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ADDIS ABABA UNIVERSITY

COLLEGE OF DEVELOPMENT STUDIES

**CENTER FOR ENVIRONMENT AND SUSTAINABLE
DEVELOPMENT STUDIES**

**PERCEPTION OF RESIDENTS TOWARDS THE EFFECTS OF
LANDFILLS ON NEARBY RESIDENTS: THE CASE OF RESIDENTS
AROUND SUMMIT LANDFILL**

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Addis Ababa, Ethiopia

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A THESIS SUBMITTED TO ADDIS ABABA UNIVERSITY, COLLEGE OF
DEVELOPMENT STUDIES, PRESENTED IN PARTIAL FULFILLMENT OF MASTERS OF
ART ON ENVIRONMENT AND SUSTAINABLE DEVELOPMENT

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COLLEGE OF DEVELOPMENT STUDIES

This is to certify that the research paper prepared by Mahelet Lisanworkk “**Perception of residents towards the effects of landfills on nearby residents: the case of residents around Summit landfill**” submitted to Addis Ababa University, College Of Development Studies, in partial fulfillment of Master Of Arts In Environment And Sustainable Development and meets the accepted standards with respect to the original quality.

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Abbreviations and Acronyms

BPR	Business Process Re-engineering
HH	House Holds
ISWM	Integrated Solid Waste Management
MSEs	Micro and Small Enterprises
MSW	Municipal Solid Waste
NGO	Non-Governmental Organizations
SW	Solid Waste
SWM	Solid Waste Management
SWMA	Solid Waste Management Authority
SWMT	Solid Waste Management Transportation
SBPDA	Sanitation, Beautification, and Park Development Authority
US EPA	United States Environmental Protection Authority

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Abstract

Waste management related problems especially that of Solid Waste Management have lived with human for generations. To address this problem of SWM the use of landfill was introduced. The introduction of landfills as an area which are carefully designed and constructed on the top of the ground to separate trash from the surrounding area has its own advantages and disadvantages. Removing waste from sight of residential area and prohibiting waste from contaminating ground water were aimed to be the advantages of landfills. However landfills have been affecting health of residents, they have resulted in air pollution and other environmental effects. Summit landfill is one the landfills within the city of Addis Ababa which is built to address the rising demand in waste management of the city. As summit is one of the newly emerging areas within the city, it has newly built buildings which are attractive to people's eyes. Even if the area is filled with new and attractive buildings, the existence of the landfill in such an attractive area has minimized the beauty of the area and it also has affected the health and economy of the residents around it. By using questionnaire and interview the researcher was able to obtain data on what residents had to say on the effects of the landfill on residents. Based on the information obtained from the responses of the residents it is concluded that the existence of the landfill has highly affected the life of residents in many ways and it is recommended that assignment of an area as a landfill should come after careful and thorough study.

CHAPTER ONE

1. INTRODUCTION

1.1 Background

Solid waste management issue is one of the biggest challenges of our day to the authorities of both small and large cities' in developing countries. This is mainly due to the increasing generation of such solid waste and the burden is posed on the municipal budget. In addition to the high costs, there exists lack of understanding towards solid waste management regarding different factors that affect the entire handling system (Abdel-Shafy, 2018).

Massive volume of solid waste is being generated by people every day. Each and every one of us is contributors to this problem as we all are potential generators. To generate waste is one issue but the way the generated wastes are handled is a different issue. Waste is generated from different sectors beginning from individual households to big industries. One of the ways by which generated wastes are managed is the use of landfill (Mukisa, 2009).

In the old days the number of human population was very small resulting in small amount of waste that was generated at that time. This has resulted in peaceful and harmonious existence with nature as compared to what is observed now a day. In the ancient history (10,000 BC to 4,000 AD), the major constituents of waste were wood, food wastes, vegetables etc. Waste at that time was simply domestic and so generally biodegradable. There were no industries and little wastes were generated. The edible part of the waste was fed to animals while the remaining was allowed to decompose in the ground and there were nothing like waste management systems. Archaeological studies from clay samples have revealed that wastes from different sources in the past formed stratified layers with time (Bello et al., 2016).

As the population density increased with time, there was a corresponding increment in the level of waste generation, hence a need for a more viable solution. There was need for a system that would manage waste effectively and efficiently. In history, the Romans were among the first set of people that started a waste management system wherein some collection teams were organized to collect waste generated in the households and streets for disposal at the outskirts of

the city. The world population growth rate nowadays is on a geometric progression. As the number of the population increases and results in rapid urbanization and raised the community's living standards it greatly accelerated the solid waste generation rate in developing countries (Hiermath, 2016).

With the advent of the modern times (1900), major parts of the developed world such as the United States and Europe have established more sophisticated waste management and landfill programs. Thus, there was introduction of modern technologies and imposition of certain regulations to protect the health and overall well-being of man. Most part of Africa started developing, population rate started increasing and there was need for more production and use of materials to cater for the needs of people, hence an increase in waste generation (Bello et al., 2016).

During the colonial era, waste management was efficient because the colonial masters introduced new methods of waste management into Africa. Waste management in developed parts of East Africa gradually became centralized, with the introduction of refuse trucks that would collect wastes from points of generation and deposit them at designated sites. During the 1940s to early 1960s, waste management in Africa was quite efficient because the population growth was still low and there was adequate resources to cater for the teeming population. However, after most of the African countries gained independence, some of them could not handle the legacy left by the colonial masters and hence, a total decline in the waste management system. Practices such as waste collection, storage, treatment and final disposal are currently reported to be major problems in urban centres (Magimba, 2016).

Landfills are the old form of waste treatment and are used in many places around the world. Landfills are used to bury the trash in such a way that it will be isolated from groundwater, will be kept dry and will not be in contact with air. Landfills are also useful as they can provide us with a beneficial land use system like using land for park and other useful purpose (Ward, 2011).

On the other hand, landfills can be potential threat to the quality of the environment, although the full extent of this threat has not always been scientifically validated. They can produce gas and contaminated water, as well as wind-blown litter and dust, and attract pests. Transport of waste

to landfill sites can also have a significant impact on the environment in terms of noise, vehicular emissions, accidental spillages, etc (Crowley et al., 2003).

Most of the wastes generated by African urban centers are believed to be decomposable organic materials as what is generated from dwellers of the urban centers are much of kitchen and compound waste. In Africa responsibility of waste management is on the shoulders of urban authorities. Effective waste management can serve us an indicator of good governance, sound management system and successful reform within the locality (Okumu, 2012).

Addis Ababa, the capital city of Ethiopia, is among the expanding urban areas in the world in the number of its population. Accumulated waste piles are observed all over the city and this is due to bad waste management habit of dwellers of the city and the existing insufficient waste management system. As the population is growing rapidly, creating awareness within the people and focusing on incorporating the issue of solid waste management is very essential (Meaza, 2016).

Solid wastes collected from the city of Addis Ababa are dumped at Koshe dump site, Summit temporary land fill and other temporary landfills that are found at nearby cities of Addis Ababa. These areas were first selected as they were far away from the city. However, as the city keeps on expanding the sites become part of the residential area within the city. In the past two three years the sites have led to various protests as the problem is directly related to individuals health and the environment at large.

Hence, this research made an attempt to understand the current practices of residents on solid waste management and related issues and majorly to investigate the dwellers' perception on the pattern of solid waste management in Summit land fill area.

1.2 Statement of the Problem

Waste Management related problems and especially that of SWM is not a recent phenomenon. It goes back to ancient prehistoric days. Though, the number of the human population is quite small, they used different products and those products resulted in emission of waste. However

due to expansion of urban centers and with the increase in the number of human population waste management is complicating through time (Ramesha, 2012).

Collecting and managing solid waste is a big challenge across the world as the concentration of population is growing rapidly. It is also one of the most threatening challenges of urban centres in developing countries like Addis Ababa (Nigatu et al., 2011).

Addis Ababa, the capital city of Ethiopia has one of the fastest growing populations in the world. The population leaped from 15,000 to 4,567,857 since its establishment in 1886 (IGNIS, 2016) various socio- economic problems are there in the city. The problem of solid waste is the major one. The city is suffering from various problems in relation to solid waste. Aesthetic beauty of the city and the lives of the dwellers are highly affected by this problem. Most of the dwellers of the city curse the city as the dirtiest city (Meaza, 2016).

A study by the New York State Department of Health reports that women living near solid waste landfills where gas is escaping have a four-fold increased chance of bladder cancer or leukaemia (cancer of the blood-forming cells). The study examined the occurrence of seven kinds of cancer among men and women living near 38 landfills where naturally occurring landfill gas is thought to be escaping into the surrounding air. Of the 14 kinds of cancer studied (seven each in men and women), 10 (or 71%) were found to be elevated, but only two (bladder and leukaemia in women) (Montague, 1998).

There are also other effects of living around a landfill. Some of them are low birth weight and small size on small children. This was conformed on the first careful study on the subject matter in New York. In a blinded study published in 1989, researchers found that children who had lived at least 75% of their lives near Love Canal — the notorious toxic chemical dump — had significantly shorter and smaller size than children who lived farther away. These results were not a result of birth weight, socioeconomic status and parental height (Montague, 1998).

Various studies are conducted in the area of solid waste management solid waste management (Rusaik, 2017) conducted research on Public Perceptions on Effectiveness of Solid Waste Management in Colombo Municipality Area and concluded that although most of the residents

are concerned about the environment, the domestic solid waste management processes and active participation of all stakeholders are still limited and has a large gap.

Oruonye (2018) made an assessment of public perception and awareness of the effect of poor solid waste disposal on the environment in Jalingo Metropolis of North East of Nigeria and found out that Most of the respondents claim that they are aware of what constitutes solid waste and on the effects of poor disposal. He concludes that there is a need to properly manage the solid waste generated by daily activities of the people as the claim of the respondents negates with what the researcher found out on the study area. There was increasing number of open waste dumping on the streets of the town.

Mukisa (2009) conducted research on public participation in SWM in Uganda and ended up with the conclusion that public participation in SWM in the town is low and there needs to be an administrative structure which allows for synergetic relationship between the public and the authorities.

Tolina (2006) studied Households' willingness to pay for improved solid waste management and suggested that the existing low and poor solid waste service coverage in Adama city is due to limited capacity of the city administration and poor private sector participation needs expansion and improvement.

Getnet (2016) researched on solid waste management practice and factors influencing its effectiveness and was able to find out that the current solid waste service delivering practice of Addis Ababa is characterized by the huge generation of solid waste coupled with unbalanced solid waste service. It also found that key element of effective SWM such as waste collection, transportation and disposal practiced by private firms in the city was ineffective.

This research contributes its own part to existing knowledge towards SWM by providing information on how the lives of HH residing near a land fill are affected. It presents how households perceive SWM practice around the landfill and how their perception affects the existing system of SWM. All in all the identified gap of this thesis is the effects of landfills on daily lives of nearby residents and what they perceive about its existence in their residential area. How is their daily life affected, what do they suggest as a solution is addressed. In the research

studies that are mentioned above households consider government to be the only responsible body for existing problem of SWM. This paper also examines what the residents think about their role in the existing condition of SWM practice in their residential area.

1.3 Research Objectives

1.3.1 General Objective

The main objective of this study was to assess the perception of residents towards solid waste management at Summit landfill.

1.3.2 Specific objectives

The following specific objectives were the major points:

1. To study resident's perception towards the landfill.
2. To study the effects the land fill has on the residents.
3. To identify the mechanisms that is being used by the city administrators to address the problems that residents are facing due to the existence of the landfill.

1.4 Research Questions

This study tries to answer the following questions:

1. How do HH residing in the area perceive the fact that all sorts of waste are being collected from the city and dumped at their surrounding area?
2. What are the possible effects of the landfill on the HH?
3. What do residents say about the assignment of an area as a landfill?

1.5 Scope and Limitations of the Study

This study is on the perception of residents towards solid waste management practice around Summit land fill area. The fact that the land fill is located at the center of residential area and

business centers has forced residents to face various challenges. In this study the residents who live around the landfill and whose everyday life is affected by the landfill are key informants.

Due to budget and time constraint the study focused on studying perception of residents towards solid waste management practice around Summit landfill.

We are in a time where administrators of the city of Addis are working hard to beautify the city. The researcher believes that this study is a timely work which will help the hard working administrators in identifying one of the waste related problems of the city.

1.6 Significance of the Study

The study wanted to contribute its part on the current effort that is taken to improve the current solid waste management of our city by focusing on residents around Summit temporary landfill. With this regard, the study would have the following significances.

To show what the residents perceive about the landfill and what they have to say about SWM practice in the area. This indirectly helps administrators to know how the lives of the residents around the landfill is affected and helps them devise mechanisms by which they can improve the existing situation around the landfill. It can also help the responsible authority to identify the effects the landfill has on resident's daily life and to work on improving the existing situation.

Finally it can serve as basis for other researchers who might be interested to conduct further study in the area.

1.7 Organization of the Study

This study is divided in to five chapters. The first chapter is concerned with introduction to the subject matter. In this part of the study detailed explanation is made on the central ideas of the research. This is done by presenting objectives of the study and by defining the research questions.

The next chapter, which is chapter two presents review of related literatures. Theoretical basis of the study is presented on this part of the study. Then it is followed by chapter three which deals

with the methods that are used to collect data from the key informants. Empirical analysis of data collected through questionnaire and interviews and discussions are presented in chapter four of the study. Lastly, conclusion and recommendations are made on chapter five of the study.

CHAPTER TWO

2. LITERATURE REVIEW

In this chapter the researcher presented a review of related literatures. The researcher started by introducing some key concepts and terminologies that are relevant to this thesis, and then a review of the related literature is presented.

2.1 Terminologies and key Concepts

2.1.1 Perception

Perception can be defined as our recognition and interpretation of sensory information. Perception also includes how we respond to information. We can think of perception as a process where we take in sensory information from our environment and use that information in order to interact with our environment. Perception allows us to take the sensory information in and make it into something meaningful. Perception is the word used to describe the process by which we get information from our sense organs. Our brains convert that information into what we see, hear, touch, smell and feel (Levitas, 2016).

Ability of someone to achieve desired goal can be limited by his/her own perception. Perception influences how a person views himself/herself and the world around him/her and how it tends to govern his/her behavior. According to a report residents 'perception are positively correlated with solid waste management practices. This suggests that residents with positive environmental perception tend to perform responsibly towards solid waste management which entailed waste collection and proper disposal. Population perception of waste management describes the whole process of how the general public comes to know what is going on regarding best practices in waste management (Marie, 2009).

2.1.2 Perception of People towards Solid Waste Management

In a certain society if people are asked to solve a problem and save the lives of others from potential risks, the opinions they raise about the issue is examined by their perception. When it comes to solid waste management, perception could refer to paying money to receive SWM service and participating in different activities related to SWM or avoiding any kind of community involvement including paying money. This could result from different situations like difficulties imposed in the form of institutionalized means or lack of understanding on the effects that ill-disposed waste may cause to their health might lead people to disobey (Longe et al., 2009).

This way people's perception of their surrounding environment and their effects will influence their responsiveness and the success of the SWM system. Therefore people's perceptions and understandings on the various processes of waste management and on the resulting effects of ill-disposed waste are crucial in helping people to adapt environmentally friendly waste-related behaviours.

2.1.3 Solid Waste Management

Solid waste management is also defined differently. SWM is defined as the field of study which focuses on the control of the generation, storage, collection, transport, processing and disposal of solid waste materials in a way that does not negatively affect the range of societies' health, conservation, economics, beauty of the area, and other environmental concerns (Leblanc, 2019).

Ethiopian SWM Proclamation No. 513/2007 "SWM" defines it as the "collection, transportation, storage, recycling or disposal of solid waste, or the subsequent use of a disposal site that is no longer operational."

2.1.4 Solid Waste

Solid Waste is a dynamic concept which can be defined in different ways. Its definition can start from the simple definition that it refers to all non-liquid waste. It refers to any kind of garbage that results from different activities of human and that are finally considered as useless and unwanted. Solid waste can be a result of industrial, residential and commercial activities in a

given area, and may be treated in different ways. For this reason, landfills are can be classified as sanitary, municipal, construction and demolition or industrial waste sites (Leblanc, 2018).

Christensen, 2011 defines waste as ‘left-over, a redundant product or material of no or marginal value for the owner and which the owner wants to discard. What is noteworthy is that the definition of what concretely is defined as waste depends on the specific situation and owner’s perception in addition to time, location, state and personal preferences (Christensen, 2010).

According to Proclamation No. 513/2007of waste is defined as “Anything which is not on liquid or gas state and is considered as unwanted material”. European Council defines it ‘Waste’ shall mean any substance or object which the holder discards or intends or is required to discard’. All in all solid waste, if not well managed, can cumulatively have long-lasting and difficult-to reverse negative effects on the environment. There have been efforts to improve on the management of solid waste. One of the suggestions has been the application of an integrated waste management strategy.

2.1.5 Landfills

A landfill is a carefully designed structure built into or on top of the ground, in which trash is separated from the area around it. It is a location where disposable materials are sent. There, the refuse is buried underground to remove it from sight. This is done in a way that prevents it from coming into contact with and potentially contaminating any groundwater (Butt et al., 2014).

According to Addis Ababa City Government Revised Integrated Solid Waste Management Regulation NO100/2018 “Landfill” means a dumping, accumulation, burying or removal site for non-usable dry wastes on the ground or under the soil in a way not harmful to health or the environment.



Source: picture from the field, 2020

2.1.6 Types of Landfills

There are a few (Not many in number but more than one) different types of Landfills. The most common dumps are Municipal Solid Waste (MSW) Landfills, which is where household waste is deposited. Another type of Landfill, Industrial Waste Landfills, receives waste collected by commercial and institutional waste. Finally, Hazardous Waste Landfills receive specialty waste that needs to be carefully handled and have the potential to be harmful if disposed of in another type of landfill (Vawhale et al., 2017).

Municipal Solid Waste (MSW) Landfills: This type of landfill collects household garbage and is regulated by state and local governments. The Environmental Protection Agency (EPA) has established minimum criteria that these landfills must meet. Some materials may be banned from disposal in municipal solid waste landfills. Items such as paints, cleaners, chemicals, motor oil,

batteries, and pesticides are some of the common items that are banned from MSW's. However, some household appliances can be turned into MSW's for disposal (Wroblewski, 2010).

Industrial Waste Landfills: An industrial waste landfill is where industrial waste is disposed of. (Jon Behm, 2020). Industrial hazardous waste on the other hand is separate form of waste consisting of nonhazardous waste associated with manufacturing and other industrial activities (Wroblewski, 2010).

Construction and Demolition Waste Landfills: the United States Environmental Protection Agency defines it as a type of industrial waste landfill designed exclusively for construction and demolition materials. The materials could possibly consist of the debris generated during the construction, renovation and demolition of buildings, roads and bridges. C&D materials often contain bulky, heavy materials, such as concrete, wood, metals, glass and salvaged building components.

These types of landfills used for debris generated during construction, renovations, demolitions of buildings and bridges. The types of debris include: concrete, wood, asphalt, gypsum (the main component of drywall), metals, bricks, glass, plastics, trees, stumps, earth, rock, and building components (doors, windows, and plumbing fixtures) (Wroblewski, 2010).

The difference between a dump and a landfill is that a dump is an open hole in the ground where trash is buried and where animals often swarm. Dumps offer no environmental protection and are not regulated. A landfill is a carefully designed and monitored structure that isolates trash from the surrounding environment (e.g., groundwater, air, rain). This isolation is accomplished with the use of a bottom liner and daily covering of soil. (Butt et al., 2014).

2.1.7 Effects of a Landfill

Landfills are place where we can find every possible thing buried beneath the ground. According to Newton this buried materials may still be releasing toxic chemicals or other hazardous materials into the Earth. As buried organic materials decompose, they release methane, a potent greenhouse gas that contributes to global warming (Newton, 2018).

Air Pollution

About two-thirds of landfill waste contains biodegradable organic matter from households, business and industry. As this material decomposes, it releases methane gas to the air. Also landfill affects biodiversity, fertility of soil and it causes ground water pollution (Newton, 2018).

Visual and Health Effects

Landfill site adversely affects the natural landscape: they stink; they are trashy looking and are believed to become a bacteria breeding ground. The smell, traffic, noise and vermin that accompany landfills can lower house prices. Because of the increase in vermin surrounding landfills, disease becomes an issue with other adverse health effects, such as birth defects, cancer and respiratory illnesses also being linked with exposure to landfill sites (Newton, 2018).

2.1.8 Overview of Existing Rules and Regulations towards SWM

World Bank Group 2016, states that when seeking to develop public private partnerships in solid waste or waste management projects, a host country's laws and regulatory environment must be considered.

Laws and regulatory considerations for solid waste management projects may include questions of land ownership, public health, standards and accountability, environmental and social benefits, and other issues.

In Ethiopia, the Environmental Protection Authority (EPA) has the main responsibility for implementing laws to protect the urban environment and the management of solid waste. In 1997, EPA in collaboration with Ministry of Economic Development and Cooperation published an environmental policy for Ethiopia, which included aspects of solid waste management (EPA, 1997). However, the first national policy for solid waste was not published until 2007. The aim of the policy was to “enhance at all levels capacities to prevent the possible adverse impacts while creating economically and socially beneficial assets out of solid waste” (FDRE, 2007: 3525).

The policy includes collection, transport, and disposal of solid waste. It refers primarily to the obligations of urban administrations to ensure the proper planning, implementation, and monitoring of solid waste. The focus is on city administrations responsibilities and on decentralizing responsibilities to the lowest levels of administration in order to fulfil the obligations. In the third part, the proclamation focuses on regulations to manage waste such as glass, plastic bags, used tires, food, household waste, and construction waste in a sustainable manner and with the focus on proper handling, segregation, reuse, and recycling.

In 2004, the city administration published a solid waste regulation – the Waste Management Collection and Disposal Regulation of the Addis Ababa City Government (AACA, 2004). This was then replaced by Addis Ababa City Government Revised Integrated Solid Waste Management Regulation No100/2018.

According to the Regulation, Private Investor's roles and responsibilities is to collect solid wastes from hotels, hospitals, government offices, palace, etc. using compressor and dump trucks. They also need to train their employees on solid waste handling and they must handle their containers and vehicles clean, dispose of dumped refuse periodically. Though, all the regulations are good in as a regulation, most of them are not adopted on ground and very little is done to enforce them by the responsible body (Louise, 2013).

2.1.9 Attitude towards Solid Waste Management

Waste can have different meaning to different people. Some people such as the trash pickers see “waste” as a resource or a way to make an income in an otherwise limited job market. On the other hand, you have a majority of people living in the developing world that see waste as a burden and a problem that needs to be addressed. To say people in developing countries don't recognize trash as an issue is an untrue statement. In fact, the opposite holds true in most cases. However, recognizing trash as a problem does not prevent littering or other negative behaviours concerning waste management (Moore, 2012).

This attitude-behaviour gap often emerges and can be further affected by a variety of reasons including convenience, social norms, lack of public participation, and lack of education and awareness of effective waste management techniques (Milea, 2009; O'Connell, 2011). Within

this attitude/behaviour gap exists an inconsistency between one's values and actions. This specifically refers to the discrepancy between people's concern over the environmental harm posed by household waste and the limited action by those same people to reduce their waste or engage in other pro-environmental behaviours (O'Connell, 2011).

There are a multitude of causes that can contribute to an increase in public littering rates, such as a lack of social pressure to prevent littering, absence of realistic penalties or consistent enforcement, and lack of knowledge of the environmental effects of littering (Al-Khatib et al., 2009). Other causes also include the amount of litter already present at a particular site, presence of signs referring to litter, and the number and/or placement and appearance (if any) of waste collection bins at the site. Convenience of garbage bins has been cited many times in research as a priority when disposing of trash, and when these are not present or lacking in areas this has been reason enough to litter (Henry et al., 2006). Other times people become accustomed to throwing their waste in streets and other inappropriate places, as there had been no formal system for sorting and disposal in their community, so when changes are implemented people are not changing their disposal behaviour out of pure habit and custom (Yousif and Scott, 2007).

2.2 Theoretical Framework

Theory of Waste Management is a unified body of knowledge about waste management. This research used this theory as its guiding framework. The theory is based on the bases that waste management will help in preventing waste from affecting the environment and the health of society. It also expects on promoting the optimum resource allocation and use. (Eva et al., 2004).

With the increase in the number of human population, the amount of solid waste generated in an area usually rises. The increase in population apart from economic and social development that comes with the demand for a higher standard of living creates the need for more production as there will be more demand for consumption (UNEP, 2007). It is obvious that humans naturally have different and in some instances distinct ways of doing things. It is no wonder that people will dispose of waste indifferent ways. Such environmentally unconscious ways of disposal contribute to the growth of the solid waste problem in the world and particularly in developing countries.

Since the problem of SWM is expanding year after year millions of people around the world are making a living by doing all sorts of activities related to disposal of waste. Waste pickers play a grate role by contributing their part. Because of their activity the effect of waste on public health is minimized, the costs associated with municipal solid waste management are reduced, and greenhouse gas emissions on the environment are significantly reduced. In many countries of the world, waste pickers are the only ones who do the job of solid waste collection (Dias, 2012).

In line with theory of waste management it also incorporates theory of reasoned action to investigate perspectives of the residents around the landfill towards solid waste management. The theory of reasoned action states that the behaviors of an individual are determined by his/her intention to perform that behavior. It also states that the intentions are results of attitudes and subjective norms of the individual. As the researcher is trying to study the perception of residents towards the landfill, the incorporation of this theory is of at most importance because in one way or another the perspective residents have towards the landfill is a result of their attitudes and of course their subjective norms. Not only this, as the theory is a widely employed tool to help our understanding of different behaviors including health and environmental behaviors, the researcher finds it as the best mechanism in studying the effect the land fill has on the residents (Sharifah, 2015).

2.3 Conceptual Frame wok

The conceptual framework in a research is a diagrammatical presentation of the different variables being analysed in the research study. The conceptual framework provides a clear outline of the interrelationship that will exists between the dependent and independent variables in the study.

The conceptual framework depicted in Figure 2.1below illustrates the relationship between factors affecting SWM practice and the existing SWM. The framework postulates that the attitudes and

Perspective of people, financial factors and social and institutional factors are influencing factors behind effective SWM. After the literature, the study will be guided by the framework below in the figure 2.1

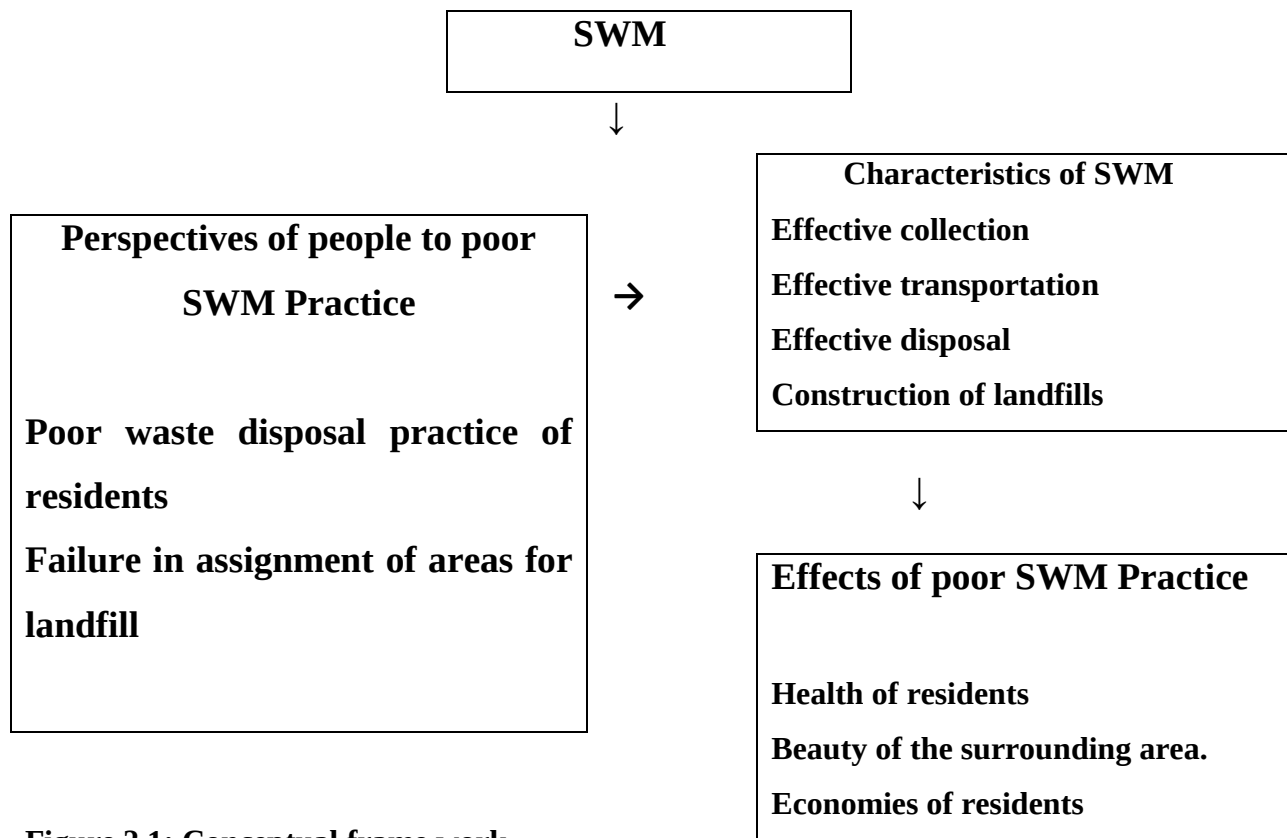


Figure 2.1: Conceptual frame work

CHAPTER THREE

3. METHODOLOGY

3.1 Description of the Study Area and Research Methods

3.1.1 Description of the study Area

Addis Ababa is the capital city of Ethiopia. It is located between 8o 49` 55.929`` and 9o 5` 53.853`` north latitude and between 38o 38` 16.555`` and 38o 54` 19.547`` east longitudes. The city lies at the foot of mount Entoto. From its lowest point 2,114 meters above sea level in the eastern periphery, the city rises to over 3,000 meters in the Entoto mountains to the north. It lies at an average altitude of 7,546 feet (2,500 meters). Its topography ranges from rolling plain to hilly areas with relatively steeper gradient and numerous rivers, stream valleys. The City Administration of Addis Ababa extends over 540 km² sub-divided into 10 sub-cities (CSA, 2007).

The study is conducted in Bole Sub-city, which is one of the largest sub-cities located in eastern Addis Ababa. It shares boundary with Yeka Sub-city in the north, Kirkos and Nifas Silk Lafto Sub-cities in the west and Akaki Kaliti sub-city in the south. The lowest point 2,114 meters in the southern periphery and the maximum elevation is 2,407 meters above sea level. The Sub city has 14 woredas and covers an area of 122.8 km².

The sub city is characterized by gentle morphology and flat land area. Summit land fill is found within the sub city in woreda10 around Pepsi Bottling Company. The land fill is located in a flat land area and it is in a condition which is not attractive to viewers. It has a very bad smell and it is in a very rotten condition. Even if the land fill is surrounded by residential areas, different kinds of business, condominium houses, apartments and other residential houses, existing condition of the land fill has minimized the beauty of the surrounding areas.

According to the information from the Woreda's Beautification Bureau, there are 64 private waste collecting associations with in the Woreda. And he informed the researcher that there are around 5000 residents within the Woreda and those who are actually living right adjacent to the land fill are around 1200 households.

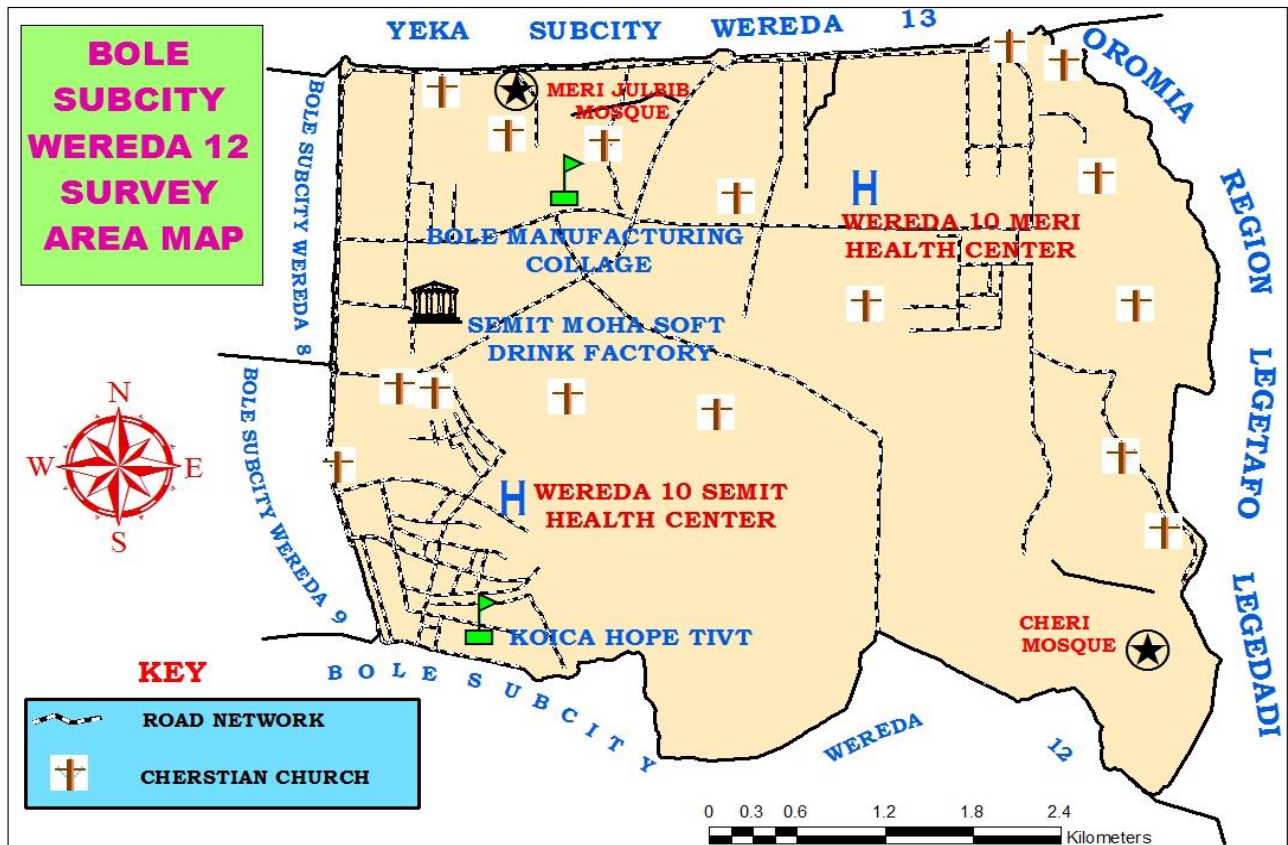


Fig. 3.1 census Enumeration Area Map Source: CSA (2007) & National Aeronautics and Space Administration (NASA) (2011)

3.2 Methods and Materials

3.2.1 Study Design

This research used a cross-sectional survey of households as the main methodological approach to collect information from selected households as it provides information about the population in a specific time. To obtain the desired information properly, the study adopted descriptive research design method. Descriptive research was used to obtain information concerning the attitudes and perception of residents around the landfill because the method helps to accurately describe a research problem and its characteristics. By so doing it helps to describe how the lives of the HH are affected. As being qualitative and quantitative are main manifestations of descriptive study, the study used qualitative research methods to help address the questions raised in the research questions.

Thus; descriptive survey approach was employed in the study. So that researcher described and interpreted the nature of the problem under study based on the data collected from both primary and secondary sources De Vaus (2006).

3.2.2 Study Population

According to the Woreda's Beautification Bureau, the target populations of this study are 1200 households around the landfill. More than half of the target population lives in close proximity to the landfill. 55% of the target population needs only 15 minutes walk to reach to their residential area. The researcher is confident at 90% regarding the values of sample in relation to true value of population at specified level of precision ($e=0.10$). In order to make the sampling manageable in terms of cost and time, the researcher had selected this significance level, as the samples are more or less homogeneous.

3.2.3 Data Sources

Data collected from both primary and secondary sources. The primary data was collected through formal survey and observation of the area. The survey carried using questionnaire, interview with residents at house hold level and the researcher made personal observation of the area.

Secondary data was also another important source of information for the study. The secondary data for this research is gathered from related published and unpublished materials, books, journals, articles, various research papers and government publications which are found in the library, website and report from the environmental protection agency.

3.2.4 Sample Size Determination and Sampling Techniques

3.2.4.1 Sample Size Determination

According to the Woreda's Beautification Bureau, around 1200 households reside around the landfill. These residents were the target population of the study. Two stage sampling technique applied to select cluster to determine the group. Based on the list of households obtained from the woreda, the first stage was listing all the apartment and grounded villa residents. Then lottery method

was used on the second stage of the sampling to randomly select the sample households (the secondary sampling units).

The formula produced the sample size of 92.308 households and approximates to 92 based on the simplified formula developed by Yamane (1967) are written as follows:

$$n = \frac{N}{1 + N(e)^2}$$

Where n – designates the sample size the research uses.

N - Designates total number of sample frame

e – Designates maximum variability or margin of error, the level of precision, on this study is chosen 10%.

1 – Designates the probability of the event occurring.

$n = \frac{1,200}{1 + 1,200(0.01)^2} = 92.308$ were taken as a sample. This is very helpful to grasp expert's opinion that will provide better understanding about the subject matter. Moreover, to reduce personal biases educational background, experience and position of experts will be taken in to consideration during the sampling process. This sample size is statistically adequate for this study. In addition, this study supplemented by qualitative data gathered through key informant interview and observation. So that gaps had to be filled.

This residential area is one of the newly emerging modern areas of Addis Ababa. It has new and modern buildings. However, its waste management is not different from those old residential areas of the city. The researcher believes that modern looking and newly emerging areas of the cities should have a better waste management condition if the city's waste management condition is needed to improve. With this belief in mind and with the existing deteriorating condition of the landfill area, the researcher was interested in conducting the study in the area.

3.2.4.2 Sampling Techniques

In determining the sample for the study the random sampling method was used. So that each of the 1200 individuals have equal chance of being selected. Having known who the population are the researcher obtained complete list of the population from the Woreda Beautification Bureau. After listing the population lottery method was used to determine the sample.

3.2.5 Tools of Data Collection

Since the study used both qualitative and quantitative methods, observation, interview both structured and semi structured and focus group discussions were used.

3.2.5.1 Observation

The researcher has made direct observation of Summit land fill and was able to see that the landfill is at the center of the community. The use of this method helps to better understand what exactly is happening in the area rather than guessing the situation. In fact, the researcher was able to observe how the lives of the residents are affected by the landfill.

3.2.5.2 Questionnaire Survey

For ease of collecting information on people's beliefs, feelings, motives and perspective questionnaire is used. On the other hand, semi- structured data is used to obtain qualitative data in the form of attitudes, feelings and perception. The questionnaire was administered in a way that the researcher personally hands out blank questionnaires and took back completed ones. But at first the questionnaire was pre tested among 15 respondents and correction was made based on the suggestions of these respondents.

3.2.5.3 Interview

For ease of collecting information on people's beliefs, feelings, motives and perspective structured and semi- structured interviews were used. Literacy level of respondents might vary for this reason; face to face interview is used in place of self- completion questionnaire. On the other hand, semi- structured data is used to obtain qualitative data in the form of attitudes,

feelings and perception. The researcher interviewed 10 residents, 2 managers from the Woredas Beautification bureau and 2 individuals from private collecting agencies.

3.2.6 Methods of Data Analysis

To analyze the quantitative data collected from HHs residing near by the landfill descriptive statistics was used depending on the nature of the basic questions. Data organization and analysis was performed with the help of Software Package for Social Science (SPSS version 23).

Descriptive statistics such as frequency counts and percentages used to analyze the background of respondents while mean, grand mean and standard deviation employed to analyze the overall data. The overall item mean values were averaged over the respondents to compute an average overall item mean value.

Finally, the data gathered through interview analyzed in narration form and used to substantiate the data obtained through the questionnaire.

On the other hand, analysis for qualitative data which gathered through structured interview and direct observation in relation to the health and environmental effects of dumping wastes collected from different areas within the cities in line with the data gathered through questionnaire. In this study, the qualitative data presented together with the quantitative data so that triangulation was possible.

CHAPTER FOUR

4. FINDINGS AND DISCUSSIONS

This chapter has two parts. The first part deals with the presentation of data and its analysis. The second part discusses the main findings of the study on the perception of residents around the land fill. To this end, findings from households, observations and questionnaires are carried out and analyzed. It is organized under three broad themes: demographic characteristics of respondents, attitudes and perceptions towards solid waste management and effects of the landfill on the life of residents.

4.1 Data Presentation and Analysis

This section of the study attempts to illustrate and describe household responses. Under this section, the major variables considered as helpful to explain perception of the residents towards SWM practices are portrayed in frequency distribution tables and cross tabulation list.

4.1.1 Characteristics of Sample Households (HHs)

The demographic characteristics of the respondents covered their sex, age, level of education, sector of employment and the number of years lived around the landfill.

Table1: Characteristics of Sample Households (Gender, Age, Level of Education)

Gender		Frequency	Percent
	Male	50	54.3%
	Female	42	45.7%
	Total	92	100. %
Age		Frequency	Percent
	18-25	24	26. %
	26-35	44	47.8%
	36-45	10	10.9%
	46-55	12	13.0%
	Total	90	97.8%
Missing	System	2	2.2%
	Total	92	100.0
Level of education		Frequency	Percent
	Unable to read and write	3	3.3%
	Elementary Educ. Completed	14	15.2%
	Secondary Educ. Completed	63	68.5%
	College Graduated	10	10.9
	Short Training	2	2.2%
	Total	92	100.0

Source: Computed from survey data, 2020

The survey result on the age group of the sampled households showed that very high percentages were 26-35 age groups with 47.8% of the respondents as presented on the table 1 above. According to a study there is the assumption that an increase in age is expected to have a positive relation with quantity of waste generated. When age increases consumption also increases, because our demand goes up with an increase in our age (Kassahun, 2018)

In this study, from a total of 92 household questionnaires responded, 54.3% were male-headed and 45.7% were female-headed households.

According to a report by Un Environment, women are considered as proper disposers of waste in many countries and they are willing to learn about waste management process (Krishnan, 2011). Though, women are good in proper disposal of waste, the fact that their involvement in the formal sector of employment is lower, has prohibited them from outshining in their good character of properly disposing waste and influencing the society

Majority of respondents (68.5%) were secondary education graduates whereas only 3.3% of respondents were unable to read and write. When it comes to education the more households are educated about solid waste management, there will be better waste management (Kassahun 2018)

From the demographic characteristics of the households, which indicates that the number of male headed families is more than female headed families, based on the report of UN environment this suggests that house holds that are lead by proper disposers are less in number. This might be reflected in the way they handle the waste that is coming out of their house. The more the consumption is the less the waste associated with it. The fact that only 3.3% of the respondents are illiterate, in principle suggests that waste generation among residents could be less.

Table 2: Number of Years Lived in the Residential Area

	Frequency	Percent
<1 years	15	16.3%
1-2 years	17	18.5%
3-4 years	33	35.9%
5-9 years	16	17.4%
10-19 years	11	12.0%
Total	92	100%
Sector of employment	Frequency	Percent
Private work	37	40.2%
Trading	12	13.0%
Government Work	33	35.9%
Other	10	10.9%
Total	92	100%

Source: Computed from survey data, 2020

The study respondents were asked some additional questions about how long they have lived in the area for them to be able to present their observation for the SWM process. The number of years spent in the area helps residents to understand the existing SWM related problems better than those who lived in the area for short time period. The number of years spent in the area helps residents to understand the existing environmental problems better than those who lived in the area for short time period.

According to the response obtained from the sample survey, 35.9% of the survey respondents have lived 3-4 years in the study area, and only 12% of respondents have lived 10-20 years in the study area. Only 27% of the respondents lived for a longer year in the area and more than half of the respondents lived from 1 to 4 years. This could be due to the existence of the landfill. Because no body will be interested to live in an area which could pose treat to health. Because of this most of the respondents do not have a good knowledge about the area.

When it comes to sector of employment 40.2% of respondents were engaged in privet work, 35.9% were engaged in governmental organization and 13% engaged in trading.

4.1.2 Respondents Perception about SWM and their practice

The issue of what constitute SWM related problems varies from person to person and from countries to countries. Material which is considered as garbage for some group could be material which is of many uses to others. This depends on the difference in the level of exposure and wealth. This is observed in countries of the world as well. For instance, we can see the cars that our countries import as new car. Materials which are trashed by developed countries are used as new ones in countries like ours. Putting this difference in mind, respondents were asked to indicate the most serious problem resulting from the existence of the land fill around the area.

Table 3: Knowledge About Solid Waste Management

	Frequency	Percent
Heard	78	84.8%
Not heard	14	15.2%
Total	92	100%

Majority of the survey respondents (84.8%) have heard about solid waste management. This shows that there is no significant gap about SWM information in the study area.

Environmental education allows people to acquire some experiences about the physical environment as well as study the natural resources that they live in it for better utilization and consequently get committed to environmental protection and conservation of natural resources for the present and future generations (Anijah-Obi, 2001). This suggests that the more people get educated on the issue of solid waste management, the more they are willing to participate in works that are done to improve the existing situation.

Construction of landfills is believed to be one of the way by which solid wastes are managed. However, the researcher strongly believes that people residing in the area should not suffer from health and environmental problems that arise from the continuous inflow of waste that is accompanied by smoke and smells. According to the discussion made on the literature review, landfills greatly affect the environment. Air pollution, ground water impact and influence on biodiversity are some of the effects of landfills on the environment (Newton, 2018).

Majority of the survey respondents (84.8%) have heard about solid waste management. This shows that there is no significant gap about SWM information in the study area. Since informational awareness by itself is not enough, the city administration should facilitate and encourage public awareness and participation by making adequate information about the importance of SWM. As indicated in the analysis part, administrators can involve residents in different means. They can distribute household containers, devise interesting environment related participatory programmes and promote active participation through collection and dumping of waste (Kaloki, 2015). This participation on waste management process is not just for the sake of participating them but it helps to develop sense of ownership and being concerned to our surrounding area.

The survey result revealed that major means of information access on how to remove solid waste that comes out from the respondents' households in the surroundings of summit landfill include radio, television, school and social meetings, etc. This implies that household solid waste management awareness in this sub-city is highly transmitted by various broadcasting. As the researcher tried to present on the analysis part of the research, the means by which people received information about solid waste management can have different implications. The residents who got the information through television may have good understanding about the issue because information is best transferred visually. Those who received the information on radio also can have good understanding because when we hear the radio we will be motivated to visualize what we are hearing. The remaining respondents who received the information through meetings and school may not be as effective as the ones who received the information on radio and television. Because there is a probability of being forced to attend those meetings and losing interest because of the push.

There is fast growth of the urban population in the city in general and Bole sub-city in particular. This fast growth has been followed by a number of mixed consequences. The surveyed households confirmed this important fact by stating that the fast growth of the population has contributed to the increase in solid waste generation in the study area. According to the analysis the difference in the type and amount of waste generation of the old days and the current situation is good indicator of the effect of population growth on solid waste management.

Table 4: Menses for obtaining information about SWM

	Frequency	Percent
Over Radio	20	21.7%
Over Television	39	42.4%
In Public Meeting	8	8.7%
In School	14	15.2%
Other	11	12.0%
Total	92	100.0

Table 4 illustrated that among the respondents who have heard about SWM, 42.40%) of the respondents heard about Solid waste management through television, 20% through radio and 15.2% in school, only 8% of respondents heard in public meeting and 12% of the respondents did not indicate from where and how they have obtained the information about SWM. The greater number of respondents got the information through television. There were respondents who gave multiple responses. This indicates that the residents may have good understanding about the issue because information is best transferred visually. Those who received the information on radio also can have good understanding because when we hear the radio we will be motivated to visualize what we are hearing. The remaining respondents who received the information through meetings and school may not be as effective as the ones who received the information on radio and television. Because there is a probability of being forced to attend those meetings and losing interest because of the push.

Table 5: Participation in the SWM

	Frequency	Percent
Took part in SWM work	12	13%
Did not take part in SWM Work	80	87%
Total	92	100. %

Furthermore, the same households were asked about their Participation in the SWM. The result shows that many of the sample households (87%) reported that they did not participate in the SWM and 13% have participated. Though respondents have heard about SWM, they didn't actively participate. With this regard the city administration should facilitate and encourage public awareness and participation by making adequate information about the importance of SWM. This could be done by trying to involve small children on environment related issues. This helps to develop good value on the coming generation. Also, administrators can distribute

household containers, devise interesting environment related participatory programmes and promote active participation through collection and dumping of waste (Kaloki, 2015). Participation on waste management process helps to develop sense of ownership and being concerned to our surrounding area.

Table 6: Disposal Mechanisms

	Frequency	Percent
In the public bin	43	46.7
In waste pool	8	8.7
in the road side	6	6.5
In the itinerant waste van	33	35.9
Total	90	97.8
System	2	2.2
Total	92	100.0

The study revealed that 46.7% of the respondents use public bin for solid waste disposal and 36.7% of the sample households use itinerant waste van. A few numbers of respondents use different storing materials such as waste pool for 8.9%, road side for 6.7%. there were respondents who gave multiple responses. This helps to understand that the residents themselves are contributing their part in the condition of the surrounding area. As the researcher explained on the introduction part of the research, we all are generators of waste. Therefore the way residents dispose of their waste shows what role they play in the existing condition of their surrounding area. What we see in front of our house is the result of what we did or did not do. If we through waste properly and clean our surrounding area there is good probability that we have neat and beautiful area.

Table 7: the way residents manage HH solid waste

	Frequency	Percent
All kind of waste together	27	29.3
Some sort of waste separation	25	27.2
Proper waste management	10	10.9
Total	62	67.4
System	30	32.6
	92	100.0

Concerning the kind of waste management practice observed in their residential area, the survey result shows that 43.5% of respondents said that all kind of wastes are put together, 40.3% indicated that they try to do some sort of separation of waste 16.1% of the respondents said that they try to segregate waste and they believe there is proper waste management.

Majority of the respondents do not sort out waste. This is one of the reasons behind the poor management of waste around the landfill. If residents were given different containers by which they can separate different kind of wastes, people who work in the landfill will be able distribute the recyclable ones to where there are people who demand them. This can minimize the smell that comes from the waste the more the people try to sort out the wastes.

Table 8: SW Collection or Disposal Process Described by Residents

	Frequency	Percent
Good	34	37.0
Fair	21	22.8
Not fair	20	21.7
Bad	11	12.0
Total	86	93.5
System	6	6.5
Total	92	100.0

A question was asked to know the perception of households to describe the waste collection and disposal process to indicate how people perceive the process and to help the responsible body to devise a better method in the area. Sample households explain the situation and status as follows, based on their daily observations.

With regard to the waste collection and disposal process, 40% of the study subjects reported that the collection and disposal process around the landfill are good; whereas the remaining respondents said that the process is fair (24 %), not fair (23%) and bad (13%). This shows the private collectors and disposers are working hard and if the society and the responsible body try to encourage them, the condition of the city's waste management can improve.

Table 9: Residents satisfaction level of SWM

	Frequency	Percent
Yes highly satisfied	118	40.5
Not satisfied at all	153	52.6
Total	271	93.1
System	20	6.9
	291	100.0

As illustrated in Table 9 above, 43.5% of the respondents believe that the solid waste collection service delivery is satisfactory and sufficient. Whereas, 56.5% stated that it is not satisfactory and sufficient (they were not happy by the SWM service rendered). This indicates that the responsible body needs to work hard in improving the existing SWM pattern. This could be done by involving the society in the process for them to act more responsibly, by encouraging private collectors through reward and by applying policies and procedures related to waste.

Table 10: Time Required to Dispose Solid Waste

	Frequency	Percent
5-10 minutes	46	50.0
11-15 minutes	17	18.5
16-20 minutes	11	12.0
21- 25 minutes	6	6.5
Other	10	10.9
Total	90	97.8
System	2	2.2
	92	100.0

As table 11 above, 51.1% of the respondents responded the time between their residential area and a landfill was 5-10 minutes. Following this, 18.9% responded as they walk 11-15 minutes to dispose their solid waste. And also 12.2% of the responded as the solid waste disposal place took 16-20 minutes. Only 6.7% of households are mentioned as they travel 25-30 minutes to disposal place where it is located. The remaining 2.2% did not tell how long they travel for the waste disposal place.

According to a study conducted by Oxford University in 2016, health is at risk for those who live within closer to a landfill site. We can see that more than half of the respondents are in close proximity to the landfill and this shows how their health is at risk.

Table 11: Condition of the Landfill Area as Perceived by the Residents

	Frequency	Percent
Rusting/rotting	14	15.2
I don't know	8	8.7
Dirty smell	67	72.8
Total	89	96.7
System	3	3.3
	92	100.0

Respondents were asked to evaluate the SWM place and majority of them (75.3%) reported that the place has dirty smell, 15.7% rusting, and 9% of them didn't know about it. As the majority of the respondents described the area as rusting or rotting, it is easy understand how living in close proximity to this area means. Health will always be at risk. There were respondents who gave multiple responses.

4.1.3 Effects of the land fill on the residents

To assess the effects that the landfill has on the residents, respondents were asked structured questions (from Q20-Q27) and their perception is summarized below:

Table 12: One Way or Another the Landfill Affects the Environment At Large

	Frequency	Percent
Yes, it has	64	69.6
No	17	18.5
Other	10	10.9
Total	91	98.9
System	1	1.1
	92	100.0

As indicated in Table 13 above, 70.3% of the respondents indicated as the landfill has affected their environment, 18.7% of the respondents responded as it has no environmental effect on the residents even if they live around the solid waste disposal area and only 11.0% indicated as it has other effects that the solid waste disposal placed in their surroundings.

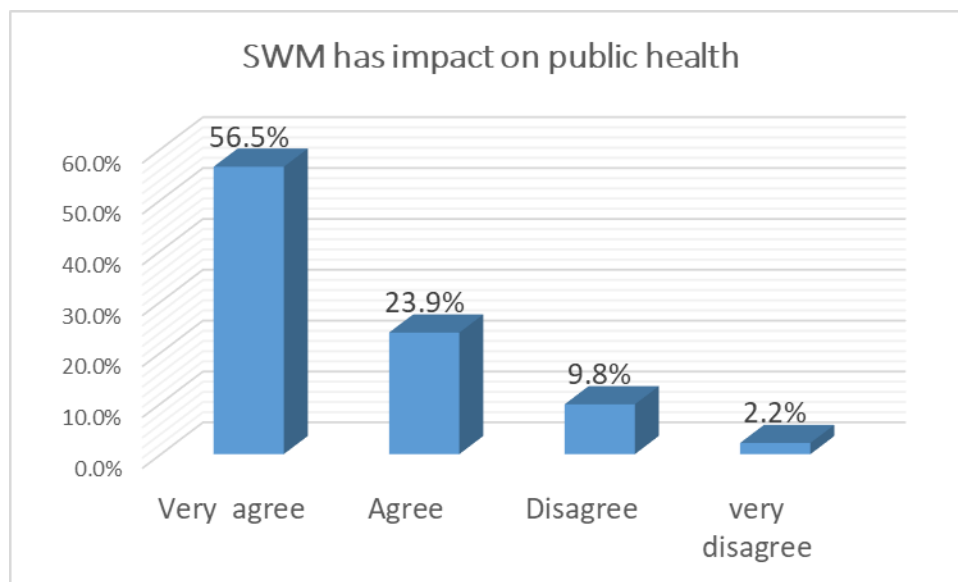
According to the discussion made on the literature review, landfills greatly affect the environment. Air pollution, ground water impact and influence on biodiversity are some of the effects of landfills on the environment. Not only the literatures but majority of the respondents of the survey believed that the landfill has environmental impacts.

Table 13: The Landfill is Near to Residents and has Exposed them to Bad Smell

	Frequency	Percent
Very agree	57	62.0
very disagree	4	4.3
Agree	20	21.7
Disagree	9	9.8
Total	90	97.8
System	2	2.2
	92	100.0

The response to the survey question concerning SW disposal is situated near residential area and has exposure to bad smell, it shows that 63.3% strongly agree and 22.2% agree that the landfill has bad smell. On the other hand, only 10 % and 4.4% of the respondents disagree and very disagree with the fact that the closeness of the landfill has not exposed them to bad smell.

The survey result has shown that the 50 % of the respondents live in close proximity to the landfill. This exposes them to bad smell which results in respiratory health related problems.



As can be observed from Table 15 above, 56.5% of the respondent households strongly agreed that the effect of SWM problem has become a serious problem for public health; 23.9% agreed that it has affected the health of the public in the sub-city. Only 9.8% and 2.2% of the respondent disagreed on the effect of the landfill on the health of the public.

According to the survey result residents who are in close proximity to the landfill are 50% of them. This shows that the landfill affects the health of half of the respondents. As half or more of the population are exposed to health related problems, we can conclude that the health of the public is at risk due to the nearness of the landfill to the residential area.

According to the interview with residents, common cold, influenza and other respiratory health related health problems are highly observed among residents. With this regard children under the age of 7 are highly affected by flu like diseases.

Consequently, perception of the respondents about the impact of this poor SWM pattern up on health and environmental pollution is reported high. As shown in Table 14 about 69.9% believe that their environment is not clean due to poor solid waste management service and hence, it is a serious problem that needs immediate attention. The survey households believe that impacts of current poor solid waste management pattern are creating various problems for health and the environment; therefore it needs urgent solutions.

All in all the residents have the perception that there is a problem in selection of dumping sites. They believe that as a result of wrong placement of dumping site their health and their finance is highly affected.

If solid waste is not handled and treated properly, it creates a negative environmental impact that can have significant consequences for the public health and environment. This was explained in the literature review part where it stated that because of the increase in vermin surrounding landfills, disease becomes an issue with other adverse health effects, such as birth defects, cancer and respiratory illnesses also being linked with exposure to landfill sites (Newton, 2018). Therefore, a hygienic and efficient management system for collection and disposal of solid waste is paramount in any urban center and that also depends on the awareness level of residents.

On the other hand, since constituents of household solid waste vary from place to place and from season to season depending on lifestyle, food habits, standard of living, and the extent of industrial and commercial activities in an area, the society affects the composition (both physical and chemical) and quantities of solid waste generation. According to the discussion presented in the introductory part of the research, Each and every one of us is contributors to this problem as we all are potential generators (Mukisa, 2009).

As indicated in table 7 of the study the residents themselves are contributors to the condition of the land fill. Majority of them uses waste bin, communal solid waste containers, nearby river side. The nature of the wastes that are dropped in the different areas is easily decomposable and with

the frequency of dumping together with poor storing practices, may result in reproduction of bacteria and germs and decomposing. This might be explained by the bad smell emanating from the accumulated wastes and may cause health problems particularly to the households and to the persons who handle the solid waste.

From personal life experience and the field observations, the researcher believes that the situation explained above exacerbates the negative perception and attitudes of the society towards solid waste management pattern. Another observation obtained from site visit showed that there are different kinds of dead animals, human wastes and various kinds of sanitation and healthcare materials in the site containers. There are also a considerable number of individuals who use to dump their household wastes near the container either deliberately or negligently. This may be due to poor public awareness or may be due to the loathing for odor associated with the container use. And most of the kids dump outside the container as they are short and/or their immaturity to know the negative externalities of poor waste handling.

Despite all these efforts, field survey results and personal observations confirmed that solid waste containers in most areas of summit landfill at Bole sub-city are full to the brim, if not overflowing and heap of rubbish in the surroundings due to the delayed transportation service provided by the agency. Household solid waste in Summit landfill, therefore, produced by the residents and by the increased number of guests is bringing about serious consequences in their life.

Table 14: Because of the landfill Residents Exposed to Various Disease

	Frequency	Percent
Very agree	58	63.0
very disagree	4	4.3
Agree	11	12.0
Disagree	19	20.7
Total	92	100.0

Regarding the existence of the landfill around the residential area, the highest number of the respondents 63.3% reported that they strongly agree its existence has an impact on their health; 12% stated that they agree the landfill is located in a wrong place; 20.7% of the respondents disagree to the issue raised; only 4.3% strongly disagree.

According to a report by World bank, in addition to public health and environmental pollution risks, the growth of solid waste in the summit increases the cost of waste removal, intensifies the pressure on urban infrastructure which already is over burdened with the provision of other urban services and reduces the life span of the available SWM facilities such as the vehicles, containers and dump site. The report also indicates that in countries where the number of population is growing and have low income, solid waste related problems require urgent response which is very hard because of the cost associated with it.

To better understand the resident's perception, level of awareness of the residents, the concern and the degree of responsiveness towards the current SWM pattern in their living environment and to the surroundings, sample households were asked questions. Based on these crossing questions, Table 13 indicated that 55.2% of the respondents confirmed that containers are full and overflowing in most of the times. Furthermore, they explained the incidents they always encounter under such situations. Some of the incidents they observed on full and overflowing containers include stinking smell, harbored insects such as flies, rats etc. domestic animals eating the waste, scattered wastes as searched by scavengers, becoming causes for uncontrollable disease. They report the delay of emptying service as the main cause of the above problems.

Table 15: Residents Repeatedly Admitted to Hospital due to Illness Related to Respiratory Problems Resulting From the Existence of the Landfill

	Frequency	Percent
Very agree	50	54.3
very disagree	2	2.2
Agree	22	23.9
Disagree	15	16.3
Other	3	3.3
Total	92	100.0

The response to the survey question concerning the residents being repeatedly admitted to hospital due to illness resulting from the landfill where it has caused health effect to the resident at their home is as follows. Accordingly, it shows that 54.3% agreed that they and their kids are repeatedly admitted to hospitals because of the landfill and 23.9% agree with the idea that says

closeness of their residential area has highly affected their health. . On the other hand, 16.3% of the respondents disagreed on the question raised and only 2.2% mentioned very disagree.

This explains either poor selection of site as a landfill or enlargement of the city has contributed a great part in exasperating the problem. Because of this residents especially those part of the population whose immunity are not developed could possibly be admitted to hospitals more often than the in the normal condition.

As indicated in earlier parts in the literature review, Landfills play an important role in waste management strategies. The degradation of wastes in the landfill results in the production of leachate and gases. These emissions are potential threats to human health and to the quality of the environment. Landfill gas consists mainly of methane and carbon dioxide, both important greenhouse gases. Landfill sites contribute 20% of the global anthropogenic methane emissions. Furthermore, it usually contains a large number of other gases at low concentrations, some of which are toxic. Leachate can migrate to groundwater or even to surface water through the flaws in the liners and this poses a serious problem as aquifers require extensive time for rehabilitation. Construction and management of landfills have ecological effects that may lead to landscape changes, loss of habitats and displacement of fauna. Socio-economic impacts of landfills include risks for public health derived from surface or ground water contamination by leachate, the diffusion of litter into the wider environment and inadequate on-site recycling activities. Nuisances such as flies, odors, smoke and noise are frequently cited among the reasons why people do not want to reside close to landfills. Various researchers conclude that landfills likely have an adverse negative impact upon housing values depending upon the actual distance from the landfill (Mahesh, 2013).

Table 16: Economies of the Residents are Affected As a Result of Being Admitted to Hospitals Repeatedly

	Frequency	Percent
Very agree	53	57.6
very disagree	2	2.2
Agree	17	18.5
Disagree	18	19.6
Other	2	2.2
Total	92	100.0

Table 18 above shows that, the highest number of the respondents 57.6% reported that they are very agree to that they are forced to go to hospitals repeatedly and their finance is affected; 18.5% stated that they agree these solid wastes disposal placed wrongly. In contrast, 19.6 of the respondents disagree to the issue raised; and only 2.2 % of the respondents mentioned very disagree.

As the frequency of admittance to hospital is higher than that of the normal condition, respondents are forced to face additional financial burden. Those who can afford to go to hospitals often can survive the problem. And those who can't afford for such medical expenses will either be forced to leave the area or keep on suffering from the disease or if the worst comes lose their life from lack of treatment.

4.1.4 Responsibility of the City Administration (Q31-Q33)

Table 17: Residents Perception on who is Responsible for Proper SWM

	Frequency	Percent
City Administration	16	17.4
Private Institution	6	6.5
people in the community	46	50.0
Other	15	16.3
Total	83	90.2
System	9	9.8
	92	100.0

The perception of respondents towards the responsibility of solid waste disposal was assessed and the result shows that more than half of them (55.4%) believed that people in the community are responsible. Only 19.3% of respondents believed that city administration and 7.2% proper institution are responsible for solid waste management. Some of the respondents gave multiple answers suggesting that it is the responsibility of all stakeholders.

According to an article waste is an issue for all of us. We all create it and that means we are all responsible for what happens to it. Waste needs to be dealt with in the safest way possible. Just because of being a dweller of certain area, we have responsibilities for how waste is managed. This could mean sorting out waste for collection for waste collection services contracted by

private agencies. So as residents of an area, we should deal responsibly with waste, for it doesn't harm the environment (Holmes, 2015).

Table 18: Residents Perception towards the Responsible Bodies Choice of area for Landfill

	Frequency	Percent
Very agree	50	54.3
very disagree	10	10.9
Agree	20	21.7
Disagree	9	9.8
Total	89	96.7
System	3	3.3
	92	100.0

Sample households were asked whether the responsible body choose the right place as a landfill or not. About 56% of the respondents stated that they strongly agreed as there is a problem in choosing the place for a landfill; 22.5% of there is a problem in choosing the place. Whereas 11.2% and 10.1% of respondents very disagreed and disagreed respectively with the fact that the responsible bodies choose the right place for a land fill.

The task of choosing and assigning an area is not easy. It rather is complex one. According to an article in developing criteria for assigning an area for a land fill the responsible body should consider the following. Environmental condition, accessibility, ecological and societal effect, geological and hydrological condition must come in to consideration before deciding the place. More over, the identified area should primarily be accepted by the society (Kharat, 2016).

According to the interview with employees in the private waste collecting agencies, it is indicated that in relation to the job, they don't get vehicles as often as promised by the authorities because of that the area is filled with pile of waste most of the times. They indicated that topographically they don't face too much problem as the area is plane and it is suitable for the waste collecting tracks. The social, health and environmental effects of the landfill are as indicated in the study. But it also has created job opportunity for those private waste collectors who are working within 64 agencies.



Source: picture from the field, 2020

The researcher interviewed 10 residents, 2 managers from the Woredas Beautification bureau and 2 individuals from private collecting agencies. Also she made her own observation of the area. The response of every one of them was different according to the effect the landfill has on their life.

The authorities from the Woreda's Beautification Bureau were pleased to talk about their achievements. In answering questions raised about what the bureau is doing the first interviewee replied the following:

1st Interviewee: “we have 5 temporary landfills with in the Woreda and 64 private waste collectors and we are working hard to avail waste collecting vehicles at least three times in a week”

For a question asked on what the bureau is doing to identify and solve problems residents who live around the landfill are facing, the second interviewee replied the following.

2nd Interviewee: “waste is being collected from their house at least twice a week and we are doing our best to remove the wastes from the temporary landfills as timely as possible”

When asked about how the bureau is supporting private collectors the second interviewee replied:

2nd Interviewee: “*ጥፋ ነው በማለት ባያስረድዱብንም በክፍ አይሰጥም፡፡*”

On the other hand the two individuals from private collecting agencies that the researcher was able to interview were doing their job and thought that the researcher is a journalist and started to list their problems. When they first saw the researcher they were unhappy and they were saying are you going to beg on our name?

They did not even allow the researcher to ask question at first but they were saying the following.

Individual 1: “many people like you come take our pictures and promise to improve our condition but they only use our pictures to beg for money and use it for their own benefit. You are one of them. Go away from here”.

“ሂጂ ጥፋ ጠረፋቸው መስመኛ ስታረገን ነው”

After explaining why the researcher was there and showing them ID, they were highly cooperative. They were asked what kind of support they get from the responsible body and they replied the following.

Individual 2: “we don’t get all the necessary protective equipments, if we are sick while doing this work, we have to get treated by our own money they don’t support us.”

Individual 1: “in relation to the job, we don’t get vehicles as often as promised by the authorities because of that the area is filled with pile of waste.”

In answering if the society is cooperative enough or not, one of them replied the following.

Individual 2: “most almost all of them treat us as the waste we collect from them. They don’t respect us. The way they remove their waste is very bad. If the wastes were separated it was better”

Two women who have small business of selling snack and tea in the area were afraid of telling about the effects of the landfill. They were afraid they might lose their business if they tell anything negative about the area. Though one of them was willing to talk but the other one keep on warning her.

“አንድ ዝም ቢያ” and talks to her in some other language the researcher do not understand. Their small shops are in front of the landfill but they keep on saying that they are not facing any problem with the land fill.

The rest of the respondents were the households who reside around the landfill. Almost all of them were happy to give response about the problem that they are facing due to the landfill. All of them agreed that they observe a problem in the concerned body’s assignment of place as a landfill. Almost all of the landfills throughout the city are within the residential area. They also mentioned that their lives are negatively affected. Their health, their economy and even the value of their houses are negatively affected.

Teen age or at an early twenties respondent in a cafeteria near the land fill said “this is really timely issue. Look at us (he was with two other boys and one girl and some of them were smoking and he was the only one talking with the researcher) seating in this cafeteria and the smell and sight of the area is really bad. This is bad selection of area to dispose waste.”

An elderly man said that “I observe a problem in our society’s waste management practice of both the concerned authority and residents. People throw every sort of trash like used soft papers, gums, and plastics everywhere. First we need to work on our mind. First we need to develop that waste hating culture. If our minds are changed, it will not be hard to get neat city like the developed nations.”

The researcher also made an observation of the area and was able to see how the lives of the residents are highly affected. To begin with, the researcher was able to observe that the area is full of residential houses and business centers. Also the researcher has observed that the beauty of the area is highly affected with the presence of the landfill. In addition, the area has a very bad smell.

Even if the residents are faced with various problems as a result of the landfill, they themselves play a great role in the condition of the area. The researcher was able to observe that families send teenagers to the landfill with big festals that are full of wastes. Since the festals are difficult and they don't reach the bins the kids throw the wastes on the ground. Even the adults do the same trying to avoid the bad smell if they go close to the area.

The researcher believes that if everyone tries to do their part properly, the problem could be minimized. With this regard, the researcher agrees with the idea of the old man who suggested about change of the mind. The researcher believes that a change in the perception of people plays a great role. If we as a society develop the belief that each and every one of us are responsible and stopped blaming others and do our own part we will enjoy change.

Table 19: Residents Perception on the Responsible Body's Timely delivery of Responsibility

	Frequency	Percent
Yes	15	16.3
No	74	80.4
Total	89	96.7
System	3	3.3
	92	100.0

Concerning the responsible bodies action in regard to SW disposal action, most of the respondents 83.1% stated that the responsible body has not managed the solid waste collected from the area; whereas 16.9% of the respondents acknowledged the solid waste management process is carrying out according to the planned way by the responsible body.

Some of the responsibilities of administrators involve providing information and advice on waste management, recovery and treatment of waste and organizing management of waste in residential areas (Sarkka, 2019). According to the result from the research survey 80 % of the respondents do not believe that the administrators are delivering this and other responsibilities. This suggests that they need to work in close collaboration with the society to identify their failures and use them as an opportunity for improvement.

CHAPTER FIVE

5. CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

The final part of the paper deals with the conclusion withdrawn and the recommendations forwarded based on the findings. The major purpose of this study was to explore the perception of the residents on the pattern of SWM around summit landfill area of Bole Sub -city, the core of Addis Ababa.

The booming growth of population has forced the sub-city administration to give timely response for basic urban services. The continuing deterioration in the environment due to the rapid population growth has challenged the capacity of this local government to work up to the expectation of the people. The major urban services delivered by the sub-city include housing, road maintenance, recreation, sanitation, etc. The responsible body for the administration of SWM of Bole Sub-City has started to provide the solid waste management service for the residents of the sub-city. The establishment of summit landfill is one of the ways of providing SWM service.

Based on the survey result, the researcher concludes the following about what the perception of the respondent toward the landfill is. Respondents perceive that there is a problem in allocation of place as a land fill. They believe the landfill is located in a wrong place. Due to the wrong placement of the landfill, residents perceive that the landfill has affected their life. On the other hand they have the perception that there is good waste collection which is conducted at least twice a week. And concerning the condition of the area they defined the area as an area full of dirty smell and in a rotten condition. Because of this condition it can be concluded that they perceive it is not suitable as residential area.

With regard to the effects the landfill has on residents, the research concludes that the health related issues arising from the land fill are far more than the disease that is observed on the residents. Though, the diseases that they are experiencing now are flu and other respiratory health related problems, the researcher believes that it might lead to serious illness that results to cancer (Montague, 1998). According to the survey result the effect on their health is also affecting their finance. Based on the findings the researcher concludes deterioration of environment, disruption of the peoples' activities because of illness and effect on finance is effects of the landfill on residents.

Participation of households in the SWM is below expectation. Assessment results revealed that most of the households have awareness on SWM and its related effects. However, participation of households in the SWM activities is insignificant as reported by the respondents.

In relation to the mechanisms that are being used by the city administrators to address the problems that residents are facing due to the existence of the landfill, the researcher concludes that they have limited their responsibility to collecting wastes from house holds. They are not doing that much effort to improve the condition of the landfill or even to change the location of the landfill. With regard to enforcement of law on wrong dowers and rewarding good deeds nothing is observed as in the case of the country at large.

All in all the researcher concludes that SWM practice observed around the landfill is in a poor state, there is a problem in assignment of areas as a landfill and finally the environment and the health of residents is highly affected by the existence of the landfill. Though private collectors who are working in the landfill are dedicated to their job and they are working hard, due to the lack of support from the society and responsible administrative body they couldn't bring about observable change in improving the existing condition of waste management pattern.

5.2. Recommendations

Based on the findings, the following recommendations are forwarded for the improvement of the patterns of SWM around Summit landfill as perceived by the residents.

Residents around Summit landfill believes that the pattern of SWM in the area is in poor state. In proper placement of landfill and late removal of waste from the area is identified as a major problem by the residents. It is therefore indispensable to apply integrated and sustainable SWM system to improve the pattern of SWM. The residents suggest that the following needs to be done to reach at SWM pattern which is beneficiary both to the residents and the surrounding area.

1. As the study findings revealed, more than half of the respondents have awareness about SWM but they don't participate in the process of SWM. The sub city's administration can take this as a great opportunity and involve the residents in the waste management. This can be done by designing far-reaching awareness raising programs and implementations through regular campaigns, training and preparing competitions among schools, institutions, NGOs, businesses and popular individuals is of paramount importance. They can participate in the form of giving insightful information to responsible officials and encouraging people who work on the landfill by different rewards and assisting them by sorting out their rubbish.
2. The researcher has presented how the presence of the landfill has affected the health of the residents. Not only the effect on health but the financial effects were also addressed. This calls for the attention of authorities in the beautification bureau who assigns certain place as a landfill and a damp to devise a way to relocate such landfills that are within the residential areas.
3. Initiating, organizing and extending support to form cleanliness and beautification committee comprising elderly and respectable people at village level. The committee should have them and to take action on those who litter and reward benevolent citizens who do well in this regard and demonstrate to the public.

4. The executive body for enforcement of rules and regulations in each woreda's beautification bureau should work hard for impartial enforcement of rules, regulations on wrong dowers.
5. Finally, commitment of some levels of government and non-government bodies in the creation and development of the perception of all stakeholders; including the households and communities requiring the service, private sector enterprises and workers (both formal and informal), and government and non- government agencies at all levels is vital.

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Annexes

Appendex1

Perception of Residents towards Solid Waste Management System: the Case of Summit Landfill

Masters of Art in Environment and Sustainable Development

Addis Ababa University

College of Development Studies

Center for Environment and Sustainable Development

Household Questionnaire

Introduction

This study is conducted by a student as part of the requirement for the award of degree of Master of Arts in Environment and Sustainable development at Addis Ababa University. The study is intended to gather preliminary information on the perception of people towards Solid Waste Management by focusing on Summit Landfill. By so doing, the effect that the landfill has brought to household will be examined. Also the level of awareness of people towards solid waste management will be addressed. Your views as a resident around the landfill, plays a crucial role for the success of this study. Please provide the following information to the best of your ability, and return your completed questionnaire to the student. Any information provided is strictly confidential and will not be relayed to a third party or used for any other purpose other than making this academic report for this study.

Part 1: General Information

Please put $\surd$ in the appropriate box/ boxes for our answer

1. Sex

Female ☐

Male ☐

2. Please mark your age group in the appropriate box

18-25 ☐

26-35 ☐

36-45 ☐

46-55 ☐

56-65 ☐

≥ 66 ☐

3. What is your highest educational level?

Illiterate ☐

Primary ☐

High School ☐

College Graduate ☐

Vocational Training ☐

University Diploma/Degree ☐

MA/PHD ☐

4. How long have you lived in this residential area?

Less than one year (12 Months) ☐

1-2 years ☐

3-4 Years ☐

5-9 Years ☐

10-19 Years ☐

More than 20 Years ☐

5. What is your major occupation

Self-employed ☐

Business ☐

Government employee ☐

Other specify

6. If your answer is business to question 5 specify your business-----

Part2. Perception towards Solid Waste Management

7. Have you ever heard of solid waste management

Yes ☐

No ☐

If Yes, in what way

Over Radio ☐

Over TV ☐

In public meeting ☐

In school ☐

Other ☐

8. Have you ever attended a meeting on waste disposal by the city council?

Yes ☐

No ☐

9. How do you dispose off your solid waste? (Multiple responses)

1. Take it to the nearby secondary storage receptacle ('genda')

2. Digging a hole around the house/ in the village and bury or bum it

3. Throw it on an open space or on the street

4. Throw it into the nearby river

5. Private collectors take it

6. Any other (Specify):_____

11. How many times do private collectors collect your waste per week?_____

Are you satisfied with their service?_____

Yes ☐

No ☐

12. Who do you think is responsible to properly manage solid waste in your residential area?
(Multiple response)

1. The Municipality
2. Private Companies
3. Households
4. Others (specify)_____

13. What problems do you think are there in relation to solid waste management in your house area?

a.

b.

c.

d.

e.

14. How do you describe solid waste collection process in your residential area?

Good ☐ not fair ☐

Fair ☐ Bad ☐

15. Are you satisfied with the waste management system in around the landfill?

Yes ☐

No ☐

16. Do you think and increase in the number of population in an area has an effect on SWM practice?

Yes ☐

No ☐

If yes, in what ways-----

Effects of land fill

16. Are there any public landfills around your residential area?

Yes ☐

No ☐

17. If yes how long does it take to get their?

5-10 min ☐

16-20min ☐

11-15min ☐

21-21min ☐

Other specify_____

18. When was the land fill built around the residential area?

30 to 40 years ☐

20 Years ☐

15Years ☐

10Years ☐

5 Years☐ other specify_____

19. How do you describe the status of the landfills around your residential area?

Rotting ☐

Smelling ☐

Don't know ☐

Other specify_____

20. Does the landfill affect you in any way?

Yes ☐

No ☐

21. The landfill is open and it has bad smell to the community

Strongly agree ☐

Agree ☐

Strongly disagree ☐

Disagree ☐

Other specify_____

22. The land fill is very near to the residential area and the bad smell is affecting health of the community.

Strongly agree ☐

Agree ☐

Strongly disagree ☐

Disagree ☐

Other specify_____

23. Are there specific types of disease that came with the coming of the land fill to the residential area?

Yes ☐

No ☐

24. What are some of the disease that came with the establishment of the land fill in the residential area?

a.

b.

c.

d.

e.

25. Health of residents is being affected by different kinds of viral disease and this has forced to visit hospitals with in short intervals. This on the other hand is affecting our economy.

Strongly agree ☐

Agree ☐

Strongly disagree ☐

Disagree ☐

Other specify_____

26. The time interval by which residents used to visit hospitals because of sickness has increased with the coming of the landfill?

Strongly agree ☐

Agree ☐

Strongly disagree ☐

Disagree ☐

Other specify_____

27. The establishment of the land fill has minimized aesthetic beauty of the residential area.

Strongly agree ☐

Agree ☐

Strongly disagree ☐ Disagree ☐

Other specify_____

28. Dumping of waste in areas which were once far away from the city and turned out to be a residential area for a number of households leads to political instability.

Strongly agree ☐ Agree ☐

Strongly disagree ☐ Disagree ☐

Other specify_____

29. There are adequate policies, laws that promote effective solid waste management.

Strongly agree ☐ Agree ☐

Strongly disagree ☐ Disagree ☐

Responsibility of city Administration

30. Who do you think is responsible to properly manage solid waste in your residential area?

- A. The Municipality
- B. Private Companies
- C. Households
- D. Others (specify)_____

32. The responsible body has assigned and designated the right place as a landfill when choosing Summit landfill.

Strongly agree ☐ Agree ☐

Strongly disagree ☐ Disagree ☐

33. Do you believe that the responsible body is doing the job of solid waste management properly?

Yes ☐

No ☐

34. If yes, what are the responsible bodies doing to properly manage solid waste?

a.

b.

c.

d.

e.

35. If no, what do you suggest needs to be done concerning solid waste management in your area?

a.

b.

c.

d.

e.

Thank You for your participation!!!

Appendix 2

A Semi Structured Interview Questions for Interviewees around Summit Landfill

1. How do you do sees the condition of Summit landfill?
2. Do you think the life's of residents around the landfill is affected in any ways?
3. Do you think the condition of the landfill has an effect on the health of the society and the environment at large?
4. What are some of the diseases repeatedly observed on the residents who are affected by the landfill?
5. Who do you think is responsible to improve the existing condition around Summit landfill?
6. Do you believe the responsible body is working hard to improve the condition of the area?
7. What do you suggest as a solution to improve existing condition of the land fill?

Appendix 3

Checklist for Field Observation

- 1) Existing condition of the landfills
- 2) Closeness of the landfill to residential areas
- 3) Working condition of private collectors in the area
- 4) Observable possible effects of the land fill

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