HAWASSA UNIVERSITY

COLLEGE OF LAW AND GOVERNANCE

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MASTERS THESIS ON:

MUNICIPAL SOLID WASTE MANAGEMENT PRACTICES AND CHALLENGES IN WOLKITE TOWN, GURAGE ZONE, SNNPRS

BY:

DIGAFENEH KIFLE WOLDE

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HAWASSA, ETHIOPIA

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HAWASSA, ETHIOPIA

DEDICATION

I the undersigned declare that this MA thesis entitled **"Municipal Solid Waste Management Practices and Challenges in Wolkite Town, Gurage Zone, SNNPRS"** is my original work and has never been presented for any degree in any university and all the sources of materials used for the thesis have been appropriately acknowledged.

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We, the undersigned members of the Board of Examiners of the final Master's degree open defense by ***Digafeneh Kifle ID NO GPDMSR 0015/11*** have read and evaluated his thesis *entitled* ***"Municipal Solid Waste Management Practices and Challenges in Wolkite Town, Gurage Zone, SNNPRS"*** and examined the candidate. This is, therefore, to certify that the thesis has been accepted in partial fulfillment of the requirement for the degree of Master's Arts in Governance and Development Studies with Specialization in Governance and Development Studies.

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ADVISORS' APPROVAL SHEET

This is to certify that the thesis entitled "***Municipal Solid Waste Management Practices and Challenges in Wolkite Town, Gurage Zone, SNNPRS***" submitted in partial fulfillment of requirements for the degree of Master's of Arts with specialization in Development Management. The Graduate Program of the School of Governance and Development Studies has been carried out by ***Digafeneh Kifle Wolde*** under our supervision. Therefore, we recommend that the student has fulfilled the requirements and hence hereby can submit the thesis to the department.

Name of Major advisor	Signature	Date
Debrework Debebe (PhD)		June 19/20/20

Name of co-advisor	Signature	Date
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LIST OF ACRONYMS AND ABBREVIATIONS

CED	Centre for Environment and Development
CSA	Central Statistical Agency
ENPHO	Environment and Public Health Organization
FDG	Focus Group Discussion
HHs	Households
HHSWM	Household Solid Waste Management
ILO	International Labor Organization
MSW	Municipal Solid Waste
MSWM	Municipal Solid Waste Management
MUDCUPSBB	Ministry of Urban Development and Construction, Urban Planning, Sanitation and Beautification Bureau
SBPDD	Sanitation, Beautification and Parks Development Department
SPSS	Statistical Package for Social Sciences
SW	Solid Waste
SWM	Solid Waste Management
UNESC	United Nations Economic and Social Council
UN-Habitat	United Nations Commission on Human Settlements
USEPA	United States Environmental Protection Agency
W H O	World Health Organization

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ABSTRACT

Solid waste management (SWM) is the collection, transfer and disposal of all non-liquid and nongaseous solid materials from residential, commercial, institutional, construction, demolishing and street sweeping. Most civilized countries recognize the importance of solid waste management as it has socioeconomic, environmental and health values. However, developing countries like Ethiopia have low consciousness and limited involvements in SWM. Based on this premises, this study is aimed to assess the SWM practices of the municipality in Wolkite town in southern Ethiopia. Descriptive research design with mixed research approach was employed in the study. Totally, 316 sample households were involved in household survey, while, other key informants from the municipality, health institutions and local community were involved in in-depth interview and FGD. The survey data was analyzed using descriptive statistics that was complemented by narration of qualitative data obtained from interview & FGDs. The finding of the study indicates that almost all of the households have temporary storage for solid wastes at their home. However, most of the households didn't store wastes separately based on the nature of the wastes. Disposing solid wastes in illegal sites is highly practiced most households. Factors like: limited awareness on solid waste management, inconsistent solid waste collection services by the municipality, in adequacy and inefficiency of the private solid waste collectors, poor coordination of governmental organizations and the private sectors in SWM. Furthermore, shortage of solid waste disposing containers and trucks in the municipality, financial constraints, inadequate human power to engage in SWM, lack of proper implementations of rules and regulations and lack of decentralized SWM services of the municipality are also among the bottlenecks that challenged the SWM practices in Wolkite town. In order to curb the challenge on SWM, concerned stakeholders should jointly work. Moreover, the municipality should carry out all the facilities for effective and efficient SWM in the town.

Key words: *Household, Municipality, Solid waste, Waste management, Wolkite*

CHAPTER ONE

1. INTRODUCTION

1.1. Background of the Study

Degradation of the environment is among the key challenges of today's life. A need to protect our surroundings and the environment has become more important than anything else (Michael, 2014). According to Allende 2009, waste has remained old age problem of human beings that has been persisted and become a growing concern of every nation of the world. Therefore, solid waste management is a challenging task not only in developing countries but also developed nations. However, generation of municipal solid waste (MSW) is one of the important contemporary environmental problems in urban areas (Pattnaik & Reddy, 2010). As urbanization continues, solid waste management (SWM) becomes a major public health and environmental threat in urban areas. Solid waste is referred to the used and leftover materials comprising of domestic solid waste (solid waste generated by households), industrial and commercial solid waste (solid waste produced by shops, hotels, offices, hospitals), construction and demolition waste and marine waste (solid waste generated from coastal zones and sea) (Jin, Wang, & Ran, 2006).

According to Tyagi *et al.*, (2014) stated that majority of developing countries are experiencing difficulties in the management of waste; especially managing the municipal solid waste produced by the growing urban dwellers. The problem for these societies, with their ever greater variety, amount and durability of refuse, is getting more serious. However, today, developed nations use solid waste as a multi dollar business and they can manage it to an acceptable level. On the contrary, third world countries face particular challenges in the management of solid waste, as in other aspects of environment management (Eshun, 2002). Therefore, even though SWM is nowhere adequately executed and is a global problem, municipalities from the developing countries are highly faced with this problem.

In addition, solid waste management is a huge task and its major responsibilities of the local authority and it needs organizational capacity and cooperation between the private and public sector (Michael, 2014). The need for managing this increasing solid waste is very crucial in an

environmentally effective, economically affordable and socially acceptable manner (Achankeg, 2004). Even though protection of the environment is very necessary for public health, solid waste management in most cities of developed or developing is unsatisfactory particularly in African cities (Michael, 2014). Therefore, proper managing, collecting and disposing of for MSW is very important for ensuring a clean and healthy environment (Pattnaik & Reddy, 2010). Moreover, the rise in population and urbanization increases in annual waste generation proportionally (Hassan, 2004).

According to Nations & Program (2005) the characteristics and quantity of solid waste generated is not only the true measure of the living standard and lifestyle of the region's inhabitant. An increase in urbanization affects the overall rate of solid waste production in many countries in the world. However, collection, disposal methods, and dumping sites for MSW exist unsolved and complex to find a solution in many large cities (Hassan, 2004). Therefore, the problem of solid waste management is more severe in African countries (Hufane, 2015). The major driving forces for waste generation are population, consumption, affluence and technology (Achankeg, 2004).

Forum for Environment (2010), one of the challenges that the Ethiopian town faces are the problem of sanitation in general and SWM in particular. Adjacently, the daily waste generation rate in a city is also increasing from time to time. But the current waste collection capacity and disposal system is not matching with the rapid expansion of the city and its corresponding waste generation. It encounters problems like shortage of containers, road side waste bins, public toilets and the absence of proper and well prepared disposal site (FUPI, 2006).

Also the current condition of municipal solid waste management service in different towns of Ethiopia is also becoming a challenge for municipalities. For instance, according to Birke's (1999) cited in Degnet (2003) study of municipal solid waste management practices of 15 regional cities of Ethiopia, a controlled solid waste disposal system was practiced in only two of them. That means small proportions of the urban dwellers are served and a large quantity of solid waste left uncollected. Moreover, a study conducted by (MoH, 1996) cited in Gebrie (2009) revealed percentage of solid wastes which are left uncollected and disposed anyplace without due attention regarding their consequences in different towns of Ethiopia.

Hence, the people give no or little attention to SWM and they dump wastes along the roads and in open spaces. In addition, most of the local government and private institutions and industries in the study area did not start treating or reusing their waste properly.

1.2. Statement of the problem

Municipal solid waste management (SWM) is a problem that is experienced by all countries in the world. It is an issue mostly witnessed in urban areas as a result of high surge in population growth rate and increase in per capita income thus posing a danger to environmental quality and human health (Javaheri 2006). Because of its nature, it has remained one of the major environmental problems man continues to face.

An investigation into waste management is now become increasingly critical in developing countries (Kyessi and Mwakalinga 2009). Issam *et al*. (2007) report that waste management, which has generally been understudied, in developing countries is now receiving increasing attention in the literature. Municipal SWM problems have become more pronounced in recent years, because of in adequate collection and disposal of wastes. In most cities, wastes are not properly collected and where proper collection is ensured, only a small fraction receives proper disposals (researcher's observation).

According to UNESC (2009), the population growth and the rate of urbanization are alarmingly increasing throughout the African continent. But the technology, technical knowhow, financial capacity, culture, and understanding of the community required to properly manage solid wastes are not adequately available.

The research conducted by Vaibhav *et al.(*2014) stated that "lack of infrastructure for collection, transportation, treatment and disposal of solid waste, proper solid waste management planning, insufficient financial resources, technical expertise and public attitude have made the situation exasperating due to which several environmental and health related problems are increasing." A research conducted by Gebretsadkan (2002) identified that absence of rules and regulations and public education on solid waste management as well as problems related with site selection for solid waste disposal, solid waste collection and transportation techniques aggravated by socio-economic factors.

As cited in Zerayakob (2002) the United Nations Center for Human Settlements (Habitat) branch for Africa estimated that 80% of the cities of developing countries do not possess an adequate

and meaningful refuse management, Ethiopia is one of the developing countries which is highly affected by the stated problem. As a result of this, the town of Wolkite is a part of Ethiopia and face the same problem.

In this regard, surveys and studies have been carried out by city administration and different organizations on the solid waste generation rate and on the assessment of SWM systems in different towns of Ethiopia. For instance, most studies conducted so far in line with this study give more emphasis to the issues like; "willingness to pay" (Aklilu, 2002), "generation rate of the waste" (Lemma, 2007; Melaku, 2008) and even special emphasis given to the "determinants of recycling of solid wastes". But such assessments do not guarantee to conclude about the determining factors of effective solid waste management in other area. It implies that, the studies conducted in other specific area do not guarantee to conclude about the image of the rest parts of the city. Hence, whether the identified factors are significant or not depend on the existing situation of the given particular area. In other words, the poor performance of each town solid waste management has its own main contextual factors or causes.

However, there are researches undertaken on municipal solid waste management (for instance, Solomon, 2011; Alie, 2015; Yohanis, 2015; Habtamu, 2015; Nigatu, 2011) but it is important to conduct another research with specific socio-economic context to confirm and extend the generalization of the existing findings.

Therefore, this study intends to fill the current literature gap related to solid waste management practice of the study area. Moreover, it also intends to fill the debate of different outcome within the same title. On top of these, this type of research has not been ever conducted in the selected study area. And the municipality also has not filtered or proved information about the problem of solid waste management in the city. And also actually what the researcher has observed in the study area the local governance and villagers inadequately manage the problem. Hence, all these can be taken as problematic to be researched in the city administration.

As a result, the researcher through this present study tried to find not only the role of municipality for effective solid waste management but also the role of private service providers, community awareness, attitude, participations and perceptions who are living in the town and factors influencing solid waste management system in Wolkite city and tried to provide feasible solution for the identified problems.

1.3. Objectives of the Study

1.3.1. General Objective

The general objective of this study is assessing the solid waste management practices of the municipality and challenges in Wolkite town, Gurage zone of Southern Ethiopia

1.3.2. Specific Objectives

- To assess the practices of the municipality in solid waste management in Wolkite town
- To explore the perception and participation of the community in solid waste management.
- To assess the job opportunities created by solid waste management activities in the town.
- To identify major challenges for solid waste management practices.

1.4. Research Questions

By having the above specific objectives, the following basic research questions were answered by the researcher in the study: trend

- How is the trend of the municipality in solid waste management?
- How is the awareness and involvement of the society on solid waste management?
- Does the municipality solid waste management system created any job opportunities?
- What are the challenges that the municipality encountered in solid waste management?

1.5. Significance of the Study

The study contributed to the understanding of solid waste management problems and its impact in the town. The study also identified and provided crucial data about the problem of solid waste management and its impacts of the population health. In doing so, the study forwarded some important recommendations towards improving the waste management practices to the local governance and community of the town, policy makers and other interested groups and organizations in identifying and solving the problem of solid waste management in the town. The study also important in putting baseline information to the next work as a springboard for researchers who would like to conduct detailed and comprehensive studies either in the city or another study area.

1.6. Scope of the Study

Geographically the scope of this study delimited to Wolkite Town in Gurage Zone. As a socioeconomic phenomenon, the subject matter is very complex and because the research investigated the perceptions, attitudes of the villagers and related changes that occurred over time and for the sake of deep investigation, it was difficult to collect data from different towns in the zone as a result, the research project to be limited to the Wolkite Town.

1.7. Limitation of the Study

The researcher did not come to an end this research without short comings. Some of them were during collecting the distributed questionnaires unable to get the respondents who took the questionnaire, to make interview, shortage of time during data collection. The writer also faced the municipal experts were not interested to give necessary or actual information. But, the researcher tried to overcome some of those problems by negotiating the respondents.

1.9. Operational definitions

- **Municipal solid waste:** Municipal solid waste, according to Solomon (2011), refers to "materials discarded in urban areas for which municipalities are usually responsible for collection, transportation, and final disposal."
- **Household**: Constitute a person or a group of person irresponsible of whether related or not who normally live together in the same housing unit and who have common cooking announcement (CSA, 2007).
- **Solid Waste:** means anything that is neither liquid not gas and is discarded as unwanted as stated in Federal Negarit Gazeta of the Federal Democratic Republic Of Ethiopia Proclamation No. 513/2007.Sold Waste Management proclamation
- **Solid Waste Management:** means the collection, transportation, storage, recycling or disposal of solid waste, or the subsequent use of a disposal site that is no longer operational as stated in Federal Negarit Gazeta of the Federal Democratic Republic of Ethiopia Proclamation No.513/2007 Sold Waste Management proclamation.

1.10. Organization of the Thesis

This study consists of five major chapters. The first chapter deals with introductory part which consists of background of the study, statement of the problem, research objective, research question, significance of the study, scope of the study, limitation of the study, and definition of terminologies. The second chapter contains review of related literatures including conceptual framework for analysis. Description of the study area, research design, target population, sampling technique and procedures, types and sources of data collection, tools and techniques for data collection and analysis are included under chapter three. The fourth chapter deals with result and discussion that consists statistical test result. Finally, conclusion and recommendation are presented in chapter five.

CHAPTER TWO

2. LITRATURE REVIEW

2.1. Theoretical Literatures

Definitions and concepts

Solid waste management ; Municipal solid waste management (MSWM) is the generation, separation, collection, transfer, transportation and disposal of waste in a way that takes in to account public health, economics, conservation, aesthetics, and the environment, and is responsive to public demands (WWF, 2005).

2.1.1. Sources and Types of Municipal Solid Waste

In order to categorize what exactly municipal solid waste constitutes, there have been different attempts of categorization based on numerous classification criteria. Some of those criteria are source from which solid waste emanates, and nature of solid waste components. On the basis of the nature of items that constitute solid wastes, it can be classified into organic or inorganic, combustible or non-combustible, and putrescible or non-putrescible (Edelman, 1997 cited in G/Tsadkan, 2002). With respect to source from which solid waste emanates, (Martin, 2000) categorized municipal solid waste as household (residential) refuse, institutional wastes, street sweepings, commercial areas wastes, as well as construction and demolition debris.

2.1.2. Characteristics of Municipal Solid Waste

For effective and efficient management of solid waste generated in a particular city, adequate knowledge and data about the characteristics of solid waste is essential. In order to decide or determine types of facilities required for solid waste management, best disposal options, and projecting future needs requires precise information about quantities, compositions, densities, moisture content and calorific value of solid waste produced in a city (Rushbrook, 1999 in G/tsadkan,2002). Though all the above characteristics are important, for this study the researcher emphasize only on municipal solid waste physical composition and generation rate.

Solid waste generation rate: refers to the "amount of waste disposed during a given period of time and the quantification of it involves different methods

(UNEP, 2009; cited in Zebenay, 2010, p.18). The rate of solid waste generated in a given town is basically determined by demographic growth, seasonal variation, geographic location, economic development and people's attitude towards waste. Nashiimirimana (2004) explained the influence of economic development by comparing gross national product of developed and developing countries with their waste generation rate. And he concludes that the higher the gross national product of a country result the higher the generation of waste. It means due to difference in level economic performance, waste generation rate of developed countries is highly greater than that of developing countries. Although developing countries have a lower rate of waste generation compared to developed countries, their quantum of waste is high owing to their higher levels of population growth. This clearly shows impact of population size on waste generation rate (Ibid, 2004). On the other hand, people's attitude towards waste can also conditioned solid waste generation rate in the form of their pattern of material use and waste handling, their interest in waste reduction and minimization, and the degree to which they refrain from indiscriminate dumping and littering (Schubeler, 1996).

Therefore, an accurate knowledge of quantity and rate of solid waste generation in a given area is essential for preparation and implementation of appropriate MSWM. Because it provides information on human, financial and equipment resources required for collection and transportation of waste, to enact appropriate laws on waste reduction, and establish current and future needs for solid waste disposal sites (Abel, 2007).

Physical composition: refers to quantity of various material types in a particular waste stream. Just like waste generation rate, physical composition of solid waste is also extremely variable as a consequence different factors. The major once are of the following:

a) Economic level difference: higher income areas are usually produce more inorganic waste while low income areas produce relatively more organic waste.

b) Demography (difference in amount of population for example, tourist places).

c) Locations: includes abundance and type of regions natural resource, and socio-cultural factors which highly contribute for variation of waste in different areas.

d) Season: for instance during certain season's yard wastes such as grass clippings and raked leaves add greatly to solid waste (web page accessed, May 25,2020).

Unlike various composition of solid waste in different areas, process of defining waste composition is similar in each area i.e. by measuring mass percentage of each material group present in a sample. Conduct of waste composition studies by using this method has several importances. "Some of these are: for identification of potential resource recovery activities, facilitate collection, transport and processing equipment, taking essential health, aesthetic and environmental precautions, and for monitoring changes in waste composition over time and improving waste management system" (Gidarkos, Havas, and Ntzamilis, 2005,p.1). Therefore, composition study is core stone for successful planning and implementation of solid waste management.

2.1.3. Functional Elements of Municipal Solid Waste Management

In the course of municipal solid waste management there are six functional elements. Identification of these functional elements allows description of relationships involved in each element, and development of a framework. As a result, to handle a specific solid waste management it is obligatory to observe the following six elements in combination. These are:

Waste Generation

Waste generation encompasses activities in which materials are identified as valueless and either thrown away or gather together for disposal. This functional element is very important because all activities that lead to identification and understanding of solid waste generation rate, volume, composition, area specific variations of waste generation and their expected changes overtime are belong to this component solid waste management. So, this functional element is a vital stage for acquiring accurate information that is necessary to monitor existing management system and to make regulatory, financial and institutional decisions (Gebrie, 2009).

On site Handling, Storage and Processing

This functional element constitutes activities associated with handling, storage, and processing of solid wastes at point of generation.

> *Waste handling involves activities associated with management of wastes until they are placed in storage containers for collection. It also encompasses movement of loaded containers to point of collection. Storage refers stock up of wastes as soon as they are generated. There are two types of storage activities at source. The first one is temporary*

storage done at household level as part of their hygiene. The second type is communal solid waste storage system on public solid waste containers prepared by municipality. While processing at source involves activities such as waste composting and separation of solid wastes for reuse and recycling. All of these components are important for protection of public health and aesthetics and environment (Web page accessed, May 27, 2020)

Collection

Collection involves the process of picking up of wastes from collection points, loading them in to a vehicle, and transporting it to processing facilities, transfer stations or disposal site. In most municipal solid waste management systems, cost of collection accounts a significant portion of total cost. For instance, "in industrialized countries collection accounts about 60-70% of total cost, and 70-90% in developing and transition countries" (UNEP, 1996). Collection is structurally similar in developing, transition, and industrialized countries, but there are important technical and institutional differences in implementation. In most cases, industrialized countries have more efficiency and effectiveness than developing ones in terms of their approach of collection, role of municipal governments, private-sector participation, and demographic and social factors relevant to collection. In developing countries, collection often involves a face to face transaction between generator and collector. The level of service is low, and generators often have to bring their wastes long distances and place it in containers. As a result many collection activities in developing countries carried out by informal sectors (UNEP, 1996). In general, there are four basic methods of collection described by (Tchobanolous, et al 1993cited in Ramachandra and Bachamanda, 2006):

*i. **Community bin**- they are placed in convenient locations where community members carry waste and throw it in. This method is comparatively cheaper than other methods, and most widely adopted method in western countries. For this method to be adopted it is important that bins are covered, aesthetic, attended regularly, kept clean, easy to handle, and separate bins are provided.*

***ii. Curbside collection** - homeowner is responsible for placing containers to be emptied at the curb on collection day and for returning empty containers to their storage location until the next collection.*

***iii. Block collection**- collection vehicles arrive at a particular place or a set day and time to collect waste from households. Households bring their waste containers and empty*

directly into the vehicle. This method requires a higher homeowner cooperation and scheduled service for homeowner collaboration.

iv. Door to door collection*- waste is placed at doorstep at a set time when waste collector*
arrives. In this method, collector of waste has the responsibility to collect waste separately. This method is very convenient for households, however requires homeowner cooperation.

Transfer and Transport

These activities are associated with transfer of wastes from public storage facilities to collection vehicle and the subsequent transport of wastes to disposal site. Transfer refers to movement of waste or materials from primary collection vehicle to a secondary, larger and more efficient transport vehicle. When location of final disposal site is at a long distance from points of collection, transfer stations may be used. With respect to transfer stations, "there are two basic modes of operation: direct discharge and storage discharge. In storage discharge refuse is first emptied from collection trucks in to a storage pit or to a large platform. While in direct discharge station, each refuse truck empties directly in to larger transport vehicles" (Meenakshi, 2005).

Transportation on the other hand covers all types of vehicles under operation to transport solid waste from its generation point to transfer station and then to treatment or disposal site. "All vehicles in operation are considered including manually driven small carts, mechanically driven sophisticated transportation vehicles, and special vehicles for hazardous, bulky, and recyclable wastes. Generally, a properly design transfer and transportation system highly reduces cost of collection" (Ibid, 2005).

Processing and Recovery

This functional element includes all techniques, equipments and facilities used both to improve the efficiency of other functional elements and to recover usable materials, conversion products, produce energy, and compost from solid wastes. In addition it also provides several advantages. First, it can serve to reduce total volume and weight of waste material that requires collection and final disposal. Volume reduction also helps to conserve land resources since land is the ultimate sink for most waste materials. On the other side, it also reduces total transportation cost of waste to its final disposal site (Uriarte and Filemon, 2008).

Solid waste processing and recovery has been carried out beginning from separation and processing of wastes at the source. But, separations of mixed wastes usually occur at materials recovery facility, transfer stations, combustion facilities and disposal sites. It often includes separation of bulky items, separation of waste components by size using screens, manual separation of waste components, and separation of ferrous and non-ferrous metals. Then they enter in small and large scale industries for recovery activities. For example, organic fraction of MSW can be transformed by a variety of biological and thermal processes. The most commonly used biological transformation process is aerobic composting and, the most commonly used thermal transformation process is incineration (web page accessed, May 27, 2020).

Disposal

This is final functional element in solid waste management system. Disposal activities are associated with final dump of solid wastes directly to a landfill site. Today disposal of wastes by land filling or land spreading is the ultimate fate of all solid wastes whether they are residential wastes, or residual materials from materials recovery facilities. "However, in most developed countries this method is officially banned allowing only sanitary landfill for final disposal. Because sanitary landfill is not a dump it is an engineered facility used for disposing of solid wastes on land without creating nuisances or hazards to public health and environment" (Techobanglous, 2002). "Though it is the most common technology around the world, conventional and environmental unfriendly methods such as open-burning, open-dumping, and non-sanitary landfill can still be used as disposal method" (UNEP, 2009).

2.2. Factors influencing effective solid waste management practice

2.2.1. Financial factors and SWM

If a system is to be fully sustainable it is very important that long term financial costs as well as short term operating costs are taken into account (Coffey & Coad, 2010). Financial resources are concerned with operating cost for waste collection, financial cost, cost reduction and control, cost recovery and operational financing (Coffey & Coad, 2010). Therefore, adequate budgeting, cost accounting, financial monitoring and financial evaluation are very important to the effectiveness of the management of solid waste systems (Schubeler, 1996). Furthermore, financial constraints is the main reason for inadequate collection and disposal of solid waste in most of the third world countries where local councils are weak and lack of finance (Zurbrugg,

2002; Hufane, 2015). Operating costs are labor cost, fuel, cost and maintenance cost. In addition to that, financial cost includes costs to own vehicle including their depreciation and the cost of recovery includes refuses collection charge, government grants, and littering fines (Coffey& Coad, 2010). Generally, the largest proportion of overall solid waste management expenditures are absorbed by the sweeping and collection services (Coffey, M., Coad, 2010). The main reasons for poor collection and disposal of wastes are related to insufficient funding and cause inadequate capacity to handle solid waste, low morale of waste workers due to poor remuneration, lack of training, and finally lack of expertise and manpower to run solid waste (Ogwueleka, 2009).

According to McAllister (2015) budgetary constraints are often felt in developing countries where resources are scarce and dissemination of these limited resource are mishandled where many municipalities are struggling to achieve acceptable quality service due to these financial problems. Another major constraint seen throughout the developing world is the lack of educational awareness and effective waste management practice (McAllister, 2015). The way to improve waste management is to improve the status of financial resources, operating cost, and management of cost recovery (Hufane, 2015). Solid waste management system in developing countries display array of problems, but one major of contributing factor of this setback is poor and inappropriate of technical aspects. The financial pressures experienced by almost all local governments encourage the tendency to concentrate only on the short term operating costs and ignore the longer term financial costs. However, this tendency will result in a crisis in fewer years time (Coffey & Coad, 2010).

Financially, the city government should allocate enough money for the provision of solid waste management, improving payment rate for collectors, providing incentives and designing revenue generation mechanism (Muche, 2016). Financial constrains, inadequate service coverage and operational inefficiencies, ineffective technologies and equipment, inadequate landfill disposal, and limited utilization of recycling initiatives are all the constraints of solid waste management (McAllister, 2015). To improve financial situation, it is necessary for the municipalities to adopt strategies like, waste segregation, door to door collection, with waste being collected daily or twice a week and the waste which cannot be composted or recycled, should be land filled (Yadav, Devi, & Singh, 2010).

Financial effectiveness of MSWM is laid on life cycle costs and long-term economic impacts. Consequently, financial analysis is very crucial input to the strategic planning and investment programming (Yadav *et al.*, 2010). Furthermore, unless funds are continuously available without any postpone or delay, it is impossible to run a regular collection services and any system which has been set up will collapse rapidly and come to stop (Coffey & Coad, 2010). As Zurbrugg (2003) shows one of main reasons of inadequate collection services is the lack of financial resources to cope with the increasing amount of generated waste produced. The largest portion of the financial cost is spent on street sweeping, waste collection, and waste transportation and no financial cost allocated for modern disposal system such as land filling or incineration due to insufficient funding (Alam, Chowdhury, Hasan, Karanjit, & Shrestha, 2008).

Due to non availability of funds and resources, MSW management is becoming a difficult task as they are generated in vast. Unscientific disposal of MSW has adverse impacts on environment and human health (Gupta *et al.*, 2007, Rathi, 2006 and Bundela et al., 2010). The most sustainable method of MSW management is difficult to identify because of legislative, environmental, economic and social restrictions (Adani *et al.*, 2000 and Bundela et al., 2010).

2.2.2. Technical Factors and SWM

According to Schübeler (1996) technical aspect of solid waste management are involved with the planning, implementation, and maintenance of collection and transfer systems, waste recovery, final disposal and hazardous waste management. Ineffective technologies and equipment is another source that can contribute to the inadequate service coverage and operational inefficiencies (Mcallister, 2015). As Hufane (2015) stated, the poor collection, disposal, and transfer of wastes are the result of poor status of technical aspects. Lack of adequate modern waste disposal equipment, lack of regular training, and inaccessibility of spare parts for damaged and broken vehicles and equipment are more or less negatively influencing factors on the proper waste disposal practice (Muche, 2016). If the container is shared by households, there is a risk that waste will be dumped near it and this will discourage others from putting their waste inside the container (Coffey & Coad, 2010). Therefore, for waste management to be technically effective the local authorities should provide proper waste collection systems with qualified personal, and availability of modern vehicle and equipment to reduce environmental health hazards (Muche, 2016). However, techniques that have often

proven effective in developed world are ineffective in developing world because they do not have needed infrastructure and knowledge to properly manage these technologies (Mcallister, 2015). Third world countries lack sanitary landfills and their disposal sites situated long distance from communities and this creates more financial difficulties because costs to collect, transport, and dispose of waste considerably hard to afford (Mcallister, 2015).

2.2.3. Social Factor and SWM

Social aspects of MSWM involve waste generation and handling community based waste management and the social conditions of waste workers (Schübeler, 1996). Public awareness and attitudes to waste influence the people's willingness to cooperate and participate in adequate waste management practice (Zurbrügg, 2003). According to Marshal and Farahbakhsh (2013) the main problems of solid waste management comes from lack of public awareness, poor condition of waste workers, and lack of private sector and social involvement. There is series lack of knowledge concerning an interest in safe and reliable waste disposal among most health workers and there is no adequate funding available for the effective implementation of safe disposal procedures for medical waste (Alam *et al.,* 2008). Social aspects of SWM can be improved by building social awareness and educational program, waste workers are subject to health problems therefore, giving support in their earnings, and access to social services will make SWM efficient (Schübeler, 1996).

2.2.4. Institutional Factor and SWM

Institutional aspects concern the distribution of functions and responsibilities and correspond to organizational structures, procedures, methods, institutional capacities and private sector involvement (Schübeler, 1996). Successful solid waste management requires integration of many organizations and groups into partnership such as national government, local government, private sector, and informal sector. (Coffey, M., Coad, 2010)**.** Local government is normally responsible for SWM, or handed over to private sector which is responsible actual sweeping, collection and disposal services (Coffey, M., Coad, 201 0). Primary collection which is door to door collection, and transport to the point of collection are often managed by community-based organizations or small enterprises and often initiated by the residents desperately need for a collection service and also willing to pay monthly collection charge(Zurbrügg, 2003). In order to improve effectiveness of MSWM the institution should do decentralization of responsibility,

capacity building for strategic planning and financial management, private sector involvement such as competitive bidding, regulatory instruments and monitoring and control systems (Schübeler, 1996).

2.2.5. Political factor

Political aspect includes the formulation of goals and priorities, determination of roles and jurisdiction and the legal and regulatory framework (Schübeler, 1996). National government have little to say in waste collection services but rather play a significant role in policy decisions such as to what extent the private sector should involved, and it may control the expenditures on solid waste management, and sometimes cover employment payment in some cases (Coffey, M., Coad, 2010). Local government often involve solid waste collection services, and often work under a national legal framework rather than a local one and this makes difficult to change framework to suit local conditions such as private sector involvement and community involvement (Coffey, M., Coad, 2010).

According to Dominic (2017) out-dated policies and lack of knowledge in re- use and recycling with effective enforcement of the law have all contributed to the ineffectiveness of MSWM. In order to increase the standard living of population, such policies are required on immediate basis for example public private partnership is such a solution to the inability to handle solid waste management operations (RODE, 2011). For the sustainable management of waste, policy and regulations need to be clear and implementable; it needs to have also oversight body to monitor the enactment and the implementation of those policies (Dominic, 2017). Lack of enforcement of policies of solid waste is the real challenge to sustainable waste management. However, straightforward, unambiguous legal and regulatory framework, involving functioning and enforcement procedures at the national, provincial, and local levels is extremely important to the proper functioning of MSWM (Mcallister, 2015). Several challenges ranging from financial constraint, inappropriate technology, inadequate manpower, and law enforcement have play a significant role against effective solid waste management practice (Fei-baffoe, Nyankson, & Gorkeh-miah, 2014)

2.3. Empirical literature

As Longe *et al* (2009) made their study on the title of peoples' perception on household solid waste management in OJO local government area in Nigeria. They applied both quantitative and qualitative methods, particularly statistical tools with severity index, in order to analyses the survey data gathered from randomly selected 60 respondents. The research objectives were assessing the existing household solid waste management practices and public perception on the effectiveness of the current system. Beside the assessment of effect of demographic factors on people perception, they were develop three means in order to assess or evaluate the public perception on solid waste management in the study a(i.e. public opinion and perception on SWM service, willingness to pay for SWM service, and level of patronage of available SWM service).

This research finding shows that demographic factors have a significant impact on the people's perception towards solid waste management service in the study area. They found that gender difference (being male or female) have a significance impact on perception. In addition, educational levels and income of the respondents have a significance positive relationship, whereas, age of the respondent have a negative relation with perception of the people on solid waste collection services. Regarding to willingness to pay, even though the result show a positive relationship between willingness to pay and people perception, till the people are ready to pay for collection service if it delivered regularly. However, in the study area there is lack of accessing the private waste collectors" service. Therefore, the local authority should give attention to performance monitoring and control of the services of private sectors in order to enhance and sustain good service delivery.

All in all, they found that inadequate service coverage and lack of timely household waste collection are the main problems in this particular area. To develop effective solid waste management system and to sustain the private sector participation in solid waste management activity through avoiding the above mentioned problems, they suggested the following: Modern waste management methods that place emphasis on waste reduction, recycling and re-use should be encourage in the local government area and in the entire State with legislative backing, increase awareness and re-education household waste minimization and sorting before collection should be encouraged, the responsible bodies should introduce training and re-training and re-orientation program for the private sectors and the waste generators respectively on issues of

waste management techniques as a matter of urgency in order to enhance the overall success of the current SWM system.

Puopiel (2010) studied on solid waste management in Ghana: the case of tamale metropolitan area. His research objective was to examine the factors of effective solid waste management in the metropolis and suggest possible measures to tackle the problem. He gathered the necessary data from 156 randomly selected samples and analyzed through descriptive statistics such as table, percentage and pie-chart.

Finally he found that inadequate skip supply for storing wastes, lack of routine collection of wastes, poor methods of waste management, and inadequate resources for waste management institutions to effectively collect the waste generated are the main factors that affect the effectiveness of solid waste management in the area. In other words, he found more of institutional factors. To effectively tackle the problems enumerated, some measures are recommended by the researcher. These are: Provision of adequate skips and dustbins, regular collection of Waste, use of Integrated Solid Waste Management Model, proper Management of Landfill, and adequate resources of Waste Management Institutions.

Kamara (2006) carried out study on household participation in domestic waste disposal and recycling in the Tshwane Metropolitan Area: An environmental education perspective. The objective of this research was to investigate the relevant factors affecting household participation in domestic waste disposal and recycling in Tshwane Metropolitan Area. The researcher collected data from 46 randomly selected households through standard household survey questionnaire and analyzed through quantitative way of analysis, particularly used descriptive statistics. As hypotheses, the research stated socio economic factors (educational level and income or wealth) and institutional factors can be the main factors of household participation.

Finally, as expected, the conclusion confirmed that, the main factors of household participation on domestic solid waste management are socio-economic factors (income and educational level) and institutional factors. It had shown that the wealthier people in the study area participating in domestic solid waste management than the poor one. In addition, the people's participation on household solid waste management and their educational level have a positive relationship. Moreover, this study found two other major factors that are related to institutional factors: low level of awareness on environmental implication of proper waste management and low level of

household coverage with the provision of waste management facilities. Therefore, it suggested that there is a need to increase the outreach of awareness creation on household sides, 25 particularly the positive implication of proper solid waste management and the institution, again, should provide adequate facilities for proper waste management.

Zahur (2007) made study on solid waste management of Dhaka city: public private community partnership. He assessed the solid waste management system in order to show the effect of private sector and community based organization involvements for the improvement of waste collection system in the area. As the data shows, although municipal officials recognized the importance of adequate solid waste collection and disposal as well as resource recovery and recycling, it is mostly beyond their resource to deal effectively with the growing amount of solid waste generated by the expanding cities. Consequently solid waste is indiscriminate by dumped on roads and in open drains thus leading to serious health risk and degradation of living environment for millions of urban people. Through time, however, the importance of community and private sectors involvement in solid waste management and use of adapted technologies were recognized for improving the solid waste management system. It implies that access to door to door solid waste management, either self-organized private sectors or NGOs or CBOs, is very crucial for the improvement of household solid waste management.

Jenkins, *et al* (2000) carried out study on The Determinants of Household Recycling: A Material Specific Analysis of Recycling Program Features and Unit Pricing. Ordered probit econometrics model was used to analyze data of set of socio-economic variables including recycling program policy variables and unit pricing program policy variables as explanatory variables in order to investigate the main determining factors for recycling of solid wastes at household level.

In this study drop-off and curbside from recycling program policy variables and household's income, family size, household head age and its educational level from socio-economic variables were found to be the main determinants of household solid waste recycling practice.

He further found that like household income and education, household size also has a positive and significant relation with the intensity of recycling of household solid wastes. Its justification was when the family members are increasing it would contribute to the number of occupants. Due to this, the increasing number of occupant in a specific area, the intensity of recycling activity in the area would be increases.

Poswa (2004) conducted a study on the importance of gender in waste management planning: a challenge for solid waste managers. He used simple descriptive statistics to analyze the data obtained from randomly selected 400 sample households. The ultimate goal of the research was to contribute some issues for the improvement of solid waste management services to the residents in developing communities. Therefore, to achieve this overall aim the researcher derived one objective: to assess the effect of socio-economic factors (in particular gender) in the planning and operation of a solid waste management system.

Finally, this study found that women in most homes in the middle and low socio-economic status suburbs in the study area were more active in the enquiry. It was justified as indicating their active role in family affairs including waste handling in their respective homes.

Moreover, the study concluded that, there were great differences between men and women on the choice of type of waste collection service system. Women most of the time preferred a door-to-door waste collection system unlike men whose choice was a drop off centre. Such variation or differences can be attributed to the cultural traditions, which govern gender relations in the households. He also said that, like the finding of World Bank, 2009, women in most societies are responsible for the domestic works, which include many tasks including childcare, shopping, cooking, cleaning and wellbeing of their husbands.

Bizatu and Negga (2010) conducted a study on community based assessment on household management of waste and hygiene practices in kersa woreda, Eastern Ethiopia. In this study the researchers' objective was to assess the status of waste management and hygiene practices in Kersa Woreda, Easteren Ethiopia. Therefore, in order to achieve this main objective, the researchers collected data from randomly selected 444 sample households through survey questionnaire and then analyzed the data via SPSS version 16 including statistical tests at 95% confidence interval.

From the study they found that majority of the households (66%) disposed off their solid wastes in open dumps and 6.9% of the households had temporary storage for solid wastes. With regard to sex and solid waste management, the study indicated that, about 98.4% of the selected households revealed that the responsibility of waste management is left for women and girls. In addition, the waste management status in the study area was highly related with the educational level of the households.

Generally, the study concluded that household management of waste is in poor condition. Health-workers and local authorities must pay special emphasis to improve these conditions.

Tewodros (2006) carried out study on household behavior and solid waste management: survey evidence from mekelle. The objective of this thesis was to explore the structure and performance of household waste management practices such as source reduction & separation and final disposal by investigating the relationship with economic, demographic and environmental behavior of households. Besides, it conducted for the purpose of investigating the supply side of waste infrastructure facilities in relation to household solid waste collection, disposal and recycling. He used both multinomial logit and probit estimation econometric models in order to identify and describe the main determinants of household's choice on dump sites. The researcher collected the necessary primary data from randomly selected 200 sample households. The study estimated that demographic factors and institutional factors have a significance impact on the household choice of disposal sites.

Finally he found that demographic factors such as age, sex, educational level, family size, number of females in the household, who are below 15 years old and years of stay in the city do not have a significant effect on the site selection of the households to dispose their wastes, Whereas, institutional facilities like distance of containers from people‟ house and inadequacy of waste storage containers in the city have a significant contribution for households to dispose their wastes in unauthorized place.

Due to this, the researcher concluded that, institutional factors are serious causes for the action of households in the case of dispose wastes in illegal places or sites. On the other hand, the educational level and other demographic factors are not. It mean that, the number of years that the household head stay in the class does not matter; rather the awareness of households about solid waste positive and negative impact through environmental education or changing the household awareness about waste and its management have a strong improvement on disposal system.

Gebrie Kassa (2009) study on Management of Domestic Solid Waste in Ethiopia: Operational Analysis and Assessment of Constraints in Bahir Dar Town, the Capital of Amhara National Regional State, Ethiopia. The main objective of the research was examining the operational processes and associated institutional, financial, and socio-cultural constraints. The study result

indicated that inefficient organizational structure, scarce and frequent turnover of workers, unequal distribution and improper assignment of facilities, lack of financial & legal instruments, poor handling of waste by the community are the major factors that influences solid waste management. Besides, demographic factors also have a significance impact on the effective management of household solid wastes.

G/tsadkan (2002) made a study on Domestic Solid Waste Management in Mekelle City: Tigray Region. His objective was to examine the overall pattern of solid waste generation, collection and disposed and also the extent of household participation on the management of solid wastes in Mekelle city by analyzing primary (which are collected from the selected 300 households) as well as secondary data. In this study, the researcher was applied descriptive and inferential statistics and map at the time of data analysis.

Finally, findings of this study show that the management practice of wastes in this particular city was very poor. Hence, the study goes further and found out the main causes for this poor performance of the city's solid waste management. Then, it indicated the finding as follows: the main causes for the poor performance solid waste management in the study area include improper organizational structure, shortage and dissatisfaction of the workers, inadequacy and improperness of the collection and transportation facilities (both the containers and vehicles), unfair distribution and sitting (placement) of the containers, and inadequate financial resources. Moreover, there were no detailed solid waste management related regulations and public education. The solid waste collecting, transporting and disposal techniques used were also part of the main constraints of the solid waste management in the city of Mekelle.

The findings also indicated that certain social-cultural factors have worsened the problem of solid waste management in Mekelle. The leading constraints in this aspect include inappropriate handling of solid wastes at home, improper dumping of wastes in the container and the illegal disposal of solid waste everywhere in city.

According to Solomon (2006) conducted a study on solid waste management: a case study of household solid waste management in arada sub-city, Addis Ababa, Ethiopia. The objective of this study was assessing the performance of household solid waste management in the sub-city. The researcher was applied qualitative description to interpret and present the data that obtained from randomly selected 400 sample households.

Finally, he found that even though household solid-waste service is given to the population in the sub-city, the service is considered poor by the population due to institutional, socio - cultural and financial factors such as lack of adequate facilities for solid waste collection and disposal services, displeasure of the workers with incentives, unfair placement and improper use of waste containers, inadequate assignment of budget to the sector, illegal ways of disposing wastes, and insignificant participation of the community in waste management.

2.4. Conceptual Framework for Analysis

Figure 2.1 below shows that there is no single cause of ineffective urban solid waste management problems, rather there is a large collection of them. Based on the above review of related literature (both theoretical and empirical literatures) the researcher has developed the following conceptual framework for the purpose of analysis.

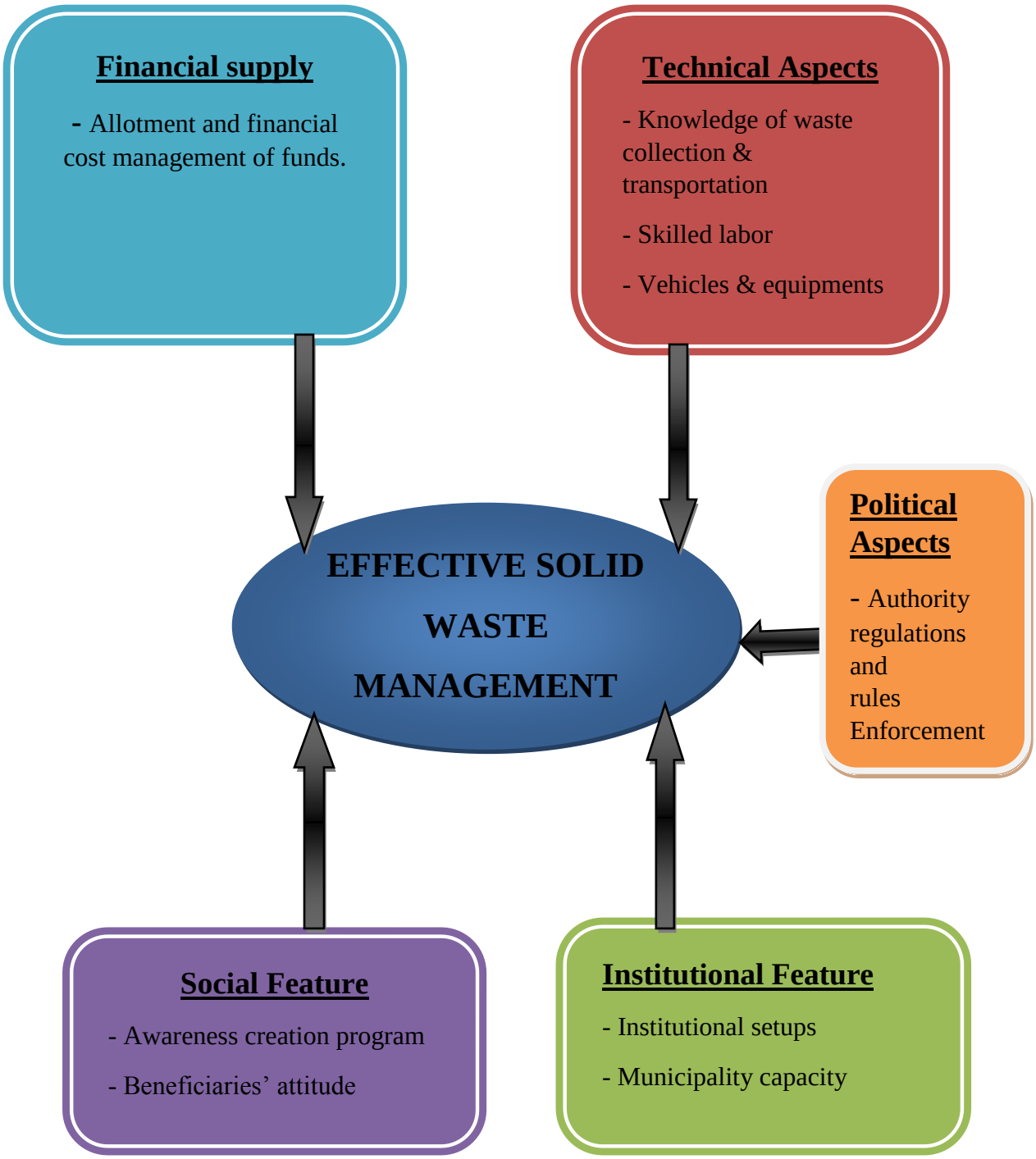


Figure 2.1: Conceptual Framework of the study

Source: Constructed by the Author (2020) based on literature information

CHAPTER THREE

3. RESEARCH METHODOLOGY

3.1. Description of the study area

This study was conducted in Wolkite town, which is located to the Southern Nations, Nationalities and peoples Region and it is the capital city of Gurage Zone. The city is organized in 3 Sub cities, namely Adiss, Bekur and Gubre, and it has 6 urban kebeles. It is located south west of Addis Ababa along the main Addis Ababa – Jimma road at a distance of155km and 254km West of Hawassa at the geographical location of approximately 8^0 17' N latitude and 37^0 47' E longitudes. The average elevation of the town is about 1870m above sea level.

Based on 2007 census conducted by Central Statistical Agency (CSA) the total population of the town are 43,000 of whom 22,360 were men and 20,640 were women, but according to the town's Administration report of 2011(Wolkite city Administration, 2011) the number of population is 92,517 people of which 48.4% is female and 51.6% is male. This data showed that population is increasing at high level due to continuous rural-urban migration.

The town connects commercially important zonal capital such as 15 Wereda's of Gurage zone, Woliso town (Oromia region), Hosanna (capital of Hadiya Zone). According to municipality report, the structural plan of Wolkite town covers 7,260 hectares or 72,600,000 Square meters.

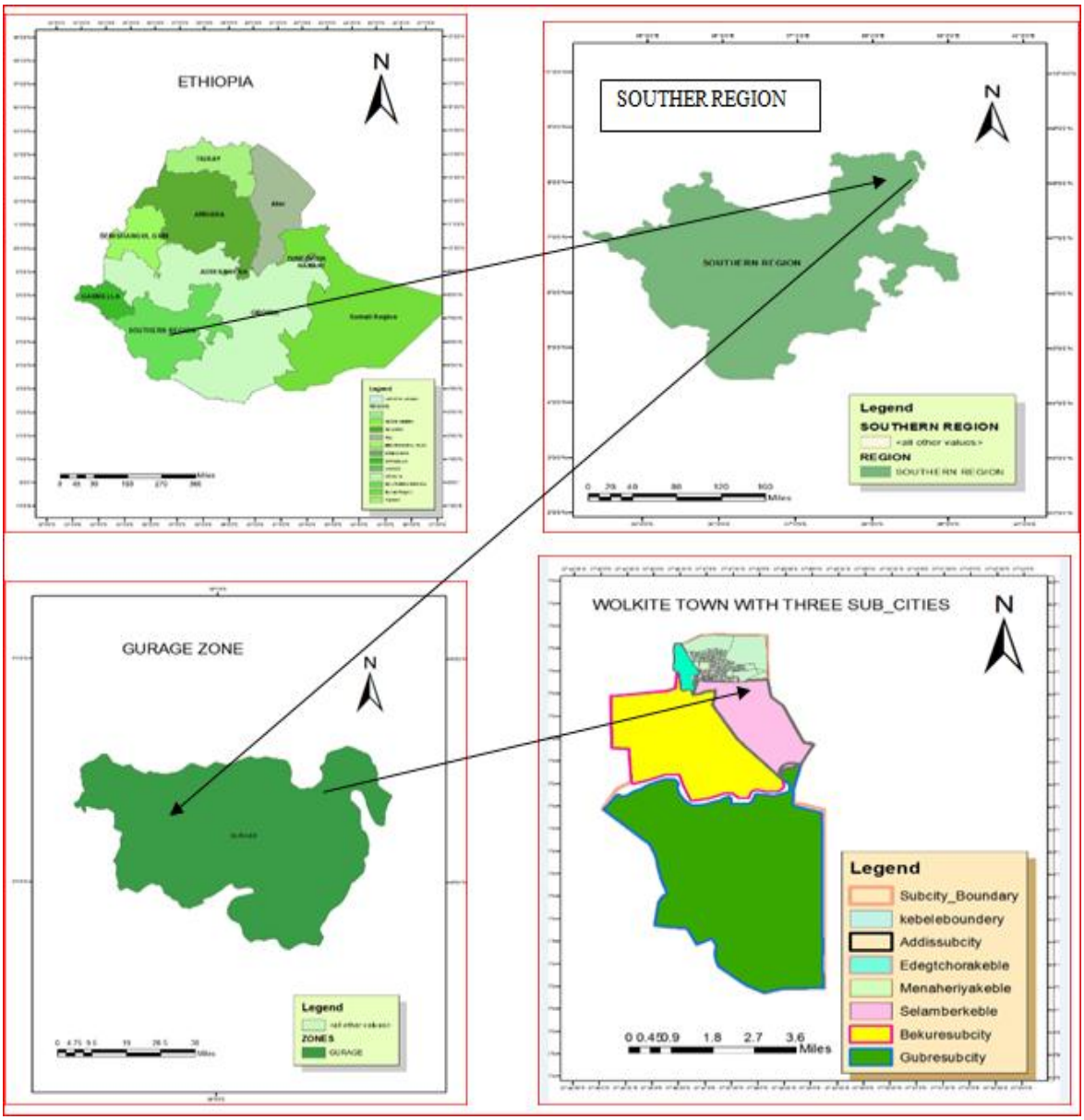


Figure 3.1: Map of Wolkite Town

Source: Wolkite City Administration Municipality office, 2018

3.2. Research Design

This study was used both quantitative and qualitative data to achieve the objective, because the data would be collected in number and description. Descriptive research design was used for this study because it was important to describe situations and events what was observed. Wolkite city administration was selected for this study because it is one of urban city in south nation and nationality people regional state and urbanization increases time to time in the city that leads to increments of solid wastes. In data collection, cross-sectional survey design used in terms of time dimension. It constructs at a single point in time, because as a result of limited time and resource for study cross-sectional design is desirable to obtain detail information regarding the state of solid waste management practice in the city.

3.3. Target Population of the study

Target population for survey was the entire set of units for which the survey data are to be used to make inferences. Therefore, the researcher target was Wolkite town Addis Sub City population at household level for quantitative approach and municipality officials, kebele leaders, private solid waste collectors and health extensions for qualitative approach in which the state of solid waste management practice in the town was studied.

3.4. Sampling Technique and Procedures

There are three sub cities in the Wolkite town. Among these sub cities, the researcher has selected one sample sub city, Namely; Addis sub-city using purposive sampling technique due to the dense settlement of population and the existence several commercial activities within this Addis sub city. Within Addis sub-city, there are 3 kebeles that hosted several residents and governmental institutions. According to the report from the town's health office 2019 report there are 1500 households in the selected sub city. From the total of 1,500 households reside within Addis Sub-city, 316 sample households were selected using simple random sampling method from the 3 kebels proportionally.

Therefore, the researcher target Addis Sub City population at household level for quantitative approach while municipality officials, kebele leaders, private solid waste collectors and health extensions for qualitative approach purposively because as they are very familiar and expertise to the issue and then to triangulate the data that obtained in which the state of solid waste

management practices and challenges in the town would be studied. As a result, the simplified formula to calculate sample sizes provided by Yemane (1967) below by considering the level of acceptable margins of error at 5% (or 95% confidence level)

$$\boldsymbol{n = \frac{N}{1 + Ne^2}}$$

$$\mathbf{n = \frac{1500}{1 + 1500(0.05)^2}} = 316$$

Where N = Total population size

n = Sample size

e = Sampling error (level of precision)

3.5. Types and Source of Data Collection

Since the purpose of the study was to assess the practices and challenges of solid waste management system in the city. Both secondary and primary data used as the most important sources of the study. Both qualitative and quantitative data obtained from the sample units, hence the qualitative method designed to assess the general practices and challenges of solid waste management system in the city. As a result to have the intended data from the subjects through this approach different methods used as a tool. Of the methods the most important were in-depth interview for key informants made with municipality officials, private solid waste collectors, kebele leaders, and health extensions and researcher's non-participant observation. These methods helped the researcher to have in-depth information from the study subjects in order to triangulate the data obtained from quantitative method about the issue under discussion.

As to the quantitative data, close ended questionnaires prepared and applied to collect the required information from the subjects of the study i.e. from residential households. All the above methods were enabling the researcher to have the very important information about the practices of solid waste management practices in the city. As far as secondary sources are

necessary, the most important sources are reviewing of relevant sources of documents like municipality of the city reports, published and unpublished documents, magazines, journal articles, on line data and newspapers used.

3.6. Tools and techniques for data collection

The following tools and techniques used for collection of primary data for the study purpose.

3.6.1. Questionnaire

One of the most important tools that used for collecting primary data was close ended questionnaire mainly to gather data from households. At the time of primary data collection through questionnaire, four external enumerators were deployed to gather the intended information after they were well oriented and introduced with the tools

3.6.2. In-depth Interviews

The second tool of data collection was unstructured face to face interview. This method helped to have very important information for the subjects because it provided the chance to the researcher to ask many questions that indicated their attitudes as well as the existing practices on solid waste management system. Moreover, since the interviewer applied unstructured checklists, it gave the chance for the subject to express their feelings without any restriction. By the interview municipal officials, private solid waste collectors, kebele leaders and health extensions were included. As a result it was possible to explain the level of the existing practices of solid waste management qualitatively.

3.6.3. Focus Group Discussion

One of the tools that were applied for the purpose of collecting primary data is focus group discussion**.** Therefore, focus group discussion was arranged as a part of data collection method so as to increase the reliability of data collected by other methods. For information concerning about solid waste management practices and challenges, focus group discussion would be appropriate in order to gain and triangulate data. Informants were selected based on age, sex, educational level, occupations, and solid waste management experiences. For focus group discussion (FGD) 7 females and 5 males total 12 informants the researcher was selected and held

in two groups. Each group has six members i.e. two males and four females in one group and that of the second group was three females and three males during FGD.

3.6.4. Non-participant Observation

In addition to the above tools, critical observations at the study area was used as important techniques to have the most valuable information that enabled the researcher to describe the existing practices of SWM in the city. For the purpose of observation the researcher prepared checklists. By using the checklists, the observation made to perceive what was going on in the city, especially in the main venues; areas where containers were placed, solid waste dumping sites and household residential area was the main target. By doing this it was possible to understand how people handle solid waste and why people thrown away solid waste anywhere in the city as well as the general practices of SWM in the city.

3.6.5. Other Data collecting Instrument and Procedures.

This instrument includes photos for collecting relevant data.

Photos- To make it the information more self-explanatory, photos were taken from different sites especially from solid waste dumping sites; places were containers were placed by the author.

3.7. Data management and analysis

As long as data analysis and interpretation was expected, we have to consider four major and important stages of processing and analysis these are checking through the forms & correcting errors, coding, preparing data tables & making sense of the data before the actual data analysis & interpretation starts.

The study used both qualitative and quantitative methods to collect the data from the subject. Mixed methods research has become popular as the newest development in research methods and in approaches to “mixing” quantitative and qualitative research. The reason behind employ mixed research approach was that both quantitative and qualitative research approach can support each other towards a better understanding of the issue under study (Creswell 2009). Descriptive data was coded and analyzed in the light of the literature reviews. Quantitative data was introduced into excel and simple statistical measures using SPSS version 20 (Statistical Package for Social Science) such as frequencies and percentages were used to reduce the volume

of data, making it easier to understand. In addition, maps, photos and figures were used to analyze the data.

3.8. Ethical Consideration

Before entering the study area to collect data, local governance, community leaders and each participant was briefed about the objective of the study which was purely academic. Also the researcher strictly respected the permission of the participant whether they were willing to participate in the research or not. In order to get an informed permission from the respondents, the researcher provided adequate information and explanation about the research, its objectives and its benefits to all participants in the study. As the researcher introduced it at the introduction part of the question, interview guide, the researcher was not personalized any of the response of the respondents during data presentation, analysis and interpretation. In addition, all the materials that used in the study were accordingly recognized.

CHAPTER FOUR

4. RESULTS, INTERPRETATION AND DISCUSSION

4.1. Analysis of municipal solid waste management practices and challenges in wolkite town

This chapter is dealing on data analysis, interpretation and discussion of the study related to municipal solid waste management practices and challenges in Wolkite town. From the total 316 sample household respondents, 316 of them responded to the survey questionnaire during the data collection. The questionnaire returned rate was 96.2 % where, the quantitative data was analyzed with a total 304 household respondents. Therefore, this section is dealing on socioeconomic and demographic background of the respondents and solid waste management practices and challenges of Wolkite town. For this purpose, the researcher distributed a total of 316 questionnaires for sample households from these 304 questionnaires returned i.e. 96.2%

4.1.1. Socio Economic and Demographic information of respondents

The socio economic structure of a given society is the most important issue to understand the practice of solid waste management and adopted the proper solid waste management system. Because of operation pattern, waste composition and generation, and disposal system could be conditioned to an important degree on the attitude, income, and awareness level of the society. As a result evaluating the socio economic and demographic difference is very essential to point out baseline information.

The demographic characteristics of the respondents have been derived from the sample household survey. The information includes gender, age, education level, marital status, family size, occupation, house ownership, income level and year of stay in the city of the respondents. The information summarized in Table 4.1, 4.2 and Graph 1 below.

4.1.2. Gender, age, marital status and family size arrangement of respondents

According to (Sujauddin, 2008) households demographic factors like gender, number of members in a family, access to education for citizens, income determine solid waste management practices. Solid waste handling shows a great variation related with difference in background characteristics of households.

In this study the researcher tried to form different sample households with various socio economic and demographic characteristics. In this study the questionnaire survey was conducted among 304 households. Among those sample respondents more than half 200(65.8 %) of them are females while 104(34.2) account male informant. This was because of the fact that most of the time females work inside their house rather than working outside. Such greater number of women is recommended and important for this research since women have better information than men about their residence solid waste handling system. And also such kind of activities is usually done by women.

Also as obtained from qualitative data that was from interview and focus group discussion most of the respondents' data showed that mainly in solid waste management at household level was practiced by women. So as to that, the data indicated in focus group discussion among the group members all of them and all interviewers understood and confirmed that this activity was as women responsibility at household level.

Table 4.1: Socio Economic and Demographic information on Household Members

Variables	Alternatives	Frequency	Percent
Gender	Female	200	65.8
	Male	104	34.2
	Total	**304**	**100**
Age	15-25years	37	12.2
	26-35years	121	39.8
	36-45years	82	27.0
	46-55years	48	15.8
	56 years and above	16	5.3
	Total	**304**	**100**
Marital Status	Married	244	80.3
	Single	45	14.8
	Divorced	10	3.3
	Widowed	5	1.6
Family Size	1 -4	50	16.4
	4 – 7	230	75.7
	Above 8	24	7.9
	Total	**304**	**100**

Source: field survey, 2020

According to International Environmental Technology Center (IETC) V.1.1 Gender and Waste Management, waste is not necessarily a gender neutral concept. Given women's primary household responsibility (such as cooking, cleaning, laundry and family health) in many societies, women & men may have different perceptions & views of what is waste & what is not. For example, what looks like dirt to men could be compost or fertilizer to women.

Beside the gender compositions, the majority of sample respondents which is 288 (94.7 %) of the respondents belong to 15-55 age groups and this age group is assumed as productive age group. As a result, this also have a positive impact on the accuracy of the information collected from such respondents. In addition to this, during focus group discussion and interview the members of the group stated that the households are such group of age order and due to this reason it has its own result.

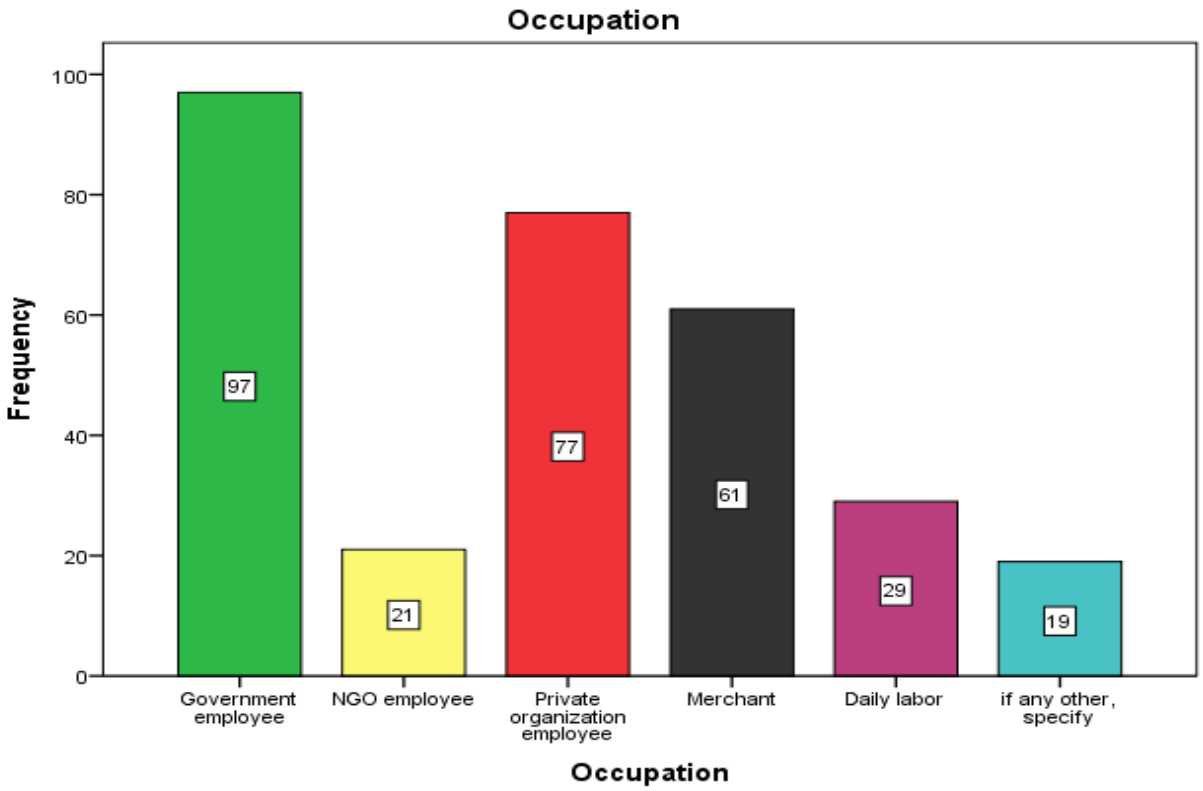
Respondents of marital status, on the other hand, 244(80.3%) were married, 45(14.8%) were single. Divorce and widowed accounted 10(3.3%) and 5(1.6%) in that order. As obtained from qualitative data shows that 100% of focus group discussion members and interviewers approved that majority of the households were married and also this data were true as observed from personal observation. Therefore, this indicated that as most of respondents were married and then they were familiar with more solid waste generation and waste management practices than the rest of respondents. Finally, this marital status data provided information about household's solid waste management practice as inputs to the study.

Also respondents of family size showed that 230(75.7%) of households had more than 5 family members and 50(16.4%) had not more than 4 families but 24(7.9%) of the households had more than 8 family members. Moreover, this data was approved during focus group discussion and interview of qualitative information, so as to that, majority of the interviewers and focus group discussion members answered that maximum number of family sizes were above five members of families. This revealed that the majority of households' 254(83.5%) had large family size and this results high amount of solid waste generation and removed high amount of solid wastes from such areas of large number of family households'.

4.1.3. Occupation of respondents

Regarding to occupation of household, majority of the respondents 97(31.9%) government employee, 77(25.3%) private organization employee and 61(20.1%) were merchant. Daily labor, NGO employee and others were 29(9.5%), 21(6.9%) and 19(6.3%) respectively. Here most respondents 195(64.14%) were employee. Therefore, they had better understanding of solid waste management practice than others but as the data gathered from qualitative information among focus group members most of them were stated that the employees' households did not give attention for solid waste management around their compounds. As employees were educated and had better awareness about effect of solid waste on human health and environmental pollution yet they did not rehearse the challenge and this also observed during personal observation.

Graph 1: Socio Economic and Demographic information on Household Members



Source: field survey, 2020

4.1.4. Educational level and Monthly income of respondents

With respect to educational level as indicated in the below Table 4.2 about greater numbers of respondents 106(34.9 %) and 96(31.6%) were diploma and secondary education complete respectively have relatively great share. Others 48(15.8%) and 42(13.8%) degree and primary education consecutively and also 10(3.3%) has no formal education and 2(0.7%) has masters. According to the qualitative data that obtained from interview and focus group discussions most of participants reacted that the households' above average percents 156 (51.3%) were educated i.e. above diploma level. These educational information of sample households resulted positive impact to get brief and different perceptions of solid waste management practice**.**

Table 4.2: Socio Economic and Demographic information on Household Members

Variables	Alternatives	Frequency	Percent
Monthly income	500 - 1000	103	33.9
	1001 – 3000	76	25.0
	3001 – 5000	93	30.6
	5001 – 10,000	32	10.5
	Above 10,000	-	-
	Total	**304**	**100**
Educational level	No formal education	10	3.3
	primary education	42	13.8
	Secondary education	96	31.6
	Diploma	106	34.9
	Degree	48	15.8
	Masters	2	0.7
	Total	**304**	**100**
House of ownership	My own house	214	70.4
	Rented from kebele/ Government	32	10.5
	Rented from private owners	58	19.1
	Total	**304**	**100**
Year of stay in Wolkite	< 5 years	10	3.3
	6 – 10 years	16	5.3
	11 – 15 years	58	19.1
	Above 16 years	220	72.4
	Total	**304**	**100**

Source: field survey, 2020

Regarding to monthly income of household, majority of the respondents 103(33.9%) earned less than 1000 birr per month and 76(25%) of them earned between 1001-3000 birr per month. About

93(30.6%) and 32(10.5%) of the respondents earned 3001 -5000 and 5001 -10,000 birr respectively. Hence, from a total of respondents 179(58.9%) more than half of them were earned less than 3000 birr.

Based on the data that obtained from interview and focus group discussion only few people expressed that above average number of households earned more than 3000 birr per month but the others or majority of them were explained that maximum number of households earned not more than 3000 birr per month. This implies that a considerable number of households' depended on a low income so this can affects waste management at household level during separation in different storage and disposing of waste by private solid waste collectors using fee now and then according to their low income and as a result the households unable to pay frequently rather they relied on municipal services.

4.1.5. House of ownership and Years of stay of respondents

About 214 (70.4 %) of the respondents were living in their own house and 58(19.1%) rented from private owners the remaining 32(10.5%) rented from kebele. The number of years of stay in current residence ranges from less than 5 years to above 16 years. Here the majority of sample respondents lived in the current dwelling more than 16 years i.e. 220(72.4%) respondents. Based on the qualitative data gathered from interview and focus group discussion few number of participants ratified that most of the households' house of ownership was rented from private owners and from kebele and they stayed not more than 5 years in the residence but majority of members of participants confirmed that above average of households living in their own house and they stayed more than sixteen years. So it was assumed that respondents could give reliable ideas about SWM practice of the town under discussion.

4.2. Existing municipal solid waste management practice in Wolkite town

To get accurate and reliable data on solid waste composition is very essential for effective solid waste management. So in order to understand the existing solid waste composition, the respondents were asked a question and give the response from the given alternatives. The result presented in the following Table 4.3 and Table 4.4 below.

Table 4.3: Existing municipal solid waste management practices of Wolkite town

Variables	Alternatives	Frequency	Percent
How do you rate the current municipal solid waste management practices of the town?	Very good	1	0.3
	Good	38	12.5
	Moderate	50	39.5
	Poor	175	57.6
	Very poor	40	16.4
	Total	304	100
Is solid waste disposing containers available in your neighborhood?	Yes	66	21.7
	No	238	78.3
	Total	**304**	**100**
What other means do you use to dispose solid wastes of your household?	Throw it on an open space, in sewerage or on street	172	56.6
	Digging a hole around the house and burn it	50	16.6
	Disposing on the backyards of the house	25	8.2
	Private collectors take it	50	16.6
	Others, please specify	7	2.3
	Total	**304**	**100**

Source: field survey, 2020

4.2.1. Rate of the current municipal solid waste management practices of the town

As showed on the Table 4.3 above, among the respondents which was 1(0.3%) of households' rated the current municipal solid waste management practices of the town was very good, 38(12.5%) good and 50(16.4%) moderate. Whereas above half of the respondents or the dominant number of respondents 175(57.6%) rated poor and finally 40(13.2%) very poor. This is the fact that as the researcher confirmed through personal observation in the field; in-depth interview made with all of selected respondents' i.e. municipal experts, kebele leaders, private solid waste collectors and health extensions and except few people, majority of focus group discussion members showed that the rate of current solid waste management practice of the town was weak and insufficient.

As observed from field observation by the researcher there were solid waste service but they had not consistency and the problem also confirmed through the in-depth interview with key informants. Besides this, according to WB (2004) report 30-50 % of solid waste generated remains uncollected. Likewise, in Ethiopia only 65% of the generated solid waste is collected and the reaming amount disposed illegally.

4.2.2. Solid waste disposing containers availability in the neighborhood

Qualitative data that indicated from interview and focus group discussions all of the respondents confirmed that there was shortage of accessibility of disposing containers in the neighborhood of households. Moreover, as presented in the above Table 4.3 the availability of solid waste disposing containers in the neighborhood among the respondents of households' 66(21.7%) there was disposing containers but dominant number of respondents 238(78.3%) replied there was lack of availability of disposing containers in the neighborhood. Also the qualitative information similarly showed that all the respondents complained the problem. This challenge also recognized by World Bank (2000).

As it stated that since the city administration often fails to provide adequate number of containers, households are motivated to dispose their wastes on road, in sewerage, inside the villages or other illegal places. Therefore, this exposed that absence of solid waste disposing containers in the neighborhood leads to poor solid waste management practice because households could throw their solid waste at any an open places.

Figure 4.1: Solid waste disposing container

Source: Picture taken by the Author, 2020

However, as the researcher's personal observations there were few containers observed as showed in the pictures placed Figure 4.1 in distant places.

4.2.3. Means of disposing solid wastes at household

According to the Table 4.3 above obtained data 172(56.6%) of the respondents their means of disposing solid wastes at households' were through it on an open space and in sewerage or on street. The data also showed 50(16.6%) respondents of them digging a hole around the house and burn it and 25(8.2%), 50(16.6%), 7(2.3%) of the households' disposing on the backyards of the house, private solid waste collectors take it, and use other different mechanisms respectively. Also the data collected from qualitative information except few numbers of respondents, maximum number of them were responded that most households dispose their solid wastes improperly.

In addition, the researcher clearly observed that most households dispose solid wastes inappropriately as showed below Figure 4.2. This information showed that their means of disposing solid wastes at households' mainly above half of the respondents (56.6%) throw it on an open space, in sewerage or on street. Such ways of disposing system exposed to improper solid waste management practices in the town.

Figure 4.2: Households' means of disposing solid wastes

Source: Picture taken by the Author, 2020

Table 4.4: Existing municipal solid waste management practices of Wolkite town

Variables	Alternatives	Frequency	Percent
Are the vehicles currently in use enough to dispose solid wastes in the town?	Yes	55	18.1
	No	249	81.9
	Total	304	100
Do you know that there are rules and regulations of solid wastes in the town?	Yes	165	54.3
	No	139	45.7
	Total	**304**	**100**
If "YES" for the above question, rate the practice of rules and regulations of SWM by concerned bodies in the town?	No regulation at all	139	45.7
	Regulation is weak	153	50.3
	Regulation is strong	12	3.9
	Total	**304**	**100**
Have you ever seen when violators of regulation in solid waste management are penalized?	Yes	38	12.5
	No	266	87.5
	Total	**304**	**100**
If "YES" for the above question, rate the appropriateness of the penalty	Very strong	2	0.7
	Strong	15	4.9
	Fair	17	5.6
	Weak	165	54.3
	Very weak	105	34.5
	Total	**304**	**100**

Source: field survey, 2020

4.2.4. Vehicles available for solid waste disposition

Based on the data obtained above Table 4.4 among the respondents 55(18.1%) of them responded that there was enough vehicles currently in use to dispose solid wastes but dominant number of respondents 249(81.9%) there was no enough vehicles to dispose solid waste in the town. According to focus group discussion and interview the data that obtained maximum number of respondents were confirmed that there were no sufficient vehicles for solid waste disposal. Similarly from personal observation of the researcher in the field the number of vehicles to dispose solid wastes did not relate to the service that need as an urban area and also the researcher confirmed by the interview and they complained the number of vehicles were very limited and so that they did not serve as expected.

Therefore, as can be understand that shortage of vehicles to dispose solid wastes leads to insufficient or improper solid waste management system. It has also been studied by many researchers (Moghadam, Mokhtarani, and Mokhtarani, 2009) that SWM is also influenced by infrastructure facilities like number of vehicles available for garbage collection, route planning by these vehicles, quality of roads, bin collection system (Tadesse, Ruijs and Hagos, 2008) has analyzed a families decision of waste management, and found that if frequency of waste collection from communal waste containers is regular and its distance from the house is less, then there is less disposal of waste in open areas, road side etc….

4.2.5. Rules and regulations of solid wastes management system in the town

With regard to solid waste management, different rules and regulations were formulated still their implementations have been not that much effective. According to MUDCUPSBB (2012), for instance solid waste management standard of Ethiopia states that every household have the responsibility to keep the sanitation within 20 meters radius of the vicinity and 50 meters for the institution. However, there was the problem of the enforcement of those rules and regulations were in line with the awareness creation activity.

To determine whether there is rules and regulations of solid wastes management system in the town, as illustrated from the above Table 4.4 more than average number of respondents 165(54.3%) reacted that there was rules and regulations of solid waste management system from these 153(50.3%) of the respondents stated there was regulation but it is weak and unable to

rehearse because of lack of strong commitment from the responsible bodies and 12(3.9%) of the respondents responded regulation is strong.

On the other hand, among households' of 139(45.7%) of the respondents said that there was no regulation at all for solid waste management As a result, this data revealed that there were rules and regulations but the regulation was weak i.e. not applicable in the town properly. This is also the researcher confirmed through in-depth interview and focus group discussion made with selected respondents majority of respondents showed that most of the rules and regulations for solid wastes management practice of the town were weak and did not functional. Moreover, the researcher proved that from personal observation violators of regulations do not penalized. In addition, from the respondents of households' 266(87.5%) responded that they did not see when violators of regulation in solid waste management were penalized.

4.2.6. Waste storage practice of households

Storage of waste at source is a very important aspect of solid waste management because of its health and environmental impact. This functional part of SWM constitutes the activity which is performed by solid waste generator. To that extent, studying solid waste storage facility has a significant impact of household solid waste management activity. The result presented in the following Table 4.5 and 4.6 as follows:

Table 4.5: Factors affecting the municipal solid waste management practices

Variables	Alternatives	Frequency	Percent
Do you have a temporary solid waste storage in your house?	Yes	264	86.8
	No	40	13.2
	Total	**304**	**100**
If "YES" for the above question what type of solid waste storage material do you use in your house to store solid wastes?	Basket	46	15.1
	Sack "madabrya"	170	55.9
	Plastic bags "festals"	36	11.8
	Write if any others	52	17.1
	Total	**304**	**100**
How often do you dispose solid wastes of your household?	Every day	135	44.4
	Every second day	64	21.1
	Every fourth day	100	32.9
	Every week	5	1.6
	Total	**304**	**100**

Source: field survey, 2020

4.2.7. Availability and type of solid waste storage at Household level

According to Samuel (2006), those persons that use plastic bucket as a waste storage minimizes solid waste generation by increasing service duration of the storage. While those who use non durable storage will not get long service from the storage, rather they pay costs for disposal of the storage as a waste.

As it could be seen from Table 4.5 above, dominant number of households 264 (86.8 %) had temporary storage material at their home while 40(13.2 %) had not. According to the type of storage, out of 304 households who had temporary solid waste storage materials, 46(15.1%) used basket as waste storage, whereas, 170(55.9%), 36(11.8%), and 52(17.1%) of the respondents used sacks "madabrya", plastic bags "festals", and other related storage materials respectively. The data also showed that the majority of households use sack "madabrya" which is not prepared

for solid waste storage service. This data also coincided with qualitative information that gathered from focus group discussion respondents. All members of group discussion acknowledged that households commonly used sacks “madabrya” to store their solid wastes but as they stated this storage was not manageable repeatedly. This is much related with the minimum cost of sack, easily available in the market however, its appropriateness for holding large volume of solid wastes was not suitable. And as all the storage materials are not standardized since they did not used consistently why because they were not water proof, uncovered and exposed easily for damage.

Figure 4.3: Waste storage practice of households

Source: Picture taken by the Author, 2020

4.2.8. Frequency of solid waste disposal at household

Based on the data obtained from Table 4.5 above among 304 households 135(44.4%) of respondents disposed every day, 64(21.1%) of respondents their solid waste disposal was every second day whereas 100(32.9%) and 5(1.6%) were disposed every fourth day and every week respectively.

According to the interview and focus group discussion data gathered from respondents almost all responded that maximum number of households removed their wastes every day and every second day but few number of respondents reacted that households disposed solid wastes not frequently. Therefore, majority number of respondents from quantitative data i.e. 199(65.5%) and almost all of qualitative data respondents replied that households dispose solid wastes frequently. Here, the information that obtained could be understood that from the respondents,

every day disposal of solid wastes that can increase or maximize the amount of solid wastes in town.

Table 4.6: Factors affecting the municipal solid waste management practices

Variables	Alternatives	Frequency	Percent
Is there a solid waste disposing truck service from the municipality in your neighborhood?	Yes	220	72.4
	No	84	27.6
	Total	**304**	**100**
If "YES" for the above question, rate the solid waste disposing truck service?	Always	29	9.5
	Once a week	113	37.2
	Once a month	79	26.0
	Never	83	27.3
	Total	**304**	**100**
How do you rate the solid waste disposal service which is rendered by the municipal?	Highly satisfactory	7	2.3
	Satisfactory	35	11.5
	Dissatisfactory	164	53.9
	Highly dissatisfactory	98	32.2
	Total	**304**	**100**

Source: field survey, 2020

4.2.9. Solid waste disposing truck services of the municipality

According to Table 4.6 above from the respondents of households 220(72.4%) were confirmed that there was a solid waste disposing truck service from the municipality in their neighborhood but 84(27.6%) of the households responded there was no solid waste disposing truck service from the municipality in their neighborhood. Also this data was similar with that obtained from qualitative information.

As responded by the focus group discussion respondents and from the interview they all assured that there was a solid waste disposing truck service from the municipality yet they all complained that frequency of service delivery was really irritating them. With regarded that frequency of service delivery 29(9.5%) of respondents got always, 113(37.2%) respondents had

access once a week, 79(26%) had once a month and 83(27.3%) of households never got service. Therefore, even though there was solid waste disposing truck service from the municipality the frequency of service delivery was not sufficient enough. Besides this some (27.3%) of the households never get service from the municipality.

Moreover, 164(53.9%) and 98(32.2%) of the respondents were dissatisfactory and highly dissatisfactory respectively with the service rendered by the municipality whereas 35(11.5%) and 7(2.3%) of the respondents were satisfactory and highly satisfactory respectively the service that rendered by the municipality. This quantitative data was also confirmed with the qualitative data obtained from the focus group discussion even if few numbers of respondents satisfied with the solid waste disposing truck service but majority of the respondents were approved that solid waste disposing truck service from the municipality was dissatisfied.

In addition, the researcher confirmed that through personal observation the households were disappointing with the frequency of solid waste disposing truck service delivered from the municipality.

Figure 4.4: Solid waste disposing trucks

Source: Picture taken by the Author, 2020

Even though there was less number of solid waste trucks in the town some of them observed by the researcher during field observation while they were serving to the households.

4.3. Opportunities for solid waste management in the town

For a better solid waste management towns must use all the opportunities that help to waste management practices. In different places used different options that assist the solid waste management system afforded by the municipality. Among those opportunities private solid waste

collectors play a vital role in order to increase a better solid waste management in the town. On top of that, having private solid waste collectors who are engaged in collecting solid wastes from door to door services privately can be more reachable and afford a better service for the households. Also this is an opportunities for small enterprises as job opportunity in order to develop their income but there was no any such activities created by the municipality.

Table 4.7: Opportunities for solid waste management in the town

Variables	Alternatives	Frequency	Percent
Do you get service from those who are privately engaged in solid waste collection in the city?	Yes	153	50.3
	No	151	49.7
	Total	**304**	**100**
What do you think is the current number of private solid waste collectors? Do you have enough access to them?	None at all	34	11.2
	Not enough access	218	71.7
	There is enough access	52	17.1
	Total	**304**	**100**

Source: field survey, 2020

4.3.1. Services by privately engaged solid waste collection

Based on the data above Table 4.7 among the households 153(50.3%) of them get services from those who are privately engaged in solid waste collection. While 151(49.7%) of households had not. Therefore, almost half of the households got services from privately engaged in solid waste collectors but according to the respondents 218(71.7%) almost the dominant number of households stated the current number of private solid waste collectors were not enough in the city.

Besides this 34(11.2%) of households responded that none at all private solid waste collectors access to them and 52(17.1%) respondents explained there was enough number of private solid waste collectors. According to the qualitative data that obtained from focus group discussion and interview respondents all of them confirmed that private solid waste collectors tried to afford services to the households but they were not reachable because limitation of their number. Moreover, as observed by the researcher during physical observation the accessibility of private solid waste collectors were not reachable to the households because of less number of private

solid waste collectors. Therefore, as clearly known that private solid waste collectors have irreplaceable role in the municipal solid waste management system, however based on the information obtained from quantitative and qualitative data above was few numbers of accesses of private solid waste collectors in the town. Hence, the less access of private solid waste collectors can affect the affordability of solid waste management practices in the town.

Figure 4.5: **Door-to-door private solid waste collectors' service**

Source: Picture taken by Author, 2020

Even though the number of private sold waste collectors were less but some of them were observed by the researcher during field observation while they were serving to the households as indicated above Figure 4.5.

Table 4.8: Opportunities for solid waste management in the town

Do you believe that the service rendering by the private solid waste collectors is satisfactory?	Yes	35	11.5
	No	269	88.5
	Total	**304**	**100**
How often do the solid waste collectors collect solid wastes from your house?	Weekly	105	34.5
	Monthly	80	26.3
	Twice a month	82	27.0
	Please indicate if any other	37	12.2
	Total	**304**	**100**
How do you see the payment compared to the service delivered by those privately engaged in solid waste collection?	Very expensive	39	12.8
	Expensive	162	53.3
	Cheap	87	28.6
	Very cheap	16	5.3
	Total	**304**	**100**

Source: field survey, 2020

4.3.2. Private solid waste collection service quality & frequencies

As can be seen from Table 4.8 above 35(11.5%) of respondents satisfied by the service rendered by private solid waste collectors but on the contrary large number of respondents 269(88.5%) of households did not satisfied by the service provided by waste collectors. Accordingly, the frequency of waste collection by waste collectors 105(34.5%) of respondents replied that they collect weekly, 80(26.3%) of households said that waste collectors collect monthly. 82(27%) of respondents answered waste collectors collect twice a month and 37(12.2%) of households stated other that was rarely collect solid wastes.

Therefore, the frequency of waste collection by solid waste collectors was not frequent. At the same time the payment compared to the service delivered by those privately engaged in solid waste collection among the respondents of 39(12.8%) said very expensive, 162(53.3%) of the respondents stated that the payment was expensive whereas 87(28.6%) and 16(5.3%) replied cheap and very cheap respectively. Based on the data gathered from focus group discussion and

interview of respondents reacted that except some respondents maximum number of them were agreed private solid waste collectors service was not satisfactory because of their insufficient rate of waste collection. Here the data obtained from qualitative information the amount of payment for solid waste collection 201(66.1%) respondents answered the payment was expensive and also this data was similar with qualitative data as responded by households at the time of focus group discussion. As a result, the households were not interested to pay for solid waste collection and that results wastes do not frequently remove from households. So that, insufficient rate of waste collection had negative impact on solid waste management system in the town as the amount of solid waste generation in urban areas and the number of densely population cause of the amount of payment for private solid waste collectors.

4.4. Community awareness and participation in solid waste management

It's clear that the attitude and level of understanding toward solid waste management have major effect on solid waste handling and perception of solid waste minimization. Education is a great way to shape the attitude and increase awareness of the society. As a result attending a formal education or related trainings will make a fertile ground for the awareness creation activity.

Table 4.9: Community participation in solid waste management

Variables	Alternatives	Frequency	Percent
Your awareness about solid waste management is:	Very good	30	16.4
	Good	100	37.2
	Poor	143	40.5
	Very poor	31	5.9
	Total	**304**	**100**
Do you separate solid waste at source in your house?	Yes	71	23.4
	No	233	76.6
	Total	**304**	**100**
How do you evaluate the practices of the community in source separation of solid waste?	Very good	20	6.6
	Medium	124	40.8
	Low	160	52.6
	Total	**304**	**100**

Source: field survey, 2020

4.4.1. Awareness about Solid Waste Management

Effective solid waste management depends on the awareness level of the society. Therefore, the participation and sense of ownership of the society relied on the awareness level of the society towards waste and waste related problems. With this regard according to Enger and Smith (2008), awareness should be created among residents to manage household refuse and educate them on the hazards that poorly disposed waste could pose to the environment as well as the population. Also the primary national policy on waste management is the Solid Waste Management Proclamation No. 513. Released in February of 2007, the proclamation's main goal is to increase community participation.

The survey data Table 4.9 showed that about 30(9.9%) of the respondents had very good awareness about solid waste management, whereas 100 (32.9%) had good awareness about waste management methods. Households who had poor awareness hold 143(47%) and respondents who had very poor awareness were 31(10.2%). As the data showed that since lack of awareness about solid waste management took maximum number of households i.e. 174(57.2%), it had negative impact on municipal solid waste management in the town. Moreover, among the respondents 71(23.4%) of households were separate solid wastes at source but 233(76.6%) of households did not separate solid wastes at source.

Furthermore, the practices of the community for separation of solid waste at source 20(6.6%) of respondents very good, 124(40.8%) of respondents medium and 160(52.6%) households low practice of solid waste separation at source. Because of this the highest respondents 52.6% less practice of solid waste separation at source and this leads to poor management practice of wastes at the very beginning of sources. In addition, according to focus group discussion and personal observation of qualitative data showed maximum number of respondents reacted that the awareness of households about solid waste and separation of solid wastes at source was poor. And therefore, community awareness about solid waste management has played a great role to practice civilized and modern system of solid waste management in urban areas.

As a result community awareness and practice of solid waste separation at source observed from the data was weak and that could be cause of inappropriate solid waste management practice in the town.

Table 4.10: Community participation in solid waste management

Variables	Alternatives	Frequency	Percent
The municipality attempts to create awareness and mobilize the community to waste disposal initiatives.	Strongly disagree	60	19.7
	Disagree	109	35.9
	Agree	82	27.0
	Strongly agree	53	17.4
	Total	**304**	**100**
How do you think of solid wastes? Do you think solid wastes are:	Useful	40	13.2
	Somewhat useful	59	19.4
	Useless	140	46.1
	Do not know	65	21.4
	Total	**304**	**100**
Who do you think is responsible for solid waste management? (you can write more than one answers possible)	The municipality	126	41.4
	The private waste collectors	5	1.6
	The households	94	30.9
	All	79	26.0
	Total	**304**	**100**

Source: field survey, 2020

4.4.2. Municipality's role in community mobilization for solid waste management

The data obtained from Table 4.10 among the respondents 60(19.7%) of households strongly disagree that the municipality did not attempt to create awareness and mobilize the community to waste disposal initiatives and 109(35.9%) of respondents disagree. Whereas 82(27.0%) agree and 53(17.4%) of respondents were strongly agree that the municipality tried to create awareness and mobilize the community to waste disposal initiatives.

From interview and focus group discussion the data that obtained among the respondents few numbers of households were replied that the municipal attempts to create awareness and mobilization of community for solid waste management on the other hand, majority of households answered there was no any attempt to create awareness and mobilization of communities for solid waste management .As can be seen from the analyzed quantitative data dominant number of respondents i.e. 169(55.6%) and from qualitative data majority of households were responded that the municipality did not try to create awareness and

mobilization for the community to waste disposal initiatives. Therefore, the municipality should create consciousness and mobilize the community for a better and civilized solid waste disposal system to obtain the intended goal.

4.4.3. Perception of the community about solid waste.

As we can see from the data above Table 4.10 among the sample respondents 40(13.2%) were responded that solid waste is useful, 59(19.4%) of households answered solid waste is somewhat useful. On the other hand 140(46.1%) of respondents recognized that solid waste is useless. More over 65(21.4%) of respondents do not know whether solid waste is either useful or useless. Also from focus group discussion information obtained that only few of respondents reacted that the community had awareness about solid waste whereas majority of respondents stated that households had not awareness about solid waste.

According to the analyzed quantitative data the maximum number of respondents 205(67.4%) and maximum respondents of qualitative data had no knowledge of the use of solid waste. So as to that lack of understanding of the use of solid waste was lead to mismanagement practice of wastes. Therefore, based on the data that obtained from quantitative and qualitative information on misperception of solid waste there must be need awareness of knowledge to the community and that can help to control at the very beginning of solid waste management practice from the sources.

4.4.4. Responsibility for solid waste management.

The data obtained from Table 4.10 among the respondents 126(41.4%) were understand that the responsibility of solid waste management is the municipality, 5(1.6%), 94(30.9%) of respondents perceived the private solid waste collectors and the households respectively. On the contrary, 79(26.0%) of respondents understood that the responsibility was all stakeholders.

To sum up this information the highest respondents 225(74.01%) assumed that there is another responsible body for solid waste management. Qualitative information that obtained from focus group discussion majority of respondents reacted that the responsibility of solid waste management was more of for municipality and few of them were reacted the responsibility was all stakeholders. Moreover, as the researcher observed during field observation and interviewed the selected interviewers the community complained that the municipality did not manage the

town's solid waste properly and they denied their responsibility as they were not responsible to manage solid wastes from their side. To avoid such misunderstanding of solid waste management responsibility there must common consensus among the communities for effective solid waste management practices in the town.

4.5. Challenges of solid waste management in the town

Increasing population levels, booming economy, rapid urbanization and the rise in community living standards have greatly accelerated the municipal solid waste generation rate in developing countries (Minghua et al., 2009). Municipalities, usually responsible for waste management in the cities, have the challenge to provide an effective and efficient system to the inhabitants. However, they often face problems beyond the ability of the municipal authority to tackle (Sujauddin et al., 2008) mainly due to lack of organization, financial resources, complexity and system multi dimensionality (Burntley, 2007).

Understanding why absence of waste collection and disposal service provisions are essential to design effective solutions to address the problem. The data collected from sample households and interviews conducted with selected key informants in the town municipality, revealed the existence of the following major factors behind the existing poor waste management practice of the town.

4.5.1. Absence of Stakeholders and Private Sectors Participation

According to the discussion made with selected key informants, there was very poor stakeholders' and private sectors involvement in decision making process, waste collection and dumping service provision and financial support to have better waste management system in the town. They also reacted that the causes for limited involvement of these bodies were absence of experience to participate stakeholders and more reliant on usual budget for expenditures to manage waste.

From the municipality, participatory strategy must consider the role of private sectors and stakeholders. In spite of the noticeable advantage of participatory approach to SWM, it is possible to say that participation of stakeholders' and private sectors was really limited in the town. According to (Visvanathan *et al.,* 2004) SWM is an area of universal concern for both the developed and developing world. Historically, countries dealt with waste by burying it the

ground, covering it up and forgetting about it. This approach is not sustainable therefore, achieving sustainability in waste management requires an integrated approach including: the use of different collection and treatment options which include prevention, recycling, energy recovery and environmentally sound land filling of solid waste and involvement and participation of all the stakeholders waste processors (formal and informal recyclers), waste generators (households, industries and agriculture) and government institutions (regulators, waste managers and urban planners).

4.5.2. Poor decentralization of waste management service provisions

Based on the qualitative information that obtained from in-depth interview with the selected expert informants decentralization of municipal solid waste management service provisions hold together government and private sectors working jointly for a better services. Decentralization also initiates participation and responsiveness to providing opportunity for participation and appreciates the harmonization of private sectors.

In study area there were no any efforts made by town's municipality to decentralize waste collection and disposal services by organizing unemployed individuals by affording them some supports but there are some private solid waste collectors who are engaged privately and an activities involving collecting of old discarded plastic shoes, plastic bottles, metals etc. for recycling purpose by informal sectors or individuals called "Quoralle" without any support by the municipality. Yet, it was not successful because of lack of effective organization and monitoring activities by the municipality. For that reason, participation of private sectors in provision of waste collecting and disposal services is none in the town except some technical supports from Wolkite University but this is not from the initiation of the municipality rather with the willingness of the University.

4.5.3. Financial limitation

Shortage of budget allotment is one of the major factors that limit the capacities of the sector to establish and provide waste management services in the town. According to the town's finance and economy office consecutive four years report indicated that Wolkite town municipality allocated 32,440.5 (25%), 36,045 (25%), 40,050 (25.7%,) and 44,500 (25%) of its total budget in 2017, 2018, 2019, and 2020 respectively for waste management (fuel for solid waste trucks, for

maintenance of vehicles, for street sweeping, for cleaning drainage lines, to reduce the composition of wastes, and the like). Even though the annual budget allocated for such activities was become some amount of increasing from time to time, the nature and extent of the problem, population growth and the like had also shown increment.

As compared to high income countries, municipalities in low and middle income countries allocate the majority of their solid waste management budget to collection and transportation services. Final disposal costs are minimal because disposal is usually accomplished through open dumping (Djk, 2006). Above all it is a budget allotment problem that made the town municipality not to give full attention for SWM, because shortage of various social services like education, clean water, electricity and health care accessibility made the municipality to give priority of fulfilling those services in the town as the information collected from the qualitative data.

4.5.4. In adequate human resource

As cited by ShiviKhanna (2017) according to Goel (2008) if workers are not employed according to the requirement there will be high absenteeism due to disciple, injury, illness diseases etc.

As selected experts in-depth interview data and the report from the human resource department of the municipality of the town showed that in adequate and efficient human resource to plan and implement SWM is one of the major problems of the municipality practicing in the town. There were not adequate man power allocation in terms of number and qualification. For example, the wide and very challenging activities under the town municipality are being run by only 11(44%) of the required employees where as the actual number of employees that required for the job must be 25. Besides this, majority of staff members in the office were allocate for duties not related with their educational backgrounds. This obviously implies that ability to plan and implement SWM is inefficient as well as the attention given to the duties by the higher officials and administrative body of the town is inconsiderable. According to (Pandey & Malik, 2015) regular capacity building programs should be conducted for labors directly involved in waste handling. With this regard, lack of education opportunity, capacity building, experience sharing and to enhance employees' performance capacities related to SWM also aggravate the existing solid waste management problem.

CHAPTER FIVE

5. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1. Summary

This research has tried to assess households' solid waste management practice in Wolkite town. The study used the data collected from 316 households among these 304 were returned for analyzing and selected key informants in the town municipality by using unstructured interview questions. Field observation and reviewing published and unpublished documents were also employed. Finally, based on the results and discussion of the study, the conclusion and recommendations are summarized as follows.

Majority of households in the town have not some kind of stable and standardized solid waste storage materials used to store solid wastes. Most of the households had not awareness creation on waste management system, so that they dispose solid wastes generated from their houses illegally.

The finding of this study also indicated that there was weak solid waste collecting, transporting and disposal services condition in the town. Hence, dispose in local informal site, throw on open space or on street, and throw waste into drainages are the dominant waste disposal systems used by households in the town. Storage and separation is a functional element of solid waste management which needs the participation of households during source at large. In the study area, most of the households have not durable storage materials that used to store solid wastes. Even these who store waste in their home, mostly stored in temporary containers like plastic bags 'festal', sack '*madaberya keretit*' and basket.

A result of this, the storage practices in the town is very poor in terms of the types of material and storage location. According to this, properly separating waste will create suitable condition to recycle or reuse the waste. Furthermore, those households had not awareness about solid wastes positive contribution.

For effective solid waste management practice, building institutional capacity which is capable of the service delivery is vey essential. Based on the survey result, however, the town municipality doesn't have enough vehicles that necessary for the provision of solid waste

management services at the town. In order to minimize solid waste management problem waste reduction and waste separation at source cannot succeed without community awareness.

All effort to reduce illegal dumping is also impossible without community participation. However, in the town, there was no any attempt for awareness creating activities applied by the municipality. Majority of respondent still did not consider solid waste management as burning issue and this perception also observed during field observation by the researcher. This confirms that the municipality does not consider how trainings and awareness are important to manage solid wastes in the town regularly.

Solid waste management is a difficult task to overcome the challenges which needs the coordination of all stakeholders. It is not possible to make solid waste management service provision available to all households if only depend on the town's municipality. So it is very important to ensure SWM of the town by the participation of all. The study result identified the main factors which influenced the town's solid waste management service. These are lack of community awareness, illegal dumping, low enforcement of rules and regulation, weak community participation approach, inefficient controlling and monitoring mechanism, in adequate vehicles

5.2. Conclusions

This section draws the conclusions of the study which is in line with the purpose statement, and in consistence with the findings and the discussions already made in the above sections. The study has been conducted to address the practices & challenges of solid waste management in Wolkite town. Solid waste management is becoming a critical issue in the world since it is a major cause for environmental pollution and human health problem. Typically observed serious problems especially in developing countries are insufficient collection, storage, treatment and uncontrolled disposal of solid wastes in open dumps which expose to serious risk like environmental pollution and human health problem. As a result, urban areas in Ethiopia have experienced serious environmental service provisions problems.

The study found out that the rate of solid waste management practice of the town was weak and insufficient; there was lack of availability of disposing containers in the neighborhood. Furthermore, majority of households have not some kind of solid waste storage container used as a primary solid waste container to store solid wastes at source and also there was no enough

vehicles to dispose solid wastes. Even though there were rules & regulations but the rules were weak & not applicable because of lack of commitment by the responsible bodies. On the other hand, most of the respondent did not have awareness creation agenda on solid waste management, because of this they were dispose solid wastes generated from their houses illegally.

This study also indicated that Wolkite town municipal solid waste management service is very weak in terms of solid waste collecting and disposal services provision in the town consistently and adequately and solid waste management facility. Moreover, the result of the study revealed open dumping and informal sites are the dominant waste disposal method practiced by the communities. Concerning factors affecting the SWM system of the study area significantly identified various factors. Among those factors poor awareness of the households about the negative impact of solid waste on their environment and health, inconsistent service provision from the municipality, in adequate solid waste vehicles, insufficient private SWM collectors who are engaged in solid waste collection and poor coordination with stake holders are some of them. The financial limitations, technical aspects, in adequate human resource and political features were all play their role for effective solid waste management

To sum up, the town's municipality could properly manage wastes generated in the town, make sure public health and reduce the impact of waste on the environment by participating the public and working together with stakeholders and by having institutional setups.

5.3. Recommendations

The following important points must be taken into consideration to improve the SWM practice & challenges of the town as recommended by the researcher based on the findings of the study.

- Socially, the municipality should provide continuous awareness through community programs to inform the community the danger and the consequences of improper wastes management. This will ensure proper waste management and help the town's community reduce poor sanitation activities that have led several health hazards in the town.
- Institutionally, the municipality and the city administration should come up with clear and enforceable responsible authorities and rules that can strengthen the capacity of the municipality and stakeholders participations & there must be institutional setups using

strategies and system for integrating the delivery of better and sound environmental SWM services.

- Financially, the municipality government should allocate capital for the improvement of solid waste in the town. Furthermore, budget should be reviewed periodically to determine that they are properly managed. .
- Technically, the municipality and local government should confirm to provide adequate and modern solid waste management hence, it will be easy to collect and transport waste. Recruiting with qualified personnel, and availability of modern vehicle equipment will reduce environmental pollution and prevent health hazards & finally for better and sustainable SWM systems in the town.
- Politically, the current research found out that there are adequate policies, laws that promote for effective SWM but it lacks strict enforcement by-laws by the waste cleaning agency such that dumping of waste in open sites and drainages are common. Therefore, the municipality should be apply rules and regulation people who are violated the regulation by introduced polluters should pay for their pollution principle "ppp" to tackle problems of illegal waste disposal system in the town.
- The municipality should be given due attention to organize interested youths and women as job opportunity in order to have their economic development and to operate door-to-door solid waste collection services in the town by acknowledging the community to introduce and implement the service effectively and efficiently.
- The municipality must work jointly with stake holders in order to tackle the challenges and to have effective and efficient solid waste management practice in the town

5.4. Suggestions for further research

However, the current study has only focused in Wolkite town Municipality and it's just limited to a small area in Wolkite town. Therefore, time and other resource limitation restricted this research to narrow scope which only focused in municipality of Wolkite. The researcher therefore recommended that further study to be done in a larger scale to cover more areas beyond Wolkite city in the Gurage Zones' town with more variables and dimensions than this study for better solution of effective SWM.

REFERENCES

Achankeg, E. (2004). Sustainability in municipal solid waste management in Bamenda and Yaounde, Cameroon. *Department of Geographical and Environmental Studies, Doctor of* (December), 405.

Aklilu, A. (2002). *Households' Willingness to Pay for Improved Solid Waste Management:*

Alam, R., Chowdhury, M. A. I., Hasan, G. M. J., Karanjit, B., & Shrestha, L. R. (2008). *Generation , storage , collection and transportation of municipal solid waste – A case study in the city of Kathmandu, capital of Nepal, 28, 1088–1097. https://doi.org/10.1016/j.wasman.2006.12.024*

Allende, R. (2009). *Waste history in the Gambia. Thesis (MSC), University of the Gambia.*

Arukwe, A. E. (2012). *Solid waste deposits as a significant source of contaminants of emerging concern to the aquatic and terrestrial environments - A developing country case study from Owerri, Nigeria; . journal of Science of the Total*, 94-102.

Awosan, et al. (2017). *Knowledge , Risk Perception and Practices Regarding the Hazards of Unsanitary Solid Waste Disposal among Small-Scale Business Op .... Knowledge , Risk Perception and Practices Regarding the Hazards of Unsanitary Solid Waste Disposal among Small-Scale Busi, (October).* https://doi.org/10.9734/IJTDH/2017/36491

Bizatu, M. a.(2010). *Community based assessment on household management of waste and hygiene practice in Kersa Woreda,Eastern Ethiopia. College of Health Science, Haramaya University, Harar, Ethiopia.* Haramaya University, Harar, Ethiopia: J. Health Dev. 2010: 24 (2).

Burntley, S.J., 2007. *A review of municipal solid waste composition in the United Kingdom. Journal of Waste Management 27 (10), 1274–1285.*

Coffey, M., Coad, A. (2010). *Collection of Municipal Solid Waste in Developing Countries.*

CSA. (2007). *Population and housing census of Ethiopia result for Southern region in specific Wolkite town .*

Dominic, M. A. (2017). *Factors Affecting the Management of Solid Waste in Urban areas.*

Enger, D. and Smith, A. 2008. *Environmental Science a Study of Interelationship. 11th edition, McGraw Hill International Edition. USA.*

Endrias, G. &. (2017). *Generation rate and physical composition of solid waste in Wolaita Sodo Town, southern Ethiopia. Ethiopian Journal of Environmental Studies & Management 10(3): 415 – 426, 2017. .*

ENPHO. (2008). *Solid waste management in Nepal.110/25 Adarsa Marga-1, Thapagaon, New Baneshwor GPO Box: 4102, Kathmandu, Nepal. Retrieved from: www.enpho.org. (Accessed date: 28 April 2020).*

Fei-baffoe, B., Nyankson, E. A., & Gorkeh-miah, J. (2014). *Municipal Solid Waste Management in Sekondi-Takoradi Metropolis , Ghana, 2014.*

FDRE *(Federal Democratic Republic of Ethiopia). 2007. Federal Negarit Gazeta, Proclamation No. 513/2007. Solid Waste management Proclamation.. 13th year No. 13.pp 3524 - 3531*

G/Tsadkan G/Michal. (2002). *Domestic Solid Waste Management in Mekelle City: Tigray Region. Master's thesis, School of Graduate Studies, Addis Ababa University, Ethiopia.* Mekelle : School of Graduate Studies, Addis Ababa University, Ethiopia.

Gebrie Kassa (2009). *http://www.amazon,com*. Retrieved May 18, 2020, from Management of Domestic Solid Waste in Ethiopia: Operational Analysis and Assessment of Constraints in Bahir Dar Town, the Capital of Amhara National Regional State, Ethiopia,.

Gidarakos E., Havas G., Ntzamilis P., (2005). *Municipal Solid Waste Composition Determination Supporting the Integrated Solid Waste Management System in the Island of Crete*, Greece.

G., M. (2015). Assessing the Current Status of Solid Waste Management of Gondar Town, Ethiopia. . *International Journal of Scientific & Technology Research, Vol.4, Issue 09, ISSN 2277-8616.*

Habtamu, D. (2015). *Domestic and Industrial Solid Waste Management Efforts for Greener Development in Shashemane Municipality, Ethiopia. Civil and Environmental Research Vol.7, No.9, ISSN 2224 – 5790 (Paper) ISSN 2225 – 0514 (online).*

Hassan, A. I. · B. I. · M. N. (2004). *Overview of waste disposal and landfills / dumps in Asian countries, 104–110. https://doi.org/10.1007/s10163-004-0117-y*

Hufane, M. A. (2015). *Challenges Facing Solid Waste Management in Borama Town, Somaliland*.

ILO. (2007). *Start Your Waste Recycling Business: A Technical Step-By-Step-Guide of How to Start a Community-Based Waste Recycling Business. Norfolk Rd, Mt Pleasant Arundel Office Park PO Box 210 Harare, Zimbabwe.*

Issam, A. (2007). *Trends and problems of solid waste management in developing countries: A case study in seven Palestinian districts. Waste Management 27 (12) 1910-1919. .*

International Environmental Technology Centre (IETC) V.1.1 *Gender and Waste Management.http:www.Oecd.org/dac/genderdevelopment/1849277.pdf…(2016).(Accessed date June 6, 2020)*

Javaheri, H. e. (2006). *Site Selection of municipal Solid Waste Landfills Using Analytical Hierarchical Process Method in a Geographical Information Technology Environment in Giroft. Iran Journal of Environmental Health Science Engineering. 3, 177-184.*

Jenkins, R. R. (2000). *the Determinants of Household Recycling: A Material Specific Analysis of Recycling Program Features and Unit Pricing. .* Retrieved March 30, 2020, from http://www..rff.org.

Jin, J., Wang, Z., & Ran, S. (2006). *Solid waste management in Macao : Practices and challenges, 26, 1045–1051.* https://doi.org/10.1016/j.wasman.2005.08.006

Kamar, A. J. (2006). *(Household participation in domestic waste disposal and recycling in the Tshwane Metropolitan area: an environmental education percpective. A master's thesis presented to the department of environmental education.* Tshwane Metropolitan area: University of South Africa.

Kassa, Z. (2010). *The Challenges of Solid Waste Management in Urban Areas, the case of Debremarkos Town Addis Ababa University, Ethiopia.*

Kyessi, A. a. (2009). *GIS Application in coordinating solid waste collection: the case of Sinza neighbourhood in Kinondoni Municipality, Dar Es Salaam City, Tanzania. FIG Working Week 2009.*

Lemma, A. ((2007)). *Household Solid Waste Generation Rate and Composition Analysis: the caseb in two Selacted Kebeles of Adama Town. A Master's Thesis presented to thue school of graduate studies of Addis Ababa University. Addis Ababa, Ethiopia.* Addis Ababa, Etiopia.

Longe, E. O. (2009). *People's Perception On Household Solid Waste Management In Ojo Local Government Area In Nigeria.* Retrieved November 16, 2019, from Iran. J. Environ.Health. Sci. 2009, Vol. 6, No3, pp. 209-216http://journals.tums.ac.ir.

Luis, F. D. (2005). "Solid wastes management". *"Solid wastes management", 01, ISBN: 92-807-2676-5.*

Martin Medina, (2000). *Globalization, Development, and Municipal Solid Waste Management in Third World Cities*, Mexico

Mcallister, J. (2015). *Factors Influencing Solid-Waste Management in the Developing World.*

Melaku, Tegegn, (2008). *Household Solid Waste Generation Rate and Physical Composition Analysis, In Jimma Town Ethiopia.* Jimma.

Minghua, Z., Xiumin, F., Rovetta, A., Qichang, H., Vicentini, F., Bingkai, L., Giusti, A.,Yi, L., 2009. *Municipal solid waste management in Pudong New Area, China. Journal of Waste Management 29, 1227–1233.*

Moghadam, M, Mokhtarani, B. (2009). *Municipal Solid Waste Management in Rasht City. Iran Journal of Waste Management, 485-489. (Accessed date May 20, 2020)*

MUCHE, G. Z. (2016). *School of Graduate Studies Solid Waste Management Practice and Factors Influencing Its Effectiveness .2016.*

MUDCUPSBB (Ministry of Urban Development and Construction, Urban Planning, Sanitation and Beautification Bureau). (2012). *Solid Waste Management Manual: With Respect to Urban Plans, Sanitary Landfill Sites and Solid Waste Management Planning. Addis Ababa, Ethiopia*

Nations, U., & Programme, E. (2005). *Solid waste management.*

Nigatu, R. S. (2011). *Challenges and Opportunities in Municipal Solid Waste Management: The Case of Addis Ababa City, Central Ethiopia. J Hum Ecol, 33(3): 179-190.*

NshimiIrimana Jules, (2004) *Attitudes and Behavior of Low-Income Households towards the Management of Domestic Solid Waste in Tafelsing, Mitchell's Plain*. A Master Thesis, University of the Western Cape, Development Studies in the Institute of Social Development. Retrieved from http: // etd. Uwc. ac. za/ usrfiles/ Modules /etd/docs/etd-init- 1668-1176902514.pdf

Ogwueleka, T. C. (2009). *Municipal Solid Waste Characteristics and Management in Nigeria. Iranian Journal of Environmental Health Science & Engineering, Vol.6, No.3, pp. 173–180. https://doi.org/10.30638/eemj.2016.002*

Pattnaik, S., & Reddy, M. V. (2010). *Resources , Conservation and Recycling Assessment of Municipal Solid Waste management in Puducherry (Pondicherry), India.*

"Resources, Conservation & Recycling," 54(8), 512–520. https://doi.org/10.1016/j.resconrec.2009.10.008

Poswa, T. T. (2004). *the Importance of Gender in Waste Management Planning: A Challenge for Solid Waste Managers.* . Retrieved November 16, 2019, from http://kharahais.gov.za.

Puopiel, F. (2010). *Solid Waste Management in Ghana: The Case of Tamale Metropolitan Area. A master's thesispresented for Science and Technology.* Retrieved February 10, 2020, from http://dspace.knust.edu.gh.

RODE, S. (2011). *Public Private Partnership in Solid Waste Management in Municipal Corporations of Mumbai Metropolitan, 3(4), 23–38.*

Rouse, J. (2008). *"Planning for sustainable municipal solid waste management: Practical Action; the Schumacher Centre for Technology and Development Bourton-on-Dunsmore Rugby", Warwickshire, United Kingdom.* . Retrieved April 27, 2020, from http://www.practicalaction.org. .

Samuel Shimelis. 2006. *Commercial Solid Waste Generation and Composition Analysis: Arada Sub city, Addis Ababa.*

Sankoh, foday pinka, & Yan, X. (2014). *Assessment of Solid Waste Management in Freetown, Sierra Leone towards Sustainable Development. Journal of Applied Science.* https://doi.org/10.3923/jas.2014.2909.2924

Schübeler (1996). *UNDP / UNCHS (Habitat)/ World Bank / SDC Collaborative Programme on Municipal Solid Waste management in Low-Income Countries Conceptual Framework for Municipal Solid Waste Management in Low-Income Countries Peter Schübeler, (9).*

Solomon, A. (2006). *Solid Waste Management: A Case Study of Household Solid Waste Management in Arada Sub-City,Addis Ababa.A Master's Thesis presented to the school of graduate studies of Addis Ababa University. Addis Ababa, Ethiopia.* Addis Ababa, Ethiopia.

Solomon, C. (2011). *Assessment of municipal solid waste management service in Dessie town. Master's thesis, School of Graduate Studies, Addis Ababa University.*

Sujauddin,M. H. (2008). *Household solid waste characteristics & waste management in Chittagong, Bagladesh. Journal of waste management, 1688-1695 (Accessed date June 6, 2020)*

Tadesse,T. , Ruijs, A, & Hagos, F. (2008). Household waste disposal in Mekele City. Northern Ethiopia Journal of Waste Managemant, 2003 - 2012. (Accessed date May 20,2020)

Techobanglous George, (2002).*Handbook of Solid Waste Management*. 2th edition, McGraw hill International Edition, USA

Tewodros, T. (2006). *Household Behavior and Solid Waste Management Survey Evidence from mekelle, Ethiopia. A Master's Thesis presented to Environmental Economics and natural Resources Group,Wageningen University.* Mekele.

UNEP, (2009). *Developing Integrated Solid Waste Management Plan: Training Manual for Assessment of Current Waste Management System and Gaps therein*, Volume 2, Osaka/ Shiga, Japan. Retrieved from http: // www. unep. or. jp /ietc/ publications/spc/ISWMplan-vol2.pdf

UNESC. (2009). *Africa Review Report on Waste Management. Committee on Food Security and Sustainable Development Regional Implementation Meeting for CSD- 18 Sixth Session 27-30 October 2009 Addis Ababa, Ethiopia.*

U.S.EPA (United States Environmental Protection Agency). (2009). *Municipal Solid Waste in the United States Office of Solid Waste.*

UN-HABITAT. (2010). *Solid waste management in the world cities. Nairobi: UNHABITAT.Retrievedfrom:http://www.sswm.info/sites/default/files/reference_attachments/UN%20HABITAT%202010%20Solid%20Waste%20Management%20in%20the%20W orlds%20Cities.pdf* . Accessed date February 30, 2020

Uriate J. and Filemon A, (2008). *Solid Waste Management and Practices*

Vaibhav, S. R. (2014). *Urban solid waste management in the developing world with emphasis on India: challenges and opportunities, Reviews in Environmental Science and Bio/Technology.*

Visvanathan, C., Trankler, J., Zou, G., Kurian, J., Basnayake, B. F. A., & Chart, C. (2004). *Municipal solid waste management in Asia. Asian regional research programme on environmental technology, Asian Institute of Technology, Bangkok.*

WB (World Bank.)2004. *Regulatory and institutional reform in the municipal solid waste management sector. In the municipal solid waste management regulatory sector. Strategy for the development of a framework for PSP in solid waste management in Ethiopia. Vol.1.*

Wilson, D.C., 2007. *Development drivers for waste management. Waste Management & Research 25 (3), 198–207.*

World Bank. 2000. *Community based pilot project on solid waste management in Khulna City: General project description. Water and sanitation program-South Asia, World Bank Office, Dhaka 3A Paribag, Dhaka 1000: Bangladesh. Available at: www.wsp.org. (Accessed date: 2, March 2020).*

Yadav, I. C., Devi, N. L., & Singh, S. (2010). *Evaluating financial aspects of municipal solid waste management in Mysore Evaluating financial aspects of municipal solid waste management in Mysore City , India Ishwar Chandra Yadav * Ningombam Linthoingambi Devi Surendra Singh, (January). https://doi.org/10.1504/IJETM.2010.038009*

Yohanis, B. &. (2015). *Assessment of Solid Waste Management Practices and the Role of Public Participation in Jigjiga Town, Somali Regional State, Ethiopia. International Journal of Environmental Protection and Policy. Vol. 3, No. 5, pp. 153- 168.*

Zahur, M. ((2007)). *BRAC UniversityJournal,Vol. IV, No. 2, 2007, pp. 93-97.* Retrieved March 10, 2020, from http://dspace.bracu.ac.bd.

Zebenay Kassa, (2010). *The Challenges of Solid Waste Management in Urban Areas, the Case of Debremarkos Town*, Addis Ababa University, Ethiopia

Zerayakob. (2002). *Analysis and Development of Solid Waste Management System of Addis Ababa City. M.Sc.Thesis Presented to the School of Graduate Studies of Jigjiga City University. .*

Zhu, D. A. (2008). *Improving municipal solid waste management in India: A sourcebook for policy makers and practitioners. Retrieved from: http://www.infibeam.com (Accessed date: 5 January. 2020).*

Zurbrügg, C. (2003). *How to Cope with the Garbage Crisis, (February), 1 –13.*

Appendix I: Status of damping site in Wolkite town

Source: Photos taken by the Author, 2020

Appendix II: Form of informal solid west damping site in Wolkite town

Source: Photos taken by the Author, 2020

APPENDIXE III.

Questionnaires prepared for sample households in Wolkite town

A questionnaire to be responded by selected households in Wolkite town at Addis Sub-City

Introduction:

Dear respondents,

The questionnaire is prepared for an academic purpose for the fulfillment of MA Degree in Governance and Development studies. The objective of the study is to assess "Solid Waste Management Practices in Wolkite town." Your response is very important for the success of the study. Hence, you are requested to give your alternative choices. Your name will not be mentioned to others and not expected to write here.

Thank you in advance for your cooperation

Part I: Demographic information on Household Members

Please select the number which indicates your choice

1. Gender: 0/ Female 1/ Male
2. Age: 1/ 15 - 25 2/ 26 - 35 3/ 36 - 45 4/ 46 - 55 5/ 56 and above
3. Marital status: 1/ Married 2/ Single 3/ Divorced 4/ Widowed
4. Family size: 1/ 1 -4 2/ 5 – 7 3/ Above 8
5. Occupation: 1/ Government employee 2/ NGO employee 3/ Private organization employee 4/ Merchant 5/ Daily labour 6/ if any other, specify_____
6. Monthly income (in birr): 1/ 500 - 1000 2/ 1001 - 3000 3/3001 - 5000 4/ 5001- 10,000 5/ Above 10,000

7. Educational Level: 1/ No formal education 2/ primary education 3/ Secondary education 4/ Diploma 5/ Degree 6/ Masters
8. House ownership 1/ My own house 2/ Rented from kebele/ Government 3/ Rented from private owners
9. Year of stay in Wolkite 1. < 5 years 2. 6 – 10 years 3. 11 – 15 years 4. Above 16 years

Part: II Existing municipal solid waste management practices of Wolkite town

1. How do you rate the current municipal solid waste management practices of the town? 1. Very good 2. Good 3. Moderate 4. Poor 5. Very poor
2. Is solid waste disposing containers available in your neighbourhood? 1. Yes 2. No
3. What other means do you use to dispose solid wastes of your household? 1. Throw it on an open space, in sewerage or on street 2. Digging a hole around the house and burn it 3. Disposing on the backyards of the house 4. Private collectors take it 5. Others, please specify_____
4. Are the vehicles currently in use enough to dispose solid wastes in the town? 1. Yes 2. No
5. Do you know that there are rules and regulations of solid wastes in the town? 1. Yes 2. No
6. If "YES" for the above question, rate the practice of rules and regulations of SWM by concerned bodies? 1. No regulation at all 2. Regulation is weak 3. Regulation is strong
7. Have you ever seen when violators of regulation in solid waste management are penalized? 1. Yes 2. No
8. If "YES" for the above question rate the appropriateness of the penalty to prevent violators of solid waste management rules and regulations? 1. Very strong 2. Strong 3. Fair 4.Weak 5. Very weak

Part III: Factors affecting the municipal solid waste management practices

1. Do you have a temporary solid waste storage in your house? 1. Yes 2. No
2. If "YES" for the above question what type of solid waste storage material do you use in your house? 1. Basket 2. Sack 3. Plastic bags 4. Write if any others_____
3. How often do you dispose solid wastes of your household? 1. Every day 2. Every second day 3. Every fourth day 4. Every week
4. Is there a solid waste disposing truck service from the municipality in your neighbourhood? 1. Yes 2. No
5. If "YES" for the above question, rate the solid waste disposing truck service? 1. Always 2. Once a week 3. Once a month 4. Never
6. How do you rate the solid waste disposal service which is rendered by the municipal? 1. Highly satisfactory 2. Satisfactory 3. Dissatisfactory 4. Highly dissatisfactory

Part IV: Existing opportunities for solid waste management

1. Do you get service from those who are privately engaged in solid waste collection in the city? 1. Yes 2. No
2. What do you think is the current number of private solid waste collectors? Do you have enough access to them? 1. None at all 2. Not enough access 3. There is enough access
3. Do you believe that the service rendering by the private solid waste collectors is satisfactory? 1. Yes 2. No
4. How often do the solid waste collectors collect solid wastes from your house? 1. Weekly 2. Monthly 3. Twice a month 4. Please indicate if any other_____
5. How do you see the payment compared to the service delivered by those privately engaged in solid waste collection? 1. Very expensive 2. Expensive 3. Cheap 4. Very cheap

Part V: Community participation in solid waste management

1. Your awareness about solid waste management is: 1. Very good 2. Good 3. Poor 4. Very poor
2. Do you separate solid waste at source in your house? 1. Yes 2. No
3. How do you evaluate the practices of the community in source separation of solid waste? 1. Very good 2. Medium 3. Low
4. The municipality attempts to create awareness and mobilize the community to waste disposal initiatives. 1. Strongly disagree 2. Disagree 3. Agree 4. Strongly agree
5. How do you think of solid wastes? Do you think solid wastes are:
   1. Useful 2.Somewhat useful 3. Useless 4.Do not know
6. Who do you think is responsible for solid waste management? (you can write more than one answers possible) 1. The municipality 2. The private waste collectors 3. The households 4. All

ለአባወራዎች እና እማወራዎች የተዘጋጀ የጽሁፍ መጠይቅ

መግቢያ፡

በወልቂጤ ከተማ አዲስ ክ/ከተማ ላይ በተመረጡ አባወራዎች/ እማወራዎች መልስ ለመስጠት የተዘጋጀ የዳሰሳ ጥናት መጠይቅ ነው፡፡ መጠይቁ በሀዋሳ ዩኒቨርሲቲ በመንግስት ልማት ጥናት የት/ት ክፍል የ2ኛ ድግሪ ማሟያ የመመረቂያ ጽሁፍ ለመጻፍ ሲሆን ትኩረቱ ለትምህርታዊ ዓላማ የተዘጋጀ ነው፡፡ ጥናቱ በወልቂጤ ከተማ "የደረቅ ቆሻሻ አያያዝ ልምዶች" ለመገምገም የተዘጋጀ ነው፡፡ ለጥናቱ ስኬት የእርስዎ ምላሽ በጣም አስፈላጊ በመሆኑ አማራጭ ይሆናል የሚሉትን ከተሰጡ አማራጮች ውስጥ ይምረጡ፡፡ ስምዎት በየትኛውም ሁኔታ ለሌሎች አይገለፅም እንዲሁም እዚህ ላይ መፃፍ አይጠበቅቦትም፡፡

ለትብብሮት ምስጋናዬ የላቀ ነው !!

ክፍል- I

የአባወራ/የእማወራ አጠቃላይ መረጃ

እባክዎ ምርጫዎትን የሚያመላክት ቁጥር ይምረጡ

1. ጾታ: 0/ ሴት 1/ ወንድ

2. ዕድሜ: 1/ 15 - 25 2/ 26 - 35 3/ 36- 45 4/ 46- 55 5/ 56 እናከዚያበላይ

3. የጋብቻ ሁኔታ: 1/ ያገባ 2/ ያላገባ 3/ አግብቶ የፈታ 4/ በሞት የተለየ

4. የቤተሰብ ብዛት፡ 1/ ከ1 — 4 2/ ከ5 — 7 3/ ከ8 በላይ

4. ሥራ: 1/ የመንግሥት ሠራተኛ 2/ መንግስታዊ ያልሆነ ድርጅት ሠራተኛ

3/ የግል ድርጅት ሠራተኛ 4/ ነጋዴ 5/ ዕለታዊ የጉልበት ሥራ

6/ ሌላካለይግለጹ ____

5. ወርሃዊ ገቢ (በብር): 1/ 500 - 1000 2/ 1001 - 3000 3/ 3001 - 5000

4/ 5001- 10,000 5/ 10,000 በላይ

6. የትምህርት ደረጃ፡ 1/ መደበኛ ያልሆነ ትምህርት 2/ የመጀመሪያ ደረጃ ትምህርት

3/ ሁለተኛ ደረጃ ትምህርት 4/ ዲፕሎማ 5/ ድግሪ 6/ ማስተርስ

7. የቤት ባለቤትነት፡ 1/ የራሴ ቤት 2/ ከቀበሌ /ከመንግስት የተከራየሁት

3/ ከግለሰብ የተከራየሁት

8. በወልቂጤ የቆዩበት ዓመታት ብዛት፡ 1/ ከ5 ዓመት በታች 2/ ከ6 - 10 ዓመት

3/ ከ11 — 15 ዓመት 4/ ከ 16 ዓመት በላይ

ክፍል- II

በወልቂጤ ከተማ የወቅቱ የደረቅ ቆሻሻ አያያዝና አሰራሮች፡

1. የከተማውን ወቅታዊ የደረቅ ቆሻሻ አያያዝና አሰራሮች እንዴት ይገመግሙታል?

1/ በጣም ጥሩ ነው 2/ ጥሩ ነው 3/ መካከለኛ ነው

4/ ደካማ ነው 5/ በጣም ደካማ ነው

2. የደረቅ ቆሻሻ ማጠራቀሚያ በአካባቢዎ ይገኛል? 1/ አዎ 2/ የለም

3. የቤትዎን ደረቅ ቆሻሻ ለማስወገድ ምን አይነት ሌሎች መንገዶች ይጠቀማሉ?

1/ ክፍት ቦታ ላይ፣ የፍሳሽ ማስወገጃ ቦይ ላይ ወይም በጎዳና ላይ በመጣል

2/ በቤት ዙሪያ ጉድጓድ ቆፍሮ በማቃጠል 3/ በቤት ጓሮዎች ላይ በመጣል

4/ በግል የተደራጁ ደረቅ ቆሻሻ ሰብሳቢዎች ይወስዳሉ

5/ ሌሎች ካሉ እባክዎን ይጥቀሱ ----------

4. በአሁኑ ወቅት በከተማ ውስጥ ደረቅ ቆሻሻን ለማስወገድ በቂ የደረቅ ቆሻሻ ማስወገጃ ተሽከርካሪዎች ይገኛሉ? 1/ አዎ 2/ የለም

5. በከተማው የደረቅ ቆሻሻ አወጋገድ ስርዓት ህጎችና መመሪያዎች መኖራቸው ያውቃሉ?

1/ አዎ 2/ የለም

6. ለጥያቄ ቁጥር “5” መልስዎ “አዎ” ከሆነ በከተማው የደረቅ ቆሻሻ አወጋገድ ደንቦችን

ለመተግበር በኃላፊነት የተሰማሩ አካላት አፈፃፀም እንዴት ይገመግሙታል?

1/ ምንም ደንብ የለም 2/ ያለው ደንብ ደካማ ነው 3/ ደንቡ ጠንካራ ነው

7. የደረቅ ቆሻሻ አያያዝ ላይ የወጣው ደንብ በሚጥሱ አካላት ላይ እርምጃ ሲወሰድ አይተዋል?

1/ አዎ 2/ የለም

8. ለጥያቄ ቁጥር "7" የሰጡት መልስ "አዎ" ከሆነ የደረቅ ቆሻሻ አያያዝ ደንቦችን በሚጥሱት ላይ የቅጣት አግባብ እንዴት ይገመግሙታል?

1/ በጣም ጠንካራ ነው 2/ ጠንካራ ነው 3/ ሚዛናዊ ነው

4/ ደካማ ነው 5/ በጣም ደካማ ነው

ክፍል- III

የማዘጋጃ ቤቱ የደረቅ ቆሻሻ አያያዝ አሰራሮችን ተፅእኖ ሊያደርጉ የሚችሉ ጉዳዮች፡

1. በቤትዎ ውስጥ ጊዜያዊ የደረቅ ቆሻሻ ማከማቻ አለዎት? 1/ አዎ 2/ የለም

2. ለጥያቄ ቁጥር "1" መልስዎ አዎ ከሆነ፣ ደረቅ ቆሻሻዎችን ለማከማቸት በቤትዎ ውስጥ ምን ዓይነት የደረቅ ቆሻሻ ማጠራቀሚያ ይጠቀማሉ?

1/ ቅርጫት 2/ ከረጢት 3/ የፕላስቲክ ከረጢት 4/ ሌላከለይፃፉ ----------

3. ከቤትዎ ደረቅ ቆሻሻ በምን ያህል ጊዜ ያስወግዳሉ? 1/ በየቀኑ 2/ በየሁለተኛው ቀን

3/ በየአራተኛ ቀን 4/ በየሳምንቱ

4. የከተማው ማዘጋጃ ቤት የደረቅ ቆሻሻ ማስወገጃ የጭነት መኪና አለው?

1/ አዎ 2/ የለም

5. ለጥያቄ ቁጥር "5" መልስዎ አዎ ከሆነ፣ የጭነት መኪናው ደረቅ ቆሻሻ በማስወገድ ምን ያህል ጊዜ አገልግሎት ይሰጣል? 1/ ሁልጊዜ 2/ በሳምንት አንድ ጊዜ 3/ በወር አንድ ጊዜ

4/ ምንም አገልግሎት አይሰጥም

6. በማዘጋጃ ቤቱ የሚሰጠው የደረቅ ቆሻሻ ማስወገድ አገልግሎት እንዴት ይገመግሙታል?

1/ እጅግ አጥጋቢ ነው 2/ አጥጋቢ ነው

3/ አጥጋቢ ያልሆነ ነው 4/ በጣም አጥጋቢ ያልሆነ ነው

ክፍል- IV

በከተማው ለደረቅ ቆሻሻ አያያዝ አሁን ያሉ ምቹ ሁኔታዎች፡

1. በከተማው ውስጥ ደረቅ ቆሻሻ በመሰብሰብ ከተሰማሩ አካላት አገልግሎት ያገኛሉ?

1/ አዎ 2/ የለም

2. በግል የተደራጁ የደረቅ ቆሻሻ ሰብሳቢዎች ቁጥር ምን ይመስልዎታል? በእነሱ በቂ የሆነ አገልግሎት ያገኛሉ? 1/ ምንም የለም 2/ በቂ ያልሆነ ተደራሽነት አለ

3/ በቂ የሆነ ተደራሽነት አለ

3. በግል በተደራጁ የደረቅ ቆሻሻ ሰብሳቢዎች የሚሰጠው አገልግሎት አጥጋቢ ነው ብለው ያምናሉን?

1/ አዎ 2/ አይ

4. በግል የተደራጁ ደረቅ ቆሻሻ ሰብሳቢዎች በምን ያህል ጊዜ ቆሻሻ ከቤትዎ ይሰበስባሉ?

1/ በየሳምንቱ 2/ በየወሩ

3/ በወር ሁለት ጊዜ 4/ እባክዎ ሌላ ካለ ያመልክቱ ----------

5. በደረቅ ቆሻሻ መሰብሰብ በግል ተሰማርተው ከሚሰጡት አገልግሎት ጋር ሲነፃፀር የክፍያው መጠን እንዴት ያዩታል? 1/ በጣም ውድ ነው 2/ ውድ ነው

3/ ርካሽ ነው 4/ በጣም ርካሽ ነው

ክፍል- V:

በደረቅ ቆሻሻ አያያዝ ላይ የህብረተሰቡ ተሳትፎ፡

1. ስለ ደረቅ ቆሻሻ አያያዝ ግንዛቤዎ: 1/ በጣም ጥሩ ነው 2/ ጥሩነው

3/ ደካማ ነው 4/ በጣም ደካማ ነው

2. በቤትዎ ውስጥ ደረቅ ቆሻሻን ለብቻው ይለያሉ? 1/ አዎን 2/ አይ

3. ደረቅ ቆሻሻን በመለየቱ ሂደት የህብረተሰቡን ልምዶች እንዴት ይገመግሙታል?

1/ በጣም ጥሩ ነው 2/ መካከለኛ ነው 3/ ዝቅተኛ ነው

4. ማዘጋጃ ቤቱ የደረቅ ቆሻሻ ማስወገጃ እርምጃዎችን ግንዛቤ በመፍጠርና ህብረተሰቡ እንዲነሳሳ ለማድረግ ጥረት ያደርጋል፡ 1/ በጣም አልስማማም 2/ አልስማማም

3/ እስማማለሁ 4/ በጣምእስማማለሁ

5. ስለ ደረቅ ቆሻሻ ያሎት ግንዛቤ ምንድ ነው? 1/ ጠቃሚ ነው 2/ በመጠኑ

3/ ጥቅም የለውም 4/ አላውቅም

6. ደረቅ ቆሻሻን የማስተዳደር ኃላፊነት የሚመለከተው ማን ይመስልዎታል? (ከአንድ በላይ መልሶች መግፍይ ችላሉ) 1/ ማዘጋጃቤቱ 2/ በግል የተደራጁ ደረቅ ቆሻሻ ሰብሳቢዎች

3/ ቤተሰቦች 4/ የሁሉም ሀላፊነት ነው

ለጊዜዎት አመሰግናለሁ!

Interview guideline

Part - III

Key informant interview for officials from the municipality, health extensions, kebele leaders and private solid waste collectors

Introduction

Dear respondents,

This interview was meant to get relevant information regarding to the problems of solid waste management practices in Wolkite town Administration and the data was used as input to get insight on the topic. The exercise was only done for the partial fulfilment of MA thesis at the department of Governance and Development Studies in Hawassa University. So ethical principles of privacy and secrecy were maintained and at any cost these were not exposed to anyone.

Thank you in advance for your cooperation!

1. How do you evaluate your solid waste collection system? ----------
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2. How do you collect solid waste? ----------

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3. How is the relationship between the households and municipality concerning to solid waste management? ----------
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   ---

4. What are the problems you faced in solid waste collection? ----------
   ---
   ---
5. How does the community participate in waste disposal initiatives? ----------
   ---
   ---
6. What is your opinion about the attitude of the community towards solid waste disposal?

   ---
7. What are the opportunities for solid waste management in the town? ----------
   ---
   ---
8. How do you evaluate stake holders and private sectors participation and decision making in SWM in the town?
9. What looks like decentralization of waste management service provision in the town?
10. Do you think that the budget allocated enough for SWM service?
11. How do you evaluate the human resource assigned for the sector?
12. Your possible suggestion to overcome all the problems: ----------
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FDG guideline

Part - IV

Interview for members of focus group discussion (FDG) in the Addis sub-city

Introduction

Dear respondents,

I am conducting a study entitled "Local governance for Effective Solid Waste Management in Wolkite town" and your answers to the discussions are of great help. All your responses will be kept confidential. You are not expected to mention your name.

Thank you in advance for your cooperation!

1. What is your evaluation of waste disposal service of the municipality?
2. What is your comment on waste disposal service in your surrounding?
3. What is your opinion about the attitude of the community towards solid waste disposal?
4. How does the community participate in waste disposal initiatives?
5. How do concerned bodies attempt to create awareness and mobilize the community to waste disposal initiatives?
6. Do you believe that the community is aware of the rule and regulation for the preservation and disposal of wastes?
7. What is your suggestion about ways of improving waste disposal programs?

Observation guideline

Part V

Was used filed observation:

- The way how stake holders manage solid waste
- Municipal solid waste management service delivery
- Municipal solid waste dumping site
- Community participation for solid waste management