provision of guiding question in each kebele according to their locational relativeness. Two FGDs which has 8 members were implemented per each kebeles. They have begun to discuss the issue understudy by reacting towards the raised question and finalized by forwarding the possible solutions for the future management and disposal mechanisms.

3.6.3 Field Observation

Direct observation indicates the eye witness of researcher about SWM disposal area and mechanism in service in the selected kebeles of Metu town. So, I have seen sampled industries, and householders waste generation level, methods of disposal and reuse. Further, during my observation I have considered the process of law enforcement and attempts of individuals to respect and obey the government policy regarding waste management and disposal. Field observation was conducted throughout the selected kebele to gain the ways of collection and transportation to the disposal sites. In addition, I have used photography and some Audio video

to show the activities of solid waste collection and its improperness as per the existing regional and national policy.

3.6.4 Questionnaires

The quantitative data gathering constitutes to the primary data of this research. As a researcher I have used questionnaires to collect certain kinds of views and perceptions of individuals about impacts of improper solid waste management and disposal from 90 respondents. This method was covered a large number householders and concerning body in the study area. Both closed-ended and open-ended questions were used to acquire the existing facts by allowing the informants to react freely.

3.6.5 Secondary Data

To support the primary data collected by the aforementioned instruments, I have collected and used archives, reports, plans, publication, earlier researches, population census data and policies on state of solid waste management and disposal in Ethiopia and Metu in particular.

So, these instruments were utilized to achieve the objective of the study by collecting necessary data from target population and institutions of this study area. Generally, with the use of these qualitative and quantitative research methods the researcher collected rich data from targeted population.

3.7 Method of Data analysis

Qualitative and quantitative data was analyzed with the use of qualitative and quantitative tools. For qualitative data, schematizing, interpreting and summarizing of response of informants were employed, while for quantitative percentages, tables', pie charts and bar charts were used to summarize the information gathered from the field.

3.8 Ethical Issues

Protecting and take caring for informant's security is the formative issue in the process of research. By considering the fears and rights of my informants I have collected all the necessary information. Initially, the researcher has begun by submitting the official letter from JU to the

concerned body to communicate with the people and collect data from site. So, this was confirmed by municipal administration before directly start data collection process. I made consent with my informants to avoid harming issues by defending informant's anonymity.

CHAPTER FOUR

RESULT AND DISCUSSIONS

4 Introduction

The data from the research site and its analysis are presented in this chapter. Data from the survey are evaluated using a variety of techniques in order to meet each of the study's specific objectives. Household and small-scale industry solid waste disposal and its management practices are examined in the cases of *Gadisa Oda*, *Sor*, *Abba Mole* and *Abba Sayya* kebeles of Metu town descriptively as indicated in the methodology part of this study. This study actively indicated **106** respondents from the mentioned four kebeles. Household participants (90), small-scale industry owner (10), Sanitation workers group leaders (5) and Key informant from Metu town administration (1) are study population of this research.

4.1 Demographic Characteristics of Respondents

The response rate of participants was also mentioned in the following table.

Selected Kebele	Administered Questionnaires	Collected Responses	Resp. Quest. in %
Gadisa Oda	30	30	100
Sor	28	28	100
Abba Sayya	25	25	100
Abba Mole	23	23	100
Total	106	106	100

Table 4.1 Rate of administered questionnaires per selected Kebele

The information mentioned in the above table implies that the distribution of participants as per selected kebeles of the Metu town municipal administration. The selected participants are provided questionnaires by the researcher, and they were administered with the intention of creating a good relationship and agreement with them.

The features of targeted population of the selected sites for this study is illustrated based surveyed data from participants. The researcher collected this necessary information about the participants during field observation. In addition, the backgrounds of individual participants were obtained under administered questionnaires and interview. This basic characteristic caused impacts of improper solid waste management directly and indirectly over the habitats of Metu town population. Because all age groups, Sexes and family members have no equal understanding on the issues under study.

Table 4.2 Socio-demographic Characteristics of Respondents

The participants of this study were including the age categories that have ability to take social responsibility. Thus, the age classes from 18– 45 are active social classes and independent to bear the required responsibility both as member of their family and individually. The observation conducted on each selected sites of this study implies that the matter of SWDM is the weakness of the municipal administration. Male Householders and Female Householders were also included in the chance of administered questionnaires and interview. In addition, individual family house bands and wives were involved due to their differences of understanding towards the SWDM practices locally. The observation data and feedback from participants show that the family size determines household solid waste generation. The household with large family has the chance to generate more waste from food remains and other material usages. However, that family which has small size generates less solid waste remains. In addition, small-scale industry also generates solid waste from their manufacturing industry. Most of these industries were owned by individual owner and few of them are mutually owned by cooperative professional workers.

Most the participants engaged within this research population were owner of residential house. Despite some of them did not use any mechanism to avoid impacts of improper solid waste disposal in a surrounding of their house. Furthermore, the sites of small-scale industry work place were located in between residential area and Main Street on which they dump wastes inappropriately.

4.2 The Solid Waste Generation and Composition in the Metu Town

The solid waste management proclamation (No. 513/2007) and Ethiopia's environment policy have been given special attention, despite the fact that there are many legislative and policy elements that are connected to solid waste in one way or another. The FDRE Solid Waste Management Proclamation aims to improve capacities at all levels to prevent adverse impacts and create economically and socially beneficial assets from solid waste, promoting community participation and implementing action plans at the lowest urban administration unit. This policy also works for Metu Municipal administration.

The main producers of solid waste in Metu town, selected Kebeles are the homes in residential areas as well as the commercial, industrial, institutional, and agricultural sectors. The solid waste dumped on the street, residential and commercial areas, small industries, and by each household are products of daily activities that are carried out to fulfill their basic needs. According to the data obtained from direct observation and interviews conducted with householders and owners of small-scale industries, the following waste compositions were identified in Metu as the main sources of pollution because of the weaknesses of law enforcement and a low understanding of the impacts of improper solid waste disposal mechanisms. Then, this needs efforts of municipal administration and experts to minimize the impacts emanated from improper management and disposal practices

4.2.1 Small-Scale Industry Solid Waste

From the trends in other parts of developing towns and cities, the waste generated from small-scale industries is a source of social impacts for a particular community. In Metu town industrial solid wastes are generated from coffee processing factories, wood and metal work, automotive

and electronics repair, road and house construction demolitions, cloths fabrics etc. The feedback forwarded by participants signifies that the weakness of law enforcement and administrative structure and their ineffectiveness to manage and guide mechanisms for disposing of small-scale solid waste are causing disturbances surrounding the residential area. It is also affecting social health and causing sound disturbances due to its establishment being nearest to residential sites. The researcher's direct observation and interview results show that the distance between industries and resident sites is not designed based on the standard of administration.

According to interview and questionnaire results, a wide range of items with differing levels of environmental toxicity are included in the Metu town's industrial solid waste. This spectrum would typically comprise things like paper, packaging materials, food processing waste, oils, solvents, paints and sludge/mud, glass, ceramics, stones, metals, polymers, rubber, wood, fabric, straw, and abrasives, to name a few. The response of participants indicates that lack of an organized, regularly updated database on industrial solid waste guarantees the precise rates of creation are generally unknown, just like with municipal solid waste. It also varies from kebele to kebele due to the appropriateness of place selection by the private sector.

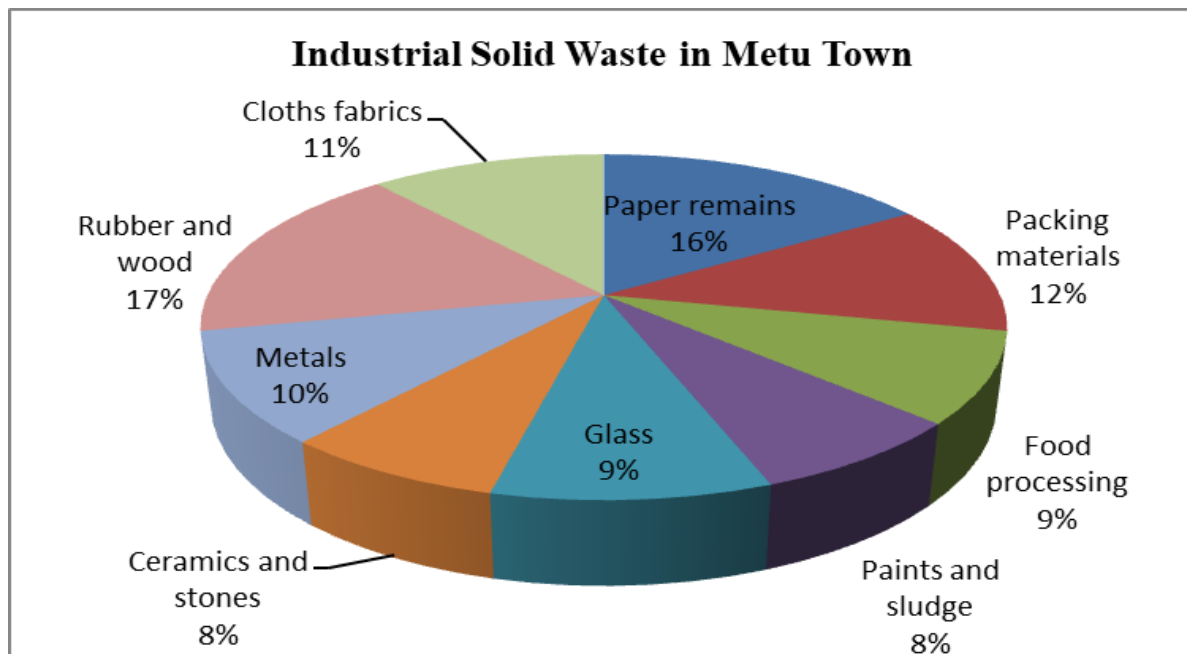


Chart 4.2 Small-Scale Industrial Solid Waste in Metu town

4.2.2 Market Station Solid Waste

The prevalence of Commercial solid waste is based on quantities and types of waste. According to my own observation, the Metu Town Market Station solid waste encompasses the remains of vegetables, fruits, fabricated material packs, crop remains, food remains, etc. Buyers and sellers largely produced these wastes regularly on market days, and the others were produced on working days by buyers and sellers. Because of weak law enforcement, the user did not take responsibility to collect and dispose of the generated waste. In addition, the khat/chat is mostly known for commercial crops in the area, and the user generates its remains as solid waste elsewhere on the street and residential areas of the selected kebeles. My informants from the market station area also replied the requested question as they didn't consider about the wastes left from their production due there is no one can influence them to collect and dispose.

S.N	Categories of Commercial Wastes	Frequency	Percentage
1	Fruits and Vegetables	20	19
2	Packed material covers	31	29
3	Crop remains	13	12
4	Food remains	13	12
5	Chat trimmings	29	27

Table 4.3 Commercial Solid Waste types in Mettu Town

4.2.3 Residential Solid Waste

Organic and some non-organic trashes are among the waste products of home activities in Metu Town. The feedback of interview and researchers' observation indicates that residential solid waste typically includes old clothes and shoes, plastics, construction demolitions, food left over, and others. The quantity and place of residential area determines the waste generated by each householder. The householder informants included under this study replied the questionnaires and interview questions provided for them as waste collection practices are not regularly carried out by responsible workers of the administration.

S.N	Categories of Residential Solid Waste	Frequency	Percentage
1	Construction demolishes	25	23
2	Food left over	13	12
3	Plastic materials	26	24
4	Old clothes and Shoes	15	14
5	Festal	27	25

Table 4.4 Categories of Residential Solid Waste in Metu Town

4.2.4 Hotels and Restaurants Solid Waste

The expansion and construction of hotels and restaurants generates waste, which affects social life. My informants from the each kebeles equally forwarded that hotel and restaurant produces waste from the remains of foods and plastic materials overthrown on the streets and disposed of inappropriate places. From my observation, this needs attention in Metu town and the surrounding areas to tackle the emerging problems. Most of these institutions are located in Sor and Abba Mole kebeles due they found right and left of main road from Addis to Gambella.

4.2.5 Agricultural Production Solid Waste

Metu Town's municipal administration is encircled by agricultural land. The residents of the town also cultivate land in the kebeles closest to the town center and in the backyards of their townhouses. The response of participants from Abba Saya and Gadisa Oda responses stated that the leftovers from this production also add to the solid trash that individual use and households produce. They have indicated that agricultural solid trash in Metu town include like remains from processed coffee, banana, *enset*, maize crop residues, avocado trees and fruit remains, mango, and other production remains.

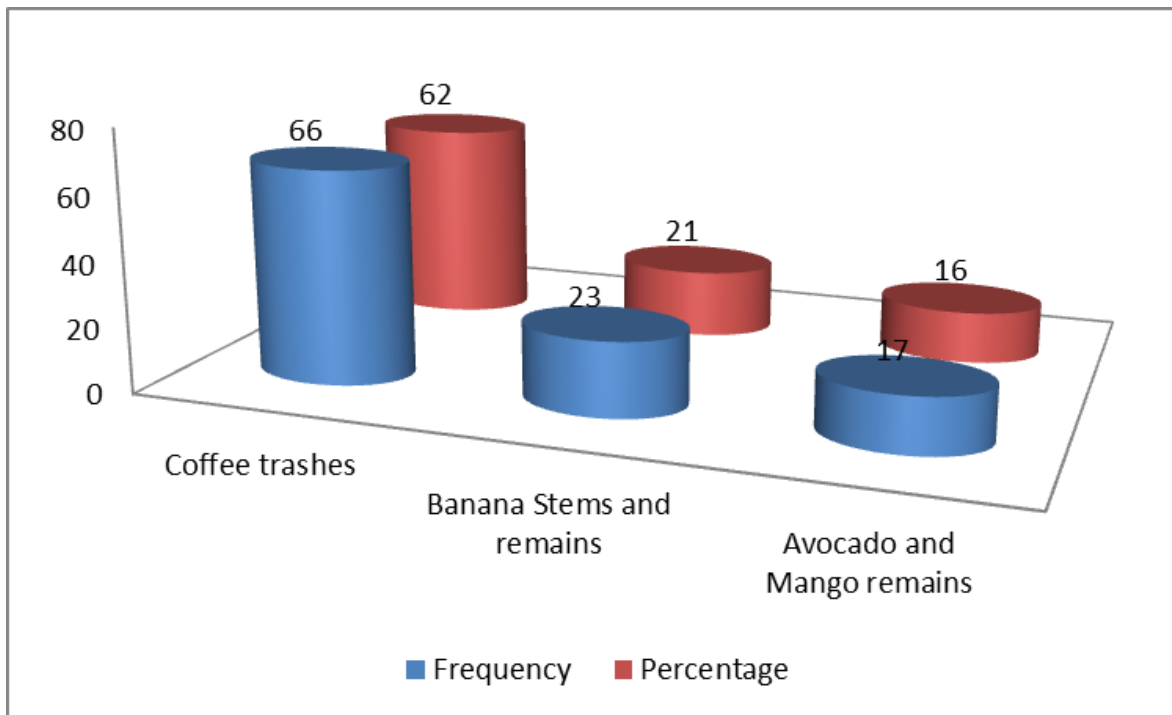


Chart 4.3 Agricultural Solid Wastes in Metu Town

4.3 Solid Waste Collection and Disposal Practices

This research surveyed the methods used in Metu town selected Kebeles for the collection, transportation, and disposal of solid waste, with an emphasis on the application of government policy concepts for environmental protection and creation of suitable residential area for health life of the community. According informant feedback, the development of dumpsites, material utilization stations, landfill security, and selective garbage collection are the main goals of Metu Town's municipal solid waste management program. Most participants, including householders and small-scale industry owners, agreed with the significance of solid waste collection to free their town from pollution and other impacts caused by improper solid waste management. Whereas some of the participants refused the issue as it was the responsibility of the town administration. Furthermore, others also said that there is a shortage of transportation, facilitating the collection of solid waste by the Metu town municipal administration. The container station and ways of collecting waste from house to house also lack coordination, according to their

response. Metu Town Municipal Administration has hired 1750 sanitation workers on contract for 3 years, of whom 840 are males and 950 are females within the existing kebeles as a town. However, these workers are complaining about the payments provided by the municipality for these cleaning processes.

4.4 Materials Used for Solid Waste Storage by Households

The materials used as storage for solid waste within selected kebele differ based on the size and amount of generated solid waste by each family. Community containers, sacks, baskets, and other methods, like the preparation of a dump hole, are among the ways of storing solid waste, according to the participants' responses. The sanitation workers collect waste from house to house over the course of two weeks with the use of a few transportation vehicles provided by the town administration.

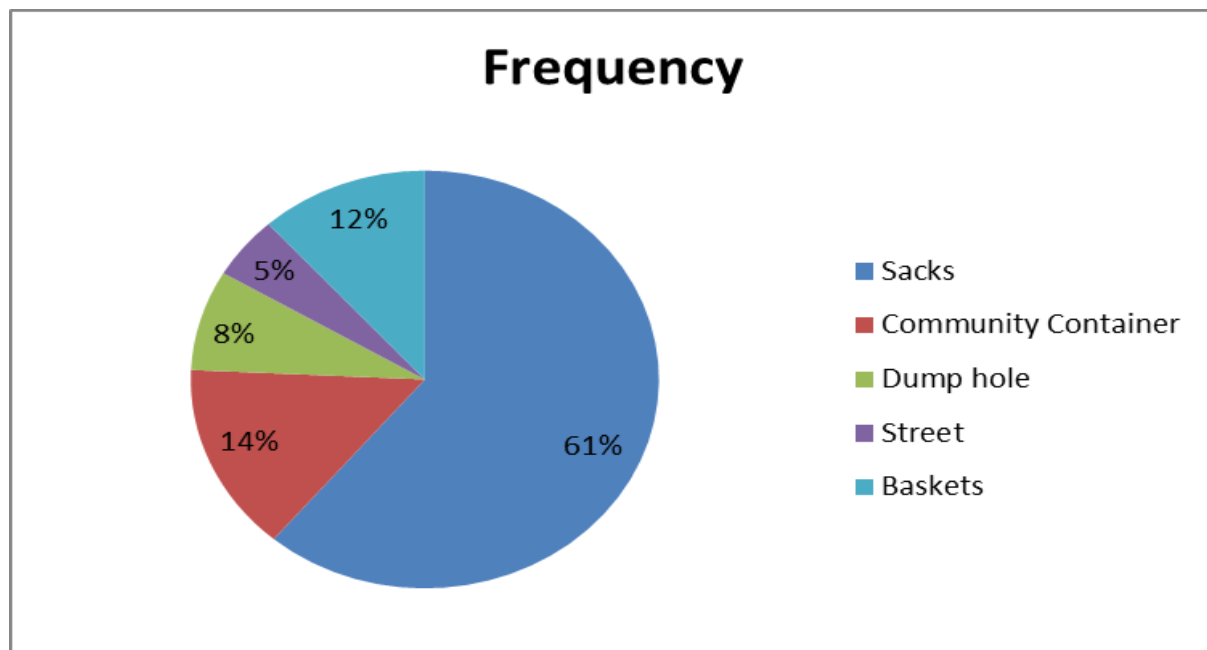


Table 4.4 Types of containers used in Metu Town

4.5 Small-Scale Industries Solid Waste Generation and Collection Practices

According to the researcher observation and key informant interview results, certain waste generated by their institutions is collected and reused, while some is disposed of completely by using individual containers. This owner of private small-scale industries includes coffee processing, woodworking, metalworking, paper manufacturing, printing presses, and automobile manufacturing. On the other hand, because of the massive quantity of garbage created, which is damaging their residential neighborhood, the community has placed blame on some of these enterprises. However, the proprietors concurred that it is important to sort garbage and collect it in order to protect the community from its effects. Furthermore, the informants informed that private property owners and local government agencies don't work together on sanitation-related issues. Thus, they claimed, cooperation between the local government and private owners was necessary to eradicate this issue completely in the future. Additionally, by stating their surrounding habitats, they have persuaded people to gather and dispose of domestic solid garbage.

4.6 Household and Private Industry Owners Disposal Methods

Depending on the kind and volume of trash produced, private sector business owners and homeowners employ different disposal methods. Under the local administration's legal enforcement, waste disposal techniques are, nonetheless, mostly the same. While some of them burn or compost the trash that are produced in their backyards, others pay for sanitation staff based on the specific services they need. According to the data from the respondents, the waste disposal method used by residents showed the table below.

S.N	Methods of disposal	Frequency	Percentage
1	Burning	41	38
2	Composting	32	30
3	Community container	20	18
4	Dumping	13	12
5	Ditching	10	9

Table 4.12 Methods of SW disposal in Metu Town

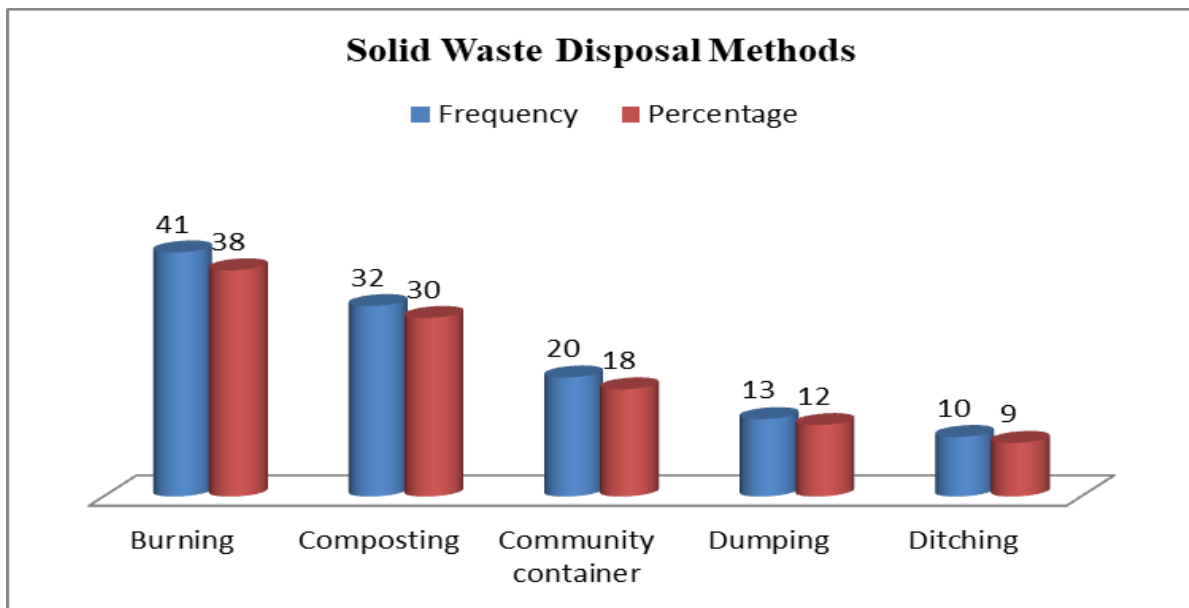


Chart 4.5 Household Solid Waste Management and disposal across the selected kebeles

The results shown in this chart indicates that the remaining families unlawfully dispose of their domestic solid waste in the study region by burning, dumping into rivers, and using drainage channels. Experts' response specified that the sites are experiencing health and environmental issues as a result of the informal method of disposing of solid waste in open dumps, drainage channels, and rivers. The next plate illustrates, respectively, the unlawful burning of solid waste at an open dump and its disposal at an open dump.



Figure: 4. 1. Solid Waste disposed in residential area & street

4.7 The Disposal Facility Provision

The participant's feedback implies that there is no continuous facility provided by the town sanitation sector. The existing materials and transportation for collection of house to house waste is few and sometimes it is not functional due to absence maintenance. The road which connects kebeles with the center is also not appropriate for vehicles with the exception of Main Street and some cobble stone lines. The community waste container is another problem of Metu town waste collection and disposal. Limited number of community container is serving on sensitive area. Otherwise, dwellers simply collect it with the use of sacks and dispose by their own methods from my observation.

The sanitation sector replied that as they are working to organize and facilitate the sanitation workers with better transportation vehicles. The town administration also adds as they are facilitating micro enterprise on sanitation and beautifying town street and kebeles. A majority of the respondents, namely 78%, stated that the research region lacks adequate disposal facilities. Good disposal facilities were mentioned by the lowest percentage of respondents (22%). The Metu Town solid waste management infrastructure, including the equipment used for collection, transportation, and disposal, is in disrepair because it is old, has not been maintained, and operates slowly. Families are unhappy with the erratic collection, financial constraints, antiquated equipment, and costly services.



Figure 4.2 Solid waste disposal site of Metu town

Source: Field Observation, 2023

4.8 Deficiencies in SWM Sector

This section addresses the difficulties in managing solid waste in the town of Metu, with a particular emphasis on solid waste from households and small-scale industries. My informants from Gadisa Oda and Sor kebele stressed that garbage is deposited in waterways, open spaces, and streets due to inadequate garbage collection services and a refusal to pay for them, which exacerbates environmental degradation and health problems for people. Families choose alternate locations for collecting outside of their homes or make use of baskets and plastic bags for short-term storage. According to a survey showed that 75% of participants in a community do not have communal trash containers for effective garbage disposal.

Key informants and the municipality's head of sanitation also stressed how crucial containers are. But in reality, door-to-door garbage pickup was favored over containers because of insufficient funding. Private enterprises are projected by the Sanitation and Beautification Office to be responsible for 35% of the collection of garbage from homes and businesses. With a few tracks and skip transporters, the municipality has enhanced collection operations. House-to-house collection is facilitated by a partnership between the municipality and three private waste collectors, including four micro-enterprises. Private companies charge 25–50 birr per month for the collection and transportation of household garbage, and 50–90 birr per month for industry. They collect the trash from the residences and the work area and transport it to the disposal site. The chart below shows the various issues and difficulties the community faced with managing, storing, collecting, and disposing of waste.

S.N.	Categories of Facing Problems	Frequency	Percentage
1	Absence of centralized trash collecting infrastructure	38	35
2	Trash being thrown around the collection sites	14	13
3	Dispersing within the garden	23	21

4	Discharging trash on any open area	18	16
5	Extended storage of refuse at central collecting facilities	13	12

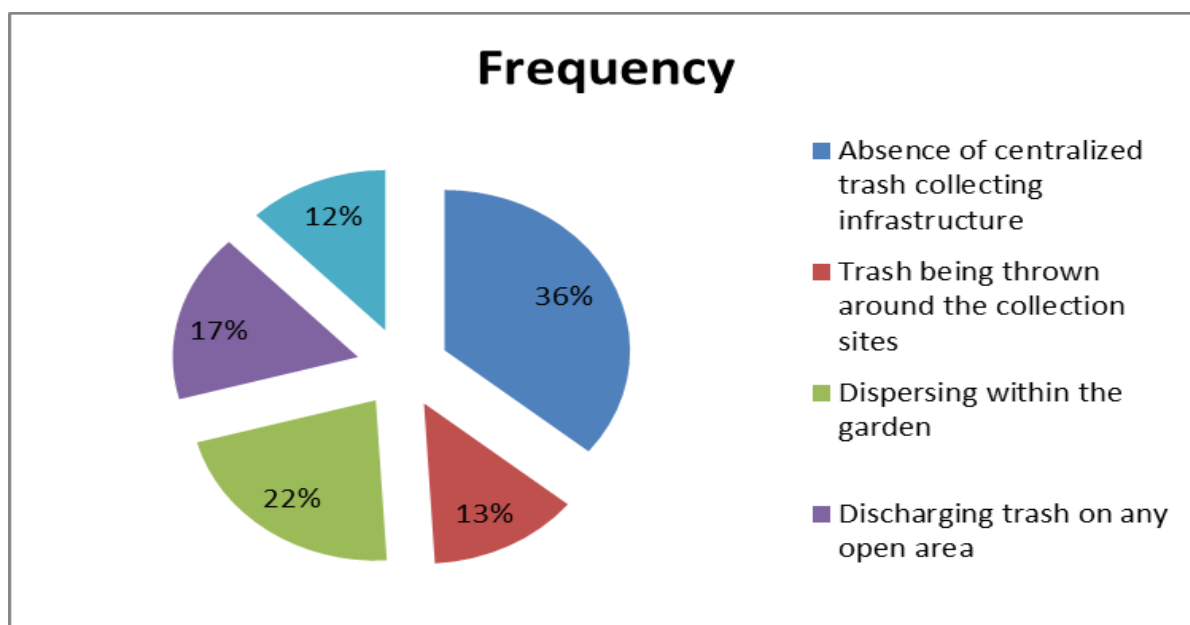


Chart 4.4 Problems facing Solid waste management and disposal in Metu town



Figure: 4.3. Collected and overthrown Waste on Main Street

Source: Field Observation, 2023

4.8.1 Weak Law Enforcement and Awareness

In today's rapidly urbanizing world, the issue of municipal solid waste disposal has become a pressing concern. The impacts of weak law enforcement and lack of awareness on this matter are far-reaching and demand immediate attention including my study area. This analysis is going to shed light on the consequences of these two factors and their implications for our environment and society from my field observation and interview made with participants.

Weak law enforcement regarding waste disposal regulations has dire consequences for both the environment and public health. My key informants suggested that when laws are not effectively enforced, individuals and businesses may disregard proper waste management practices, leading to the indiscriminate dumping of waste in unauthorized areas. This not only pollutes the surrounding environment but also poses a significant risk to the health of nearby communities. Toxic substances from improperly disposed waste can contaminate soil, water sources, and even the air we breathe, causing serious health issues such as respiratory problems, skin diseases, and even cancer, replied the interviewee.

Furthermore, the lack of awareness among the general public exacerbates the problem. From my own field observation, many people are unaware of the potential harm caused by improper waste disposal and the importance of recycling and reducing waste. Lacking proper education and awareness campaigns, individuals may continue to dispose of waste in an unsustainable manner, perpetuating the cycle of pollution and environmental degradation.

One of my informants from Metu Municipal administration said that the consequences of weak law enforcement and lack of awareness on municipal solid waste disposal extend beyond the immediate environmental and health impacts. They also have economic implications. Improper waste management can lead to increased costs for local governments, as they are forced to allocate resources to clean up and mitigate the damage caused by illegal dumping. Moreover, the

negative image associated with areas plagued by waste mismanagement can deter potential investors and tourists, hindering economic growth and development.

According to results of administered FGD' and interview with participants, to address these issues, a multi-faceted approach is required. Strengthening law enforcement and implementing stricter penalties for waste-related offenses is crucial. Additionally, raising awareness through educational programs, public campaigns, and community engagement initiatives can empower individuals to make more sustainable choices in waste disposal. Encouraging recycling, promoting composting, and reducing single-use plastics are just a few examples of the actions that can be taken to mitigate the impacts of weak law enforcement and lack of awareness.

The research findings indicate that the issues surrounding solid waste management in Metu Kebeles are mostly caused by insufficient institutional capacity to address the problem. This is due to a lack of financial resources, competence, and administrative and legal enforcement of environmental standards. Uncontrolled solid waste disposal is the result of a combination of these factors, including a lack of environmental ethics and public awareness. The goal of cleanliness control is not being met, despite the fact that the city administration has an independent bureau dedicated to the task. Additionally, I discovered that there is a lack of coordination between the residents, the government, and non-governmental organizations during my interviews and visits to the villages chosen for this study. Implementing the current laws has been plagued by shortcomings on the part of the city administration. Individuals have not kept up with the necessary cleaning and upkeep of their living spaces. The town administration is allegedly not fostering a solid relationship with dwellers and small industrial owners regarding dry trash and cleanliness.

The primary barrier continues to be budget in Metu municipality facilitate the solid waste disposal, along with a deficiency of knowledge among waste generators at the local level that contributes to the issue of scattering. As shown in illegally dumped waste solid beside the road, uncollected waste is unlawfully dumped in public areas, around bodies of water, or even burned

on streets and by the side of roads. This study also demonstrated that improper waste management has a detrimental effect on public waste because of environmental pollution. According to the survey, respondents who don't know how about solid waste management are more likely to handle waste improperly.

This finding is consistent with other research that suggests that greater awareness of the topic results in more efficient waste management. Only less, though, employ effective management techniques. Regulation enforcement and effective waste management are positively correlated, with law enforcement respondents being more likely to handle trash inappropriately in the presence of lax limitations. One further contributing issue is negative attitudes toward trash management.

In summary, this study found that most houses and industry solid waste disposal systems were inappropriate and unapproved, based on data collected from the study area. The impacts of weak law enforcement and lack of awareness on municipal solid waste disposal are significant and wide-ranging. From environmental degradation and public health risks to economic setbacks, the consequences are far too great to ignore. The participants justified that it is imperative for governments, communities, and individuals come together to address these issues through effective law enforcement, education, and sustainable waste management practices. Only through collective action can we create together a cleaner, healthier, and more sustainable future for generations to come.

4.8.2 Lack of cooperation and invitation of Stakeholders

Solid waste generation and disposal is a pressing issue that municipalities worldwide are grappling with. In order to effectively address this issue, it is crucial for municipalities to actively engage and cooperate with stakeholders. However, there is a concerning lack of cooperation and invitation of stakeholders by municipal authorities in many towns. The reasons behind this lack of cooperation and the importance of involving stakeholders in solid waste management was observed and analyzed as follows.

According to participant's point of view, one of the main reasons for the lack of cooperation is the limited understanding of the role and significance of stakeholders in solid waste management. Municipal authorities often view waste management as solely their responsibility, neglecting the fact that it is a shared responsibility that requires collaboration from various stakeholders such as residents, businesses, waste management companies, and environmental organizations. By involving stakeholders, municipalities can tap into their expertise, resources, and innovative ideas, leading to more effective waste management strategies. But, this was lacked, as they said.

Another reason for the lack of cooperation is the absence of clear communication and engagement strategies from municipal authorities. Stakeholders need to be informed and educated about the importance of their involvement in waste management initiatives. Municipalities should actively reach out to stakeholders through various channels such as public meetings, workshops, and online platforms to create awareness and foster a sense of ownership among stakeholders. By doing so, a Metu municipality hasn't built trust and encourages stakeholders to actively participate in waste reduction and recycling efforts.

Furthermore, the lack of incentives and recognition for stakeholders' contributions hinders their willingness to cooperate. Municipality should acknowledge and appreciate the efforts of stakeholders in waste management. This can be done through recognition programs, awards, or even financial incentives for businesses and residents who actively participate in waste reduction programs. By providing tangible benefits, municipality hasn't motivated stakeholders to actively engage in waste management initiatives.

In conclusion, the lack of cooperation and invitation of stakeholders by municipal authorities in controlling solid waste generation and disposal is a significant challenge in Metu town. However, respondents forwarded that by recognizing the importance of stakeholders, improving communication and engagement strategies, and providing incentives, municipality can enhance stakeholder cooperation and achieve more effective solid waste management. It is crucial for municipality's to actively involve stakeholders in order to address this pressing issue and create a

sustainable future for communities. Participants are also responded that there is no enough coalition between other stakeholders and mass population regarding the issues under study. One of my respondents said that the concerning office about town sanitation carelessly advices and works on solid waste management in Metu town. And this should be solved in the future as he has said.

4.9 The Economic and Health Impact of Improper SWMD

Improper municipal solid waste disposal has significant economic and health impacts on communities. Under this sub-section I have analyzed impacts and highlight the importance of proper waste management practices.

Economically, from my observation improper waste disposal can lead to increased costs for local governments and taxpayers. When waste is not managed efficiently, it can result in the need for additional waste collection services, transportation, and disposal facilities. These extra expenses can strain municipal budgets and divert funds from other essential services such as education and healthcare.

Furthermore, according to the study area existing realities, improper waste disposal can have detrimental effects on the environment, leading to pollution and degradation of natural resources. When waste is not disposed of properly, it can contaminate soil, water sources, and air quality. This pollution can harm ecosystems, wildlife, and human health. The costs associated with cleaning up and remedying the environmental damage caused by improper waste disposal can be substantial.

In terms of health impacts, my key informants and FGD participants informed me that improper waste disposal can pose serious risks to human well-being in this area. When waste is not managed correctly, it can attract pests such as rats, flies, and mosquitoes, which can spread diseases, participants said. For instance malaria is severely affecting the town inhabitants currently. Additionally, householders responded that the decomposition of organic waste can release harmful gases and odors, leading to respiratory problems and other health issues for

nearby residents. Improper disposal of hazardous waste can also expose individuals to toxic substances, increasing the risk of long-term health problems.

One of my key informants revealed that to mitigate these economic and health impacts, it is crucial to implement proper waste management practices. This includes promoting recycling and composting, investing in waste treatment facilities, and educating the public about the importance of responsible waste disposal. By adopting sustainable waste management strategies, communities can reduce the economic burden associated with improper waste disposal and safeguard public health. From my point of view as I understand the feedbacks of question to respondents, the issue under study has weakness from the side of government experts and institutions. Thus means, if they necessarily encourage and facilitate the community the existing solid waste disposal should be controlled in a good manner.

In conclusion, improper Metu town municipal solid waste disposal has significant economic and health impacts. It is essential for communities to prioritize proper waste management practices to minimize these effects. By doing this, we can guarantee the effective use of resources, protect the environment, and improve public health.

4.10 Major Causes for Inappropriate SWD

Improper municipal solid waste disposal poses significant environmental risks as well as impacts public health and quality of life. Understanding the major causes behind this problem is crucial in order to develop effective solutions according to Metu town. So, this section analyzes the key factors contributing to improper municipal solid waste disposal.

Lack of Awareness and Education is one of the primary causes of improper waste disposal is the lack of awareness and education among the general public in this site. From interview and questionnaire results, many individuals are unaware of the negative consequences of improper waste management and the importance of recycling. This leads to a lack of motivation to properly dispose of waste, resulting in increased pollution and environmental degradation. This is exemplified by small-scale industry those which manufactures one limited production at a time.

From my observation and interview with experts and private owners, for instance, coffee processing and wood work industry remains can be used to produce charcoal and other production if they have provided training how to reuse. But many of the institutions are simply overthrown the remains and burnt it within their backyards and nearest to street and residential area. So, this is the responsibility of government institutions to invite innovators to equip owners with the knowledge of reusing and multiplying their productions in terms of service to the local community.

Inadequate Infrastructure for waste management is another major cause of improper waste disposal in Metu Municipal. According to participant's view, communities lack proper waste collection systems, recycling facilities, and landfill management. This leads to the accumulation of waste in public spaces, rivers, and other natural habitats. Inadequate infrastructure also hinders the implementation of effective waste management practices. As respondents' reaction to this issue during interview and administered questionnaires, shortage of waste container with permanent specified place, insufficient vehicles to collect waste across kebeles and limited number of workers are the underlying problems.

Limited Financial Resources can also contribute to waste disposal in Metu town. The head of beautification and Sanitation Office stated that the budget allocated for this purpose is minimal compared to the other sector of the town administration. He said that most of the time the payments for the sanitation workers were paid on the individual householders' levels. Despite of inability to pay the necessary payments, residents were overthrown the waste around school area, offices and greenery sites. Municipality often faces budget constraints, making it challenging to invest in waste management infrastructure and services. This can result in inadequate waste collection, improper disposal methods, and a lack of recycling facilities. In line to this the Sanitation Officer forwarded that without sufficient funding, it becomes difficult to implement sustainable waste management practices.

Absence of Government Regulations Enforcement is another issue raised by the informants. Almost all participants' responses imply that the absence of strict government regulations and

enforcement mechanisms is another significant cause of improper waste disposal. In this area, there may be a lack of legislation or weak enforcement of existing laws related to waste management. This allows individuals and businesses to disregard proper waste disposal practices, leading to increased pollution and environmental impacts. For instance, the results of my own observation and interviews conducted with some householders within Abba Mole and Sor kebeles express this certainty. As they have described beyond the day, the inhabitants threw waste carelessly on street and living area tonight. I have also observed the collection of wastes dumped improperly in a surrounding area of schools and Main Street of the town.

The cultural and behavioral value towards the environment also plays a role in improper waste disposal according to my observation and views of informants. In some communities, there may be a lack of social norms and practices that promote responsible waste management. Additionally, a throwaway culture and a lack of personal responsibility for waste disposal contribute to the problem. Changing these cultural and behavioral patterns is essential for improving waste management practices. Some respondents reacted towards issue as the young generation lacks respect for living environment and incapability to contribute the management and disposal of solid waste. One of my informants has risen how they generate waste during chewing chat elsewhere in the town instead of collecting.

In conclusion, improper municipal solid waste disposal is a complex issue with multiple causes. Lack of awareness and education, inadequate infrastructure, limited financial resources, lack of government regulations and enforcement, and cultural and behavioral factors all contribute to this problem. Addressing these causes requires a multi-faceted approach involving education, infrastructure development, policy changes, and community engagement. By understanding and addressing these causes, we can work towards more sustainable waste management practices and create a cleaner and healthier environment for future generations.

4.11 Challenges in SWMD in Metu Town Area

Focusing on infrastructure issues, particularly with regard to collection and transportation operations from informal settlements, the researcher examined waste solid reduction measures in

Metu Town kebeles. From my observation wastes are unofficially dumped in sites of wetlands, abandoned houses, and along roadside due to poor road networks and landowners who are ignorant of trash management. Residents and garbage trucks found it challenging to access the new disposal sites because they were situated distant from densely populated suburbs. The researcher proposes moving residents close to a landfill, which will cost a large sum of money. The Metu Town district's fast urban population expansion and industrial activity lead to an increase in trash volumes, endangering the environment and public health. In addition to water and sanitation, MSWM is a crucial issue in urban management. The research draws attention to the legal difficulties faced by the Metu Town Districts, such as the absence of solid waste management policies and the dearth of environmental education in both formal and informal educational settings.

This research analysis highlights social and economic challenges with the private sector's involvement in garbage transportation and collection. Public waste management techniques are still ineffectual, and many people produce trash without thinking through the consequences. Urban councils' incapacity to enforce waste rules, political meddling, and low public participation all contribute to the public's unfavorable attitude toward trash management. According to Key informant interview and results of observation, political meddling undermines the institutions that oversee environmental protection, making it more challenging for the public to participate. The economy, low living standards, education, and negative attitudes and culture all contribute to low participation rates. Weaknesses in urban councils result in management breakdowns, which fuel waste buildup, deterioration of the environment, and disease outbreaks. However, the government is helping the people of Metu City become more conscious of solid waste management.

In order to comply with environmental and waste management regulations, sorting, effective skip usage, recycling, composting, and trash minimization are all included according to the sanitation officer. In addition to organizing communities on a monthly basis and addressing *attitude issues through public education and economic opportunities*, the study emphasizes the important role that Community Based Organizations (CBOs) play in solid waste management methods. Via

CBOs and garbage collectors, the government is putting solid waste reduce, reuse, and recycle processes into place. These strategies include giving market information, developing community capacity, and dividing up local communities into groups according to enterprise. In order to solve land scarcity and boost the production of solid waste, the government also makes strategies for land use and management. Incinerators are being put into place, but because of budgetary limitations, the process is just getting started.

CHAPTER FIVE

5 CONCLUSION AND RECOMMENDATION

5.1. Conclusion

This study reveals that the main causes of the solid waste management problems in Metu town Kebeles include insufficient institutional facilities, a lack of knowledge, a lack of funding, and environmental rules. Environmental ethics and public awareness have a role in the uncontrolled disposal of garbage, which results in littering and contamination of the environment. Public waste is negatively impacted by inadequate waste management. Inadequate waste management has an adverse effect on public garbage, which can result in pollution of the environment and illnesses including cholera, malaria, and diarrhea. Due to their smoke and offensive aromas, open dumpsites cause serious environmental issues that impact the water and air supplies, lead to disease, and have a large financial and social impact on public health services.

Waste management is a crucial component of urban management because of the Mettu Town District's rapid urban population expansion, small-scale industrial activity, and increasing volume of decomposable organic and electronic waste, which pose serious risks to the environment and public health. Due to a lack of knowledge, resources, labor, equipment, funding, and community involvement, Mettu Town, is confronted with a serious environmental issue. Water contamination, overflow, and flooding are caused by inappropriate waste management practices, such as inappropriate disposal. Policies pertaining to the community's willingness to pay for services, the creation of jobs for garbage collectors, and the permission for

nearby farms to use waste as fertilizer are all areas that could use improvement. Reduced stakeholder involvement is essential for better trash management and cleans urban environments.

5.2. Recommendations

Raising community awareness and strengthening capacity building on appropriate waste management are essential for reducing solid waste and improving waste management practices. For the purpose of minimizing waste and generating social and economic advantages, urban waste management should concentrate on composting and the 4Rs (Reduce, Reuse, Recycle, and Rethink) strategies. To alter the thinking of the populace, awareness campaigns must to be easily understood and accessible. Smaller towns must gradually improve their disposal techniques as part of an integrated strategy that covers resource recovery, final disposal, and segregation. A designed landfill, a sanitary landfill, or regulated dumping can all help achieve this. The study reveals that the following measures are crucial for addressing the SWM issues in Metu Town.

- ❖ Environmental education should be used to encourage the community to embrace ecologically friendly solid waste management techniques, such as appropriate collection, storage, transportation, and disposal.
- ❖ The municipality of the town is severely short-staffed; therefore, it has to hire more people and provide them with training opportunities like seminars and workshops where they can learn from other cities' best practices.
- ❖ Encourage the community, business community, and non-governmental groups to provide money for environmental education, equipment, labor, and solid waste management in order to guarantee financial capability and a seamless implementation.

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Appendix I

Jimma University
College of Law & Governance
Department of Civics & Ethical Studies

Numerous social and economic issues have an impact on people's quality of life in emerging nations like Ethiopia. The first step in addressing the effects of these issues is to carry out research at various levels. In the interim, I plan to conduct research under the heading "**The impact of improper Household & small-scale industries solid waste management in Mettu town municipality**" in order to complete my MA degree. I therefore plan to distribute questionnaires to various stakeholders in order to get input for the study. For this reason, I kindly ask that you fill out the questions below.

Questionnaires for Mettu Town Householders (dwellers of the town)

1. Do you put household waste in solid and liquid forms? Yes ☐ No ☐
2. Do you collect waste in sacks or other materials? Yes ☐ No ☐
3. If not, where do you deposit the waste? _____
4. Do you dispose of waste in ditches? Yes ☐ No ☐
5. Does the town or municipality collect waste from your home? Yes ☐ No ☐
6. If yes, how often have they collected it? Daily ☐ Weekly ☐ Monthly ☐
7. Is there a waste container around your residence? Yes ☐ No ☐
8. Do you believe your resident area is free from waste, clean, and attractive? Yes ☐ No ☐
9. If not, what are the major sources of waste in your area? _____
10. Do you think there are problems with this waste? Yes ☐ No ☐ if yes, state the problems.

11. Does the city administration set a strategy for public participation in waste disposal? Yes ☐ No ☐

12. If yes, how often does society involve itself in cleaning the environment? Regularly ☐ early ☐
13. Do you know any rules and regulations that the administration of the town adopts to manage solid waste in the town? _____
14. If you have any additional feedback on the waste disposal management service of Metu Town Municipality, please leave a comment. _____

Thank you!

Appendix II

Jimma University
College of Law & Governance
Department of Civics & Ethical Studies

Numerous social and economic issues have an impact on people's quality of life in emerging nations like Ethiopia. The first step in addressing the effects of these issues is to carry out research at various levels. In the interim, I plan to conduct research under the heading "**The impact of improper Household & Small-Scale industries solid waste management in Mettu town municipality**" in order to complete my MA degree. I therefore plan to distribute questionnaires to various stakeholders in order to get input for the study. For this reason, I kindly ask that you fill out the questions below.

Questionnaire for Mettu Town Municipal Administration

Name of the respondent _____

Job _____

1. Does the town have a special sector that works on waste disposal management?

Yes ☐ No ☐

2. How much trash is expected to be produced in the town? _____

3. What are the major sources of waste in the town?

4. Does the town municipality arrange a regular work schedule for waste disposal?

Yes ☐ No ☐

5. Is there regular supervision for small-scale industries in the town in the case of waste disposal managers? Yes ☐ No ☐

6. If 'yes', how often? Regularly ☐ sometimes ☐

7. How do small-scale industries in the town make money from their industries?

8. How many residents of the town have access to the service of waste disposal in the town?

9. Is there a container of waste in the town? Yes ☐ No ☐ If yes, how many?

10. Is there a vehicle to transport luggage? Yes ☐ No ☐ if yes, how many_____

11. Is there a selected area for waste disposal? Yes ☐ No ☐

12. If yes, how far is it from the resident area and drainage?

13. If not, where is the waste disposed of?

14. Do the residents participate in waste disposal activities?

15. If yes, how often? Regularly ☐ Rarely ☐

16. If not, why? _____

17. Have other stakeholder groups participated in the service provision? Yes ☐ No ☐ if yes, write the bodies and their roles.

18. Are there rules and regulations that regulate solid waste management in the town? Yes ☐ No ☐ if yes, state the rules.

19. What are the major challenges that affect your service provision?

20. If you have additional remark on solid waste disposal services of Metu town municipality, please, write it_____

Thank you!

Appendix III

Jimma University

College of Law & Governance

Department of Civics & Ethical Studies

Numerous social and economic issues have an impact on people's quality of life in emerging nations like Ethiopia. The first step in addressing the effects of these issues is to carry out research at various levels. In the interim, I plan to conduct research under the heading "**The impact of improper Household & Small-Scale industries solid waste management in Mettu town municipality**" in order to complete my MA degree. I therefore plan to distribute questionnaires to various stakeholders in order to get input for the study. For this reason, I kindly ask that you fill out the questions below.

Interview for the owners of Small-Scale Industries

1. Are there waste products that are produced in your industries? Yes ☐ No ☐
2. Does the waste product cause pollution in the environment? Yes ☐ No ☐
3. If yes, how does your organization manage to avoid pollutant products?

4. How far is the factory from the residents' area and institutions like schools and hospitals?

5. How often do the town and municipality administrative officials supervise the industries?
Regularly ☐ Rarely ☐ Never ☐
6. How do you collect complaints from society about your factory?

Thank you!

Appendix IV

Jimma University

College of Law & Governance

Department of Civics & Ethical Studies

Numerous social and economic issues have an impact on people's quality of life in emerging nations like Ethiopia. The first step in addressing the effects of these issues is to carry out research at various levels. In the interim, I plan to conduct research under the heading "**The impact of improper Household & Small-Scale industries solid waste management in Metu town municipality**" in order to complete my MA degree. I therefore plan to distribute questionnaires to various stakeholders in order to get input for the study. For this reason, I kindly ask that you fill out the questions below.

Interview for Sanitation Workers

Name _____

Job _____

1. How many kebeles are included in the service?

2. Why these kebeles are selected? _____

3. Do householders collaborate while you are doing your job? Yes ☐ No ☐

4. Are the workers permanent or temporary employees? _____

5. Do you believe the payment is fair? _____

6. What are the challenges in the services? _____

7. Do the town and municipality administrative officials have provided you with additional support? Yes, no. If your response is 'yes', please explain it.

Thank you!

Appendix V

Yuunivarsiitii Jimmaatti

Kolleejjii Seeraa fi Bulchiinsaa

Muummee Lammummaa fi Naamusaa

Biyyoota guddataa jiran kanneen akka Itoophiyaa keessatti rakkooleen diinagdee fi hawaasummaa kanneen jiruu fi jireenya dhala namaa dararaa hedduu tu jiru. Rakkoowwan kuniin furuuf tarkaanfiin jalqaba fudhatamuu qabu, dhimma rakkicha irratti qorannoo geggeessuu dha. Bu'uruma kanaan anis xumura barnoota koo digirii 2ffaa tiif qorannoo mata duree "**Dhiibbaa Balfaan Mana Keessaa Fi Warshaalee Xixiqqaa Haala Gaariin Dhabamsiisuuf Dhabuun Fidu Kan Magaalaa Mattuu**" kan jedhu irratti qorannoo geggeessuu waanan jiruuf, isinis odeeffannoo dhimma kana galmaa ga'uuf na gargaaru armaan gadii xiyyeeffannoo dha akka naaf guuttan kabajaan isin gaafadha.

Gaaffilee Barreeffama Abbootii Warraa Filatamaniif Dhiyaate

1. Balfaa mana keessaa isa jiidha fi gogaa addaan baaftanii ni kuusuu ?
2. Balfaa gogaa qofaatti kuustanii ni qoopheessituu? Eeyye ☐ Lakkii ☐
3. Yoo Lakkii jettan balfaan gogaa eessatti gattu ? _____
4. Balfaa gogaa bo'oo lolaa keessatti ni gattuu? Eeyye ☐ Lakkii ☐
5. Eeyyee yoo jettan maaliif? _____
6. Hojjettoonni balfaa gogaa sasaaban kan bulchiinsa magaalaa Mattuu balfaa mana keessatii sssabanii beekuuf Eeyye ☐ Lakkii ☐
7. Eeyyee yoo jettan yeroo ammamii keessatti _____
8. Kuusaan balfaa ykn taankerii naannoo keessan jiraa? _____

9. Akka yaada keessaniitti, naannoon Jireenyaa keessn balfaa irraa walqabata fi hawwisiisa dha?
Eeyyee ☐ Lakkii ☐

10. Yoo Lakkii jettan maddi balfaa naannoon keessanii maali jettu? _____

11. Balfi naannoon mana Jireenyaa tti gatamuu kun miidhaa akkamii fida jettanii
yaaddu _____

10. Bulchiisni magaalaa Mattuu dhabamsiisuf balfaa irratti hawaasa ni hirmaachaa ? Eeyyee ☐
Lakkii ☐

11. Eeyyee yoo jettan yeroo hammamii keessatti ? Dhaabbiidhan ☐ Darbee darbee ☐ akka tasaa
☐

12 . Seerota fi qajeelfamoota bulchiinsi magaalattii balfaa gogaa ittiin too'achuuf baastee beektan
jiraa ? Eeyyee ☐ Lakkii ☐

13. Yoo yaada dabalataa dhimma kenninsa tajaajilaa dhabamsiisa balfaa gogaa magaalaa Mattuu
irratti qabdan bakka kanatti barreessaa _____

Galtoomaa!

Yuunivarsiitii Jimmaatti
Kolleejjii Seeraa fi Bulchiinsaa
Muummee Lammummaa fi Naamusaa

Biyyoota guddataa jiran kanneen akka Itoophiyaa keessatti rakkooleen diinagdee fi hawaasummaa kanneen jiruu fi jireenya dhala namaa dararaa hedduu tu jiru. Rakkoowwan kuniin furuuf tarkaanfiin jalqaba fudhatanii qabu, dhimma rakkicha irratti qorannoo geggeessuu dha. Bu'uruma kanaan anis xumura barnoota koo digirii 2ffaa tiif qorannoo mata duree "**Dhiibbaa Balfaa Gogaa Mana Keessaa Fi Warshaalee Xixiqqaa Haala Gaariin Dhabamsiisuf Dhabuun Fiduu Kan Magaalaa Mattuu**" kan jedhu irratti qorannoo geggeessuu waanan jiruuf, isinis odeeffannoo dhimma kana galmaa ga'uuf na gargaaru armaan gadii xiyyeeffannoo dha akka naaf guuttan kabajaan isin gaafadha.

Gaaffilee Barreeffamaa Itti_Gaafatamtoota Dhimma Qulqullina Magaalaa Mattuutiif Dhiyaate

Maqaa _____

Itti_gaafatamummaa _____

1. Bulchiinsi magaalattii qaama dhimma dhabamsiisa balfaa gogaa irratti qofaa hojjatu qabaa? Eeyyee ☐ Lakkii ☐ yoo jiraate maqaa isaa nuuf haa ibsamu _____
2. Magaalatti yetti guyyaattibalfaa gogaa gogaa hangam tu Oomishama jedhamee tilmaamama?

3. Maddoonni balfaa gogaa kunnnin maal fa'a irraatii? _____
4. Bulchinsi magaalattii karoora fi sagantaa dhabamsiisa balfaa gogaa ni qabaa? Eeyyee ☐ Lakkii ☐
5. To'annaa fi hordofiin warshaalee xixiqqaa magaalattii kanneen balfaa gogaa oomishan irratti godhamu jiraa? Eeyyee ☐ Lakkii ☐
6. Yoo Eeyyee jettan yeroo ammamii keessatti? Dhaabbiidhan ☐ darbee darbee ☐
7. Warshaaleen kunniin haala kammiin balfaa dhabamsiisu? _____
8. Jiraattotni Magaalattii hangam tu tajaaila dhabamsiisa balfaa gogaa argata? _____

9. Taankeriin /qodaan balfaa itti kuusan/ ni jiraa? Eeyyee ☐ Lakkii ☐ Eeyyee yoo jettan meeqa?

10. Magaalattiin konkolaataa balfaa gogaa geejjibu ni qabdii? Eeyyee ☐ Lakkii ☐

11. Bakki balfaan itti gatamu kan adda bahe jiraa? Eeyyee ☐ Lakkii ☐

12. Yaadni keessan eeyyee yoo ta'e bakki kun nannoo mana jireenyaa fi bishaan yaa'u irraa ammam fagaataa?_____

13. Yaadni keessan Lakkii yoo ta'e balfi eessatti gatamaa?_____

14. Hawaasni magaalattii dhabamsiisa balfaa gogaa magaalattii ni hirmaatu? Eeyyee ☐ Lakkii ☐

15. Lakkii yoo jettan maaliif_____

16. Eeyyee yoo jettan yeroo ammamii keessatti? Sagantaa dhaabbatam ☐ Darbee darbee ☐

17. Qaamoleen biroon dhabamsiisa balfaa gogaa tti hirmaatan jiruu? Yoo jiraate qaamolee fi gahee isaanii maalii_____

18. Seerotni fi qajeelfamaootni magaalattiin balfaa gogaa ittiin too'atu ni jiraa? Eeyyee ☐ Lakkii ☐ yoo jiraate seerota kan gabaabinaan barreessaa_____

19. Gufuuwwan kenniinsa tajaajila dhabamsiisa balfaa gogaa kana keessatti isin muudatu Maal fa'a? _____

20. Yaada dabalataa kenninsa tajaajila dhabamsiisa balfaa gogaa magaalaa Mattuu irratti qabda yoo jiraate barreessaa_____

Galtoomaa

Yuunivarsiitii Jimmaatti
Kolleejjii Seeraa fi Bulchiinsaa
Muummee Lammummaa fi Naamusaa

Biyyoota guddataa jiran kanneen akka Itoophiyaa keessatti rakkooleen diinagdee fi hawaasummaa kanneen jiruu fi jireenya dhala namaa dararaa hedduu tu jiru. Rakkoowwan kuniin furuuf tarkaanfiin jalqaba fudhatanii qabu, dhimma rakkicha irratti qorannoo geggeessuu dha. Bu'uruma kanaan anis xumura barnoota koo digirii 2ffaa tiif qorannoo mata duree "**Dhiibbaa Balfaan Mana Keessaa Fi Warshaalee Xixiqqaa Haala Gaariin Dhabamsiisuf Dhabuun Fiduu Kan Magaalaa Mattuu**" kan jedhu irratti qorannoo geggeessuu waanan jiruuf, isinis odeeffannoo dhimma kana galmaa ga'uuf na gargaaru armaan gadii xiyyeeffannoo dha akka naaf guuttan kabajaan isin gaafadha.

Af-Gaaffii Abbootii Qabeenyaa Warshaa Xixiqqaatiif Dhiyaate

1. Warshaan keessan keessaa hafteen bahu jiraa? Eyyee ☐ Lakkii ☐
2. Eeyyee, yoo jettan balfaa kun nannoo ni faala moo hin faalu? _____
3. Ni dabala yoo ta'e, balfaa kana akkamii dhabamsiisuf? _____
4. Warshaan keessan Kun mana jireenyaa ykn dhaabbilee kanneen akka m/barumsaa irraa ammam fagaatee? _____
5. Hojjettoonni bulchiinsa magaalaa Mattuu haala dhabamsiisa balfaa gogaa irratti too'annaa ni taasisuuf? Eyyee ☐ Lakkii ☐
6. Dhaabbanni keessan komee uummataa akkamii sassaabaa? _____

Galatoomaa

Yuunivarsiitii Jimmaatti
Kolleejjii Seeraa fi Bulchiinsaa
Muummee Lammummaa fi Naamusaa

Biyyoota guddataa jiran kanneen akka Itoophiyaa keessatti rakkooleen diinagdee fi hawaasummaa kanneen jiruu fi jireenya dhala namaa dararaa hedduu tu jiru. Rakkoowwan kuniin furuuf tarkaanfiin jalqaba fudhatanii qabu, dhimma rakkicha irratti qorannoo geggeessuu dha. Bu'uruma kanaan anis xumura barnoota koo digirii 2ffaa tiif qorannoo mata duree "**Dhiibbaa Balfaan Mana Keessaa Fi Warshaalee Xixiqqaa Haala Gaariin Dhabamsiisuf Dhabuun Fidu Kan Magaalaa Mattuu**" kan jedhu irratti qorannoo geggeessuu waanan jiruuf, isinis odeeffannoo dhimma kana galmaa ga'uuf na gargaaru armaan gadii xiyyeeffannoo dha akka naaf guuttan kabajaan isin gaafadha.

Af-Gaaffii Hojjattoota Qulqullina Magaalaa Mattuutiif Dhiyaate

1. Hojii kana dhaabbii moo kontraataan hojjattu? _____
2. Tajaajila qulqullina kana gandoota magaalattii meeqa keessatti kennuu? _____
- 3 Kaffaltii jiraan argattan gaha dha jettanii yaaduu? _____
4. Bulchiinsi magaalaa Mattuu hojii keessan ni to'ataa ykn ni deggersa? _____
5. Hojii kana keessatti rakkoon isin muudatu Maalii? _____

Galatooma!