

ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES
DEPARTMENT OF SOCIOLOGY

**SOCIO ECONOMIC FACTORS AFFECTING HOUSEHOLD SOLID WASTE
PRODUCTION AND EFFECTIVE MANAGEMENT IN DESSIE TOWN**

**A THESIS SUBMITTED TO SCHOOL OF GRADUATE STUDIES OF ADDIS ABABA
UNIVERSITY IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE
DEGREE OF MASTER OF ARTS IN SOCIOLOGY**

BY

SHALOM ALI FARIS

RESEARCH ADVISOR

DR. YERASWORK ADMASSIE

SEPTEMBER, 2018

ADDIS ABABA, ETHIOPIA.

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STATEMENT OF THE AUTHUR

First, I declare that this thesis is my own work and that all sources of materials used for this thesis has been fully acknowledged. This is to certify that the thesis prepared by Shalom Ali Faris entitled: socio economic factors affecting household solid waste production and effective management in Dessie town; submitted in partial fulfillment of the requirement for the Degree of Master of Arts in Sociology complies with regulation of the University and meets the accepted standards with respect to the originality and quality. I declare that this thesis has not been submitted to any other institution anywhere for the award of any academic degree, diploma or certificate.

TO BE SIGNED BY THE EXAMINING COMMITTEE:

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ABBREVIATIONS AND ACRONYMS

CBO	Community Based Organization
MSW	Municipal Solid Waste
MSWM	Municipal Solid Waste Management
SBPDA	Sanitation, Beautification and Park Development Authority
UK	United Kingdom
UN	United Nation
UNEP	Use of Economic Instruments in Environmental Policy
UNESCO	United Nations Educational, Scientific and Cultural Organization
WHO	World Health Organization

ABSTRACT

The general objective of this study was to examine socio economic factors that affect effective household solid waste production and management System in Dessie town. The study used mixed-method approach. For a quantitative method a structured close ended questionnaire was used and for the qualitative method, key informant in-depth interviews, focus group discussions and field observation were conducted to collect the data for this study. A multistage cluster sampling was used to select the sample household heads for this study. From the five sub-city found in Dessie town, Hotei sub-city was selected randomly and then the three kebeles found under this sub-city where all selected again from 9346 households in the selected kebeles. Of these, 184 households were randomly selected. A snow ball purposive sampling technique was used to select five municipal workers in solid waste sector for the key informant in-depth interview and two focus group discussions with solid waste collection workers under the municipality were conducted with 6 and 12 participants respectively. The result of survey data revealed that the largely produced solid waste was food wastes, and 86 (46.7%) respondents mentioned that food wastes as most difficult wastes to manage. 161(87.5%) showed that food wastes were put in sacks, followed by baskets and plastics 167 (90.8%), 8 (4.3 %) and 7(3.8 %) respectively. 61 (33.2%) respondents said that the estimated weight of their waste container was 26-50 kilos, and the number of sack produced from one household per month was maximum 8 and minimum 1 sack.151(82.1 %) respondents mentioned that they used a household solid waste collection service to dispose the solid waste (17 (9.3%) by burning it, 12 (6.5%) by dumping on common dump sites (rode, streets and rivers valley) and 4 (2.2%) using the community waste bins, but 17.9 % of the respondents said they did not use the household solid waste collection service and 160 (87.0 %) respondents said that they paid for the service while 24 (13.0) did not pay for the service. 98(53.3 %)respondents said that they did not separate their wastes, 51 (27.7%) said that they sometimes separate their wastes and 35 (19.0 %) said that they did separate their wastes and they said that the waste given to the municipality through waste collectors was disposed in a place called Menber Tsehai around Azewa Gedel.

The result from FGD and interview revealed that the production of waste affected economic status and family size. The FGD participants mentioned that the main challenge in the current waste management work was that most people are still trapped in their dumping and unclean habits they have developed before the current household management system and the unsmooth interaction between waste collectors and community members and its effect on the waste collection process. The result from FGD and interview also revealed that the problems of the existing system in Dessie town was institutional and social factors such as transportation problem of the waste collected , low motivation and attrition of the waste collection workers, financial constraint, lack of awareness of the household heads towards household solid waste management , rules and regulations of the town, lack enforcement of rules and regulation, problems of sharing accountability and responsibility among town security , Kebeles , the municipality, community members and the household owners. It is concluded that, although there is a solid waste management system in Dessie town, there are gaps both on the system itself and its application by the community members. Thus the community has to be provided with adequate education and develop awareness on how to handle its solid wastes at home and about the consequences of disposing solid. The municipality should give adequate emphasis for solid waste management in general which requires policy priority and adequate budget allocation.

Key words: Household, Solid waste, Waste management, Waste production

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

The urbanization that has been taking place during the 20th century virtually transformed the world into communities of cities and towns facing several challenges on environmental issues (Smith, 2010). Among the environmental issues, the world is facing, solid waste management is the critical one because as long as humans have been living in settled communities, solid waste generation has been unavoidable and critical issue both in developed and developing nations (Use of Economic Instruments in Environmental Policy [UNEP], 1996). Solid waste has become the major consequence of development and modernization. Yet some of the greatest challenges to its management are mostly felt in the developing countries. This is part of the large paradox of development factors which create the most intransigent problems currently facing the developing countries (Thomas-Hope, 1998).

A definition of Solid Waste in this report is described according to (Martin, 2000) as materials generated from the result of human daily activities resulting from areas such as households, public places and city streets, shops, offices and hospitals. On the other hand Solid waste management is defined as the collection, transportation, processing, recycling, and disposal of solid waste materials so as to reduce their effect on health, environment and aesthetics. It is highly related with urbanization and industrialization (Solomon Cheru, 2011).

Beede and Bloom (1994) estimated the global solid waste generation rate at 1.3 billion ton per day; a recent research report from Dublin, Ireland, estimated the global total amount of solid waste generation was 1.84 billion tons, an increase of 7% than the previous figure. The problem is compounded as many nations continue to urbanize rapidly; 30-50% of populations in many developing countries is urban (Thomas-Hope, 1998).

A solid waste management is especially a difficult environmental challenge for African and developing countries like Ethiopia. According to United Nations Educational, Scientific and

Cultural Organization [UNESCO] (2009), the population growth and the rate of urbanization are alarmingly increasing throughout the African continent. But the technology, technical knowhow, financial capacity, culture and understanding of the community required to properly manage solid wastes are not adequately available. In many African countries the growth rate of urban areas exceeds 4% (Senkoro, 2003). In most African cities the situation of solid waste management is insignificant and inadequate that could associate with different factors (UNEP, 2004, 2005). Solid waste arising from human domestic and social activities is increasing in quantity and variety as a result of growing population (Dickerson, 1999 and Suess, 1995).

Although developing nations spend between 20 and 40% of municipal revenues on waste management, it is often unable to keep pace with the scope of the problem (Bartone, 2000; Schubeler, 1996; Thomas-Hope, 1998). In fact, when the governments of African countries were asked by the World Health Organization to prioritize their environmental health concerns, the results revealed that solid waste was the second most important problem (after water quality), since less than 30% of urban populations have access to proper and regular garbage removal (Senkoro, 2003).

In Ethiopia, like in other developing countries, the increase of solid waste generation has resulted from rapid urbanization and population booming. According to Dawit Walelign and Alebel Bayrau (2003), the amount of solid waste in fast growing towns of Ethiopia has been increasing over time, while possible disposal areas for solid waste are diminished. As a result cities and towns are facing the challenge of managing municipal waste. Solid waste collection system in many countries cannot cope with the increasing volume of solid waste. Collection service coverage of less than 70% is not uncommon in developing countries. These inadequate municipal solid waste management systems cause environmental and public health problems (Lemma Asfaw, 2007).

Ethiopia has a range of solid waste management problems, including inadequate waste collection, transportation systems and inadequate waste handling and improper final disposal resulting urban environmental pollution. These problems are being aggravated by the growing waste generation rates associated with population growth, change of composition of waste and economic condition of population (Degnet Abebaw 2008; Getahun Tadesse, 2011).

The current rate of solid waste generation in the city of Addis Ababa is 0.252 kg /cap /day (Sanitation, Beautification and Park Development Authority [SBPDA], 2003). According to this rate the total amount of solid waste generated in one year reached about 321,930 ton. While (Martin , 2004) stated that the generation of solid waste in most cities of the developing countries is not exactly studied but it is estimated to be between 0.4-0.6 kg /cap /day for developing countries.

The solid waste management in Dessie town is entirely carried out by the municipality which provided the full range of waste collection, transportation and disposal service. But, the provision of this service is not kept in pace with the town's solid waste generation rate. This is particularly true in the area of solid waste management at the household level (Solomon Cheru, 2011).

Dessie town is one of the Ethiopian towns that are characterized by rapid population growth and population density caused by natural increase and migration from rural area. Such rapid increase in population together with rapid development of the town has produced increasing volumes of solid waste which induced greater infrastructural demand, institutional setup and community participation for its management (Solomon Cheru, 2011).

According to Solomon Cheru (2011), the town households dominantly produced biodegradable solid wastes (75.6%) with generation rate of 0.231kg/person/day. Together with other four solid waste sources the total daily solid waste generation of the town is about 136.11(50360.7kg) but only 32 (23.51%) of this is collected and disposed to the town disposal site. Therefore, solid waste management of the town is found in a very low status and in a special coverage.

Solid waste management is highly affected by various socio economic aspects of the society such as knowledge and attitudes of the community. Recent developments and analysis do prove that any waste management system that does not consider the social aspect does not have a high chance of success. The community's participation in all stages of waste management, from informal status until the acceptance, including behavior upgrading, is as significant as the technical, economical and legal criteria (Loureiro, 2007 sited in Delia, 2009).

The need to manage the increasingly generated solid waste in a way that is environmentally effective, economically affordable and socially acceptable manner is a problem faced by all

nations in the world today (Zurbrugg, 2002). Therefore Solid waste management has been a big challenge to both the developed and developing countries all over the world. Effective solid waste management is an important component of public service provisions and need to be getting attention, but it is not adequately recognized in Dessie town.

Thus the objective of this study is to examine the socio economic factors that affect the household solid waste management and production system of the community in Dessie town. Investigating the community's attitude and knowledge towards solid waste management and production will bring a better understanding and solution to the problem.

1.2 Statement of the Problem

Many researchers at different times have reported that there are solid waste management (SWM) problems in Ethiopia. For instance Aklilu Abebaw (2002) has studied the issue of "willingness to pay for solid waste management service"; Lemma Asfaw (2007), Melaku (2008) and Abiyot (2014) on "generation rate of waste" and they gave special emphasis to determinants of recycling solid wastes. In addition other researchers such as Mengstu Abate & Solomon Cheru (2011) and Desalegn (2012) have also undertaken their study on Solid Waste Management particularly in Dessie town.

Solomon Cheru (2011) has conducted his study on the "assessment of municipal solid waste management service in Dessie town". His findings indicated that the lack of financial resources, institutional weakness, and improper selection of technology, transportation systems and disposal options are the factors for low performance of SWM in Dessie town. Moreover Mengistu Abate (2011) on his study findings indicated that SWM in Dessie town needs commitment from the municipality to impose heavy penalty on those who practice indiscriminate dumping. However the social aspect of waste management has obtained less or no research attention in Ethiopia particularly in the study area.

Prior to this study, preliminary observation had been undertaken in the town. For this reason, there were ample amount of rubbish loads scattered on the path; solid waste clogged the drains and stinks. Although SWM (waste collection, storage, recovery and recycling of waste as well as composting) system was proclaimed by Federal Government of Ethiopia (SWMP No.513, 2007

p.No.3524), the town was certainly generating an ever increasing volume of waste. Therefore Investigation of the socio economic factors is important to understand constraints of effective solid waste management in Dessie town from the social science perspectives. Thus this study will examine the socio economic factors affecting effective household solid waste management in Dessie town, Ethiopia.

1. 3 Objectives of the Study

1.3.1 General objective

The general objective of this study is to examine socio economic factors that affect household solid waste production and effective management System in Dessie town.

1.3.2 Specific objectives

- To identify the current status of household solid waste production practice in the town.
- To identify the current status of household solid waste management practice in the town.
- To examine awareness of the household heads towards household solid waste management.
- To investigate the attitude of the household heads towards household solid waste management.
- To examine the socio economic factors that affects the production of solid waste by households.
- To investigate the socio economic factors that affect effective household solid waste management.

1.4 Significance of the Study

Understanding the socio economic factors that affect the household solid waste production and Management system has a number of significances. Socio- economic input will seek to identify if there are areas of weakness in the ‘people’ dimension of planning. Recommendations to ensure

that policies and plans are in line with people's traditions, customs, beliefs and cultural values will be made. To make sure waste management Services are congruent with the life style of the community and to ensure acceptability of the services. The study will be important by serving as input for the improvement of the current household waste management practice. This study will lead to the development of strategies and recommendations at a district and municipal level. Moreover, it will create inspiration for further researchers on the area and the findings can be used as initial references.

1.5 Scope of the Study

The scope of this study is limited to Dessie town in south Wollo Zone, Amhara region in Ethiopia due to time and budget restraints. This study is also limited to year 2017/18. Therefore the findings of this particular study may not be representative of all other towns in Ethiopia or other countries.

CHAPTER TWO

1 LITERATURE REVIEW

2.1 The Concept of Solid Waste

Wastes arising from human and animal activities that are normally solid and are discarded as useless or unwanted are broadly defined as solid waste. It includes municipal garbage, industrial and commercial wastes, sewerage sludge, waste of agricultural and animal husbandry, demolition waste and mining residues (Tchobanglous, et al., 1993). Solid waste - can be defined as “any garbage, refuse, sludge, and other discarded solid materials resulting from industrial, commercial, agricultural operations, and community activities, but does not include dissolved materials” (Samuel Shimelis, 2006,P.5).

waste is any substance which constitutes scrap materials, an effluent or other unwanted surplus arising from application of any substances or article which requires to be disposed off which has broken, worn out, contaminated or otherwise spoiled (UK Environmental Protection, 1990).

Municipal solid waste (MSW) is also known garbage, trash or domestic waste that is related to the municipality. It is defined as “Any waste generated by households, commercial and institutional activities and is not hazardous. It refers to materials discarded in the urban areas for which municipalities are usually held responsible for collection, transport and final disposal. It encompasses household refuse, institutional wastes, street sweepings, commercial wastes, as well as construction and demolition debris”. (Abiyot Hailemeskel, 2014, p.9)

According to Jamal (2002) Solid Waste Management is defined as the control, generation, storage, collection, transfer and transport, processing and disposal of solid waste consistent with the best practices of public health, economics, and financial, engineering, administrative and legal environmental considerations. Solid waste management explained the various patterns of solid waste handling in terms of collection, transfer and disposal in developed and developing countries.(Mesfin Tesfaye, 2006) defines solid waste as material that been abandoned and discarded because it has no more use for the owner. This type of waste may be solid, semi-solid or liquid. It is made up of household refuse, institutional waste, constructional and demolished

debris, residential ashes, street cleaning, maintenance refuse, abandoned dead animals, and bulky waste (Techobanoslous et al., 1993; Eshuan, 2002; Mesfin Tesfay, 2006).

2.2 Solid Waste production and Effective Management Overview

Solid wastes have been defined by several authors as unused, unwanted, useless and discarded materials with insufficient liquid content to be free flowing produced through human activities. The process of making unwanted solid materials is called generating or producing solid waste. (United States Environmental Protection Agency, 1971; Rushbrook and Pugh, 1999; Ogwueleka, 2009; Oke et al., 2010).

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

Solid waste management is a challenge for the cities authorities in developing countries mainly due to the increasing generation of waste, the burden posed on the municipal budget as a result of the high costs associated to its management, the lack of understanding over a diversity of factors that affect the different stages of waste management such as the social, cultural economical, geographical etc. and linkages necessary to enable the entire handling system functioning (Deweese, 1998). Solid waste management may be defined as the discipline associated with control of generation, storage, collection, transfer and transport, processing and disposal of solid waste in a manner that is accord with the best principles of public health, economics, engineering, conservation, aesthetic and other environmental consideration and that is also responsive to public attitudes (Cunningham, 2006). In its scope, solid waste management includes all administrative, financial, legal, planning and engineering functions involved in solutions to all problems of solid wastes. The solutions may involve complex interdisciplinary relationships among such fields as political science, city and regional planning, geography,

economics, public health, sociology, demography, communication and conservation as well as engineering and material sciences (Cunningham, 2006 cited in Solomon Cheru p. 20).

The scope of solid waste management encompasses planning management systems, waste generation processes and organizations, procedures and facilities for waste handling. Developing strategies comprise specific objectives and measures in these areas. They need to consider the specific interests, roles and responsibilities and numerous factors including households; community based organizations and other service users, local and national government authorities and non – governmental organizations.

As a result, effective solid waste management depends upon an appropriate distribution of responsibilities between national, provincial and local governments (Schubeler, 1996). To keep the household and environment clean and to reduce health problems, solid waste should be disposed properly. Untreated waste degrades both the quality of the environment and the quality of life in the community and it also provides a breeding ground for disease causing vectors such as mosquitoes, flies and rats (Abdulwahid Idris, 2011). Solid waste generated by household may contain organic waste (for example from the kitchen and gardens), recyclable waste (for example, plastics, paper, cans, etc), non recyclable waste and household hazardous waste (for example, batteries, some oils, etc (UNEP, 2009).

2.3 Sources and Types of Solid Waste

In order to categorize what exactly municipal solid waste constitutes, there have been different attempts of categorization based on numerous classification criteria. Some of those criteria are source from which solid waste emanates, and nature of solid waste components. On the basis of the nature of items that constitute solid wastes, it can be classified into organic or inorganic, combustible or non-combustible, and putrescible or non-putrescible (Edelman, 1997 cited in Solomon Cheru, 2011).

According to (Martine, 2004, p. 13) the three general types of solid wastes are municipal waste, industrial waste and hazardous wastes. Industrial wastes: - are wastes arising from industrial activities. Industrial process wastes include a very wide range of materials and the actual composition of industrial wastes in a country will depend on the nature of the industrial base.

Composition of industrial waste depends on the kind of industries involved. Examples of the wastes which may be found under this category are general factory rubbish ashes, organic wastes from food processing, packaging materials, plastics, papers, acids, and alkalis, metallic sludge's, demolition and construction waste, hazardous waste and tarry residues.

Hazardous wastes: are wastes or combination of wastes which because of its quantity, concentration, or physical, chemical or pathogenic characteristics may: cause an increase in serious illness, morbidity and mortality.

Municipal Solid Wastes (MSW): urban solid waste Martine, (2004) also commonly referred as municipal refuse is defined as: material for which the primary generator or user abandoning the material within the urban area requires no compensation up on abandonment. With respect to source from which solid waste emanates,

Martine (2004) categorized municipal solid waste as household (residential) refuse, institutional wastes, street sweepings, commercial areas wastes, as well as construction and demolition debris. In developing countries, MSW (Municipal Solid Waste) also contains various amounts of industrial wastes from small scale industries. In these sources there are diverse types of solid wastes. In developing countries, MSW also contains various amounts of industrial wastes from small scale industries. In these sources there are diverse types of solid wastes. But, some of typical solid wastes of those sources are 11 described by (Dereje Tadesse, 2001: 36) as follows and urban solid waste materials discarded in urban areas and generally viewed as municipal responsibility includes:

Household wastes: is also referred to as residential refuse or domestic waste, this category comprises wastes that are the consequence of household activities. These include: food preparation, sweeping, cleaning, fuel burning and gardening wastes. It also include: old clothing, old furnishing, retired appliances, packaging and reading matter.

Commercial waste or refuse: This category consists of wastes from shops, offices, Hotels, stores offices, fuel service stations, warehouses, restaurants, etc and typically consisting packaging materials, office supplies and food wastes. In developing countries, markets may contribute the major portion of these waste categories refuse.

Institutional waste: waste from schools, hospitals, clinics, and government offices, police, barracks, religious buildings, military bases etc, and comprise hospital and clinical wastes including potentially infectious and hazardous materials. Where the institution involves residents, such as in camps, the wastes are similar to those from households.

Street sweepings: This type of waste always includes dust, dirt, litter, soil, paper, etc. However, in developing countries it may also contain appreciable amounts of household refuse, street sweeping also include fruit and vegetable residues, household wastes dumped along roads, drain cleanings, human fecal, animal manure and plant remains.

Construction and demolition wastes: its composition depends on type of construction materials used, but it typically includes soil, brick, stone, concrete, ceramic materials, wood, packaging materials and the like.

2.4 Solid Waste production and Effective Management in Ethiopia

Solid waste management is becoming a major public health and environmental concern in urban areas of Ethiopia. In Ethiopia, like developing countries, increase of solid waste generation is resulted from rapid urbanization and population booming and the average solid waste generation rate is about 0.221kg per person per day and it is also estimated that only 2% of the population received solid waste collection services (Zebenay Kassa ,2010 p. 18).

One of the poorest environmental performances in Ethiopia pertains to the management of all types of waste and the country lacks any disposal or destruction facility, sanitary landfills, and incineration. For instance, in Addis Ababa hazardous solid wastes totally untreated, may be put into the city's municipal dump when properly disposed of, or remain un dealt with in the general environment and the situation in Addis Ababa is now being repeated in the fast developing urban centers throughout the country (UNCED,2002). Similarly, the current condition of solid waste management service in different towns of Ethiopia has also become challenging.

According to Degnet Abebaw (2003) study of solid waste management practices of 15 regional towns of Ethiopia, a controlled solid waste disposal system was practiced in only two of them. In addition, a study conducted by Gebrie Kassa (2009) revealed solid wastes are left uncontrolled and disposed of anywhere without giving due attention regarding their consequences. This shows

that only a small proportion of the urban dwellers are served by waste management services and a large quantity of solid waste is left uncollected. The following table shows the percentages of Uncollected Solid Waste in Major Towns of Ethiopia in the year 2009.

Table:1 Percentage of Uncollected Solid Waste in Major Towns of Ethiopia in the year 2009

Town	Percentage of uncollected solid waste
Jijiga	82
Hawassa	75
Dessie	70
Dire Dawa	63
Jimma	63
Harar	53
Mekelle	52
Addis Ababa	32

Source: Solomon Cheru, 2011.p. 2.

In cities and towns of Ethiopia, domestic and industrial effluents are released into water ways with minimal or no treatment, threatening both human and animal health as well as aquatic life and the proportion of the urban population covered by sanitation service in the country is very small. For instance, more than 29% of the residents of Addis Ababa lack any kind of sanitary service, even the simplest latrine and this is the situation in all other urban areas in the country UNCED, (2002). A study conducted by (Hunachew Beyene, 2011), stated that, the growing concern of health and environmental risks in the landfill area are now becoming more serious as different incompatible land uses are surrounding the site and in countries like Ethiopia, where there is a general lack of awareness of the risk associated with long serving open solid waste sites.

Ranges of skills are required, in order to meet the demands of the rapidly evolving solid waste area and a better understanding of integrated waste management with a particular emphasis on the top level of the integrated waste management hierarchy and strategic thinking and planning, public involvement strategies improved group problem solving at all levels (Jejaw, 2008).

In Ethiopia management of waste is given a coverage in the environmental policy and the draft pollution control proclamation has articles expressed on the management of hazardous and all types of municipal waste but the major constraints in all waste management is the low priority

that urban administrations give to waste management services and no municipal waste disposal systems worthy of the name exist in the country (Schubeler, 1996).

2.5 Socio Economic Aspect of Solid Waste Production and management

The functioning of solid waste production and management systems is influenced by the waste handling patterns and underlying attitudes of the urban population, and these factors are, themselves, conditioned by the people's social and cultural context. Programs to disseminate knowledge and skills, or to improve behavior patterns and attitudes regarding waste management, must be based on sound understanding of the social and cultural characteristics (Schubeler, 1996).

However usually waste production and management is most often seen as a technical issue to be handled by engineers, as an administrative issue to be handled by regulators, or as a political-legal topic to be handled by policy-makers and law enforcement. But a key focus of social science research is the nature of modern industrial society, which includes an examination of patterns of production and consumption. What often goes unnoticed is the fact that all social and economic activities entail the production of waste that must somehow be disposed (Benjamin, 2007). Recent developments and analysis do prove that any waste management system that does not consider the social aspect does not have a high chance of success. In such cases the decision making process focuses upon technical characteristics, economical aspects and legal compliance (Delia, 2009).

Most African countries including Ethiopia are highly diversified ethnically and culturally. The fast growing low-income residential communities within these countries may comprise a considerable diversity of social and ethnic groups, and this social diversity strongly influences the capacity of communities to organize local waste production and management. At the same time, urban communities often preserve rural traditions of mutual self-help and cooperation, which significantly enhance the potential for community-based waste management. Therefore it important that people be involved from the outset in planning of local segments of waste management systems; to take in to consideration the socio cultural factors that reside within the communities (Schubeler, 1996).

2.5.1 Culture and waste production and management

Culture consists of particular knowledge, attitudes, values and beliefs shared by members of a community. These are highly valued and enable people to operate in a manner that is acceptable to the group.

Ethiopia, like many other countries, is a multicultural country. There are much cultural universality; that is shared meanings, beliefs and values and much cultural diversity, which is variability in meanings, beliefs and values that need consideration in planning and development of services. To ensure that services are accepted as culture congruent, plans must be directed at cultural preservation of what is good, cultural accommodation which implies negotiations to change only the detrimental practices and cultural re-planning or restructuring which implies a total change of a culture which is not conducive to physical and social health (Leininger, 1988).

2.5.2 Socio Economic Factors Influencing Solid-Waste Production and Management

Oftentimes when systems are breaking down and problems are escalating, people look to societal factors to fix the issue. This has often been the case when dealing with the mismanagement of solid waste in the developing world. Many researchers have argued that the waste problem is caused by human behavior and therefore the solution lies in changing that behavior (Milea, 2009). Socio cultural factors such as Public awareness and attitudes about waste can affect the whole SWMS (Zhu et al., 2008). How is waste defined in the developing world? Why has littering become such a prevalent behavior in these communities? What role do social norms, awareness and attitudes play in shaping these behaviors? And what measures must be taken to ensure that these behaviors change? These are questions that must be answered in order to come to realistic solutions to the problem of solid-waste management in developing countries.

2.6 The Attitude and Behavioral failure towards solid waste management

Waste can mean many things to different people in different cultures and communities (Moore, 2012). Some people such as the trash pickers of Ghana 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. The opposite is often true. However, recognizing trash as a problem does not prevent littering or other negative behaviors concerning waste management (Moore, 2012). This attitude-behavior 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/behavior 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 behaviors (O'Connell, 2011). Many researchers observed this gap first hand when conducting observations in communities of the developing world. where individuals who claimed they were concerned about the trash problem in their community, then proceeded to litter in the street later that day, not connecting their values with this action (O'Connell, 2011).

A negative behavior often associated with the mismanagement of solid waste in developing countries is the occurrence of littering. 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 behavior out of pure habit and custom. These factors are region and culture dependent, and it is very important to study them if an effective littering prevention program is to be designed (Al-Khatib et al., 2009).

To get a clearer understanding of the complexity of street litter problems, integration between socio-economic and environmental studies is essential (Al-Khatib et al., 2009). The participation

of the community in the production and use of scientific knowledge is considered the best approach to environmental management of waste. Many studies have been conducted in the developed world to evaluate and apply strategies to reduce littering by means of behavioral interventions (Al-Khatib et al., 2009), but in developing countries like Ethiopia very little has been done.

2.7 Lack of awareness in the community members about solid waste management

Another major constraint visible throughout the developing world is the lack of education and awareness of effective waste-management practices. One study in Gaborone, Botswana, found that even though citizens were aware of recycling and other sustainable waste-management techniques, this does not necessarily translate into participation in pro-environmental activities such as recycling initiatives. They appear to have not embraced waste management reforms amid their limited knowledge of such activities (Bolaane, 2006). The lack of interest in the environment creates a culture of non-participation of communities in decision-making processes. That stance enhances lack of responsibility for pollution and waste issues. Ultimately this produces communities that have little knowledge of, or concern for, their impact on the environment (Poswa, 2001). What it may come down to is the difference between information and knowledge. Being presented with the information without prior knowledge may be ineffective in creating change. However, if prior knowledge of waste management was met with new information, these communities may be more willing to accept it and implement these changes.

Typically, people are more likely to participate in waste management activities, for example recycling, when they observe others in their vicinity recycling. In developing countries including Ethiopia waste management programs are rare, so practicing citizens of the country rely on inappropriate waste managing activities and norm (O'Connell, 2011).(the tragedy of the common good)

The results of a study done in Malaysia by Aini and colleagues (2002) indicated that, in order to overcome the solid waste crisis, the “conscience of the individual needs to be raised through environmental awareness and concern, inculcation of sustainable consumption practices and education on waste management.” Environmental awareness and knowledge about

environmental conservation were found to affect recycling attitude positively but positive attitude may not have resulted in recycling if knowledge about it was poor (Aini et al., 2002), so waste managers need to take steps to help align the information presented to the public with the knowledge these individuals already have.

Another problem is that many people feel that they have no impact on the decision-making process, and as a result do not bother to register complaints with the authorities. This attitude differs among socio-economic groups. Wealthier socioeconomic groups are more likely to feel like they can make a difference when it comes to these environmental problems or become involved in doing something about them because they feel that they have the ability to make more impact in addressing and fixing the problem. Some researchers argue that people of lower socio-economic groups tend to have less regard for environmental issues on the basis that employment and housing are their main priorities (as cited in Périou, 2012).

Turning to more of a response side of this issue, there is often this \the lack of a sense of responsibility, which is manifested by the accumulation of huge amounts of litter in public places such as parks, highways and recreational facilities and in private areas such as business places. This can be explained as a function of ownership (Scarlett and Shaw, 1999).

From all these Waste generation is conditioned to a high degree by people's attitude, awareness economic and cultural conditions towards waste: their pattern of material use and waste handling, their interest in waste reduction and minimization, the degree to which they separate waste and the extent to which they refrain from indiscriminate dumping and littering (Schubeler, 1996).

2.8 Traditional habits on solid waste production and management

In accordance with behavioral theory, what people choose to do with their wastes should depend to a large extent on how they see those wastes. Management of solid waste disposal began as a public health function (Douglas, 1970). In urban cultures, it also serves the functional purpose of clearing accumulated wastes from streets and waterways so that the business of commerce and city life in general, can proceed. Essentially, two notions are spawned, that waste is "unclean", and that it has no function or is useless. The desire to get rid of wastes flows from these assigned

characteristics. He further described that the concept of something unclean, or "pollution", fundamentally connotes "something out of place". Simply put, pollution, regardless of its type, occurs when something is where it is not supposed to be, but something cannot be out of place without a pre-formed idea of where its proper place is. So the conception of waste as unclean is inherently associated with an organized cultural system of where things belong (Douglas, 1970).

Cultural systems are organized innately by a community to fit and support their beliefs and values (Keesing, 1971). When waste is viewed from the tendency of being useless or without value, something cannot be considered without value regardless of a pre-conceived idea of what is valuable. What waste includes can, therefore, be any number of various objects and ideas depending on the culture. For example, spitting on the ground is considered as dirty and out of place in some cultures, but not in others. So in the case of people who dump their wastes due to cultural reasons, the essential idea is that they do not conceive of wastes dumped openly on the ground to be out of place this is conception of how the world should be, and are considered appropriate (Douglas, 1970).

2.9 The Role of individual Community Members in Solid Waste Management

Community's social and cultural circumstances affect the Solid Waste Management system directly or indirectly. Community members and local leaders in urban communities play significant roles in solid waste management. These roles correspond to different levels of community culture of waste management and willingness to participate in the management process. Community members can participate in solid waste management by showing proper sanitation behavior, by contributions in cash, kind or labor, by participation in consultation and by participation in administration and management of solid waste services, (Anschutz, 1996).

To this end, community members may, take part in committees, become member of a CBO (Community Based Organization) involved in waste collection, environmental education, etc. Participate in decision-making during meetings, real community management, involving all three aspects of responsibility, authority and control is not very common in solid waste management. Using one criterion, control by a neighborhood committee, one can conclude that one third to half of the solid waste management projects studied are managed by the community. Only a

small segment of the community is really active in the management of a garbage collection scheme, a recycling centre or a composting plant (Douglass& Zoghlin 1994).

Proper sanitation behavior is behavior that facilitates solid waste management systems. It may include: adapt daily habits to agreed solid waste system (rules, schedules, e.g. to offer it at the right time and place to the collection team), bring garbage to communal collection point for transfer, store garbage in a plastic bag, a special bin etc, cooperate in clean-up campaigns, keep house and immediate environment clean (drains, streets in front of the house), separate waste in organic and non-organic, wet and dry, keep plastic, paper etc. apart, compost the organic fraction in own backyard .Some projects try to influence and change the sanitation behavior of households via education, awareness campaigns, etc. The effectiveness of these campaigns depends on how aware is the persons who carry out education and on the training about the cultural context of the community (Anschutz, 1996).

2.10 The Role of Local Leaders in Solid Waste Management

Local leaders can be divided into traditional, formal and informal leaders. Traditional leaders derive their authority from hereditary rights and from their status in the local culture. Formal leaders are appointed by the government or elected as local representatives of the government. Informal leaders are influential members of a community on the basis of their personal status or of their activities in community-based organizations such as political parties, churches, youth and women's organizations, neighborhood committees, etc. All three types of local leaders may have different roles in solid waste management. Usually formal and informal leaders are more involved in solid waste management than traditional leaders. Involvement in management of solid waste services includes participation in the management of solid waste services and keeping in contact both with the municipality and the community. Regarding contacts with the community, local leaders may: Carry out education and awareness raising control of behavior households (watchdog function), mobilize the community. A community-based organization may design and implement education campaigns, even if it is not directly involved in waste collection or treatment. Thus it can support collection services and change the behavior of households. It may also have a watchdog function, to control that the behavior of households

conforms to the agreed rules and schedules. Traditional leaders are often involved in the mobilization of the community for clean-up campaigns, (Hawkins, 1989).

From all these literatures we can see that the socio cultural issues such as the communities' attitude and awareness can be positively influenced through awareness building campaigns and educational measures on the negative impacts of inadequate waste collection with regard to public health and environmental conditions, and the value of effective disposal (Schubeler, 1996).

Yet despite the facts mentioned above the focus of research on socio cultural dimensions of effective waste management is at its minimum level when we see it in Ethiopia as well as in Dessie which is the target of this study to be contacted.

CHAPTER THREE

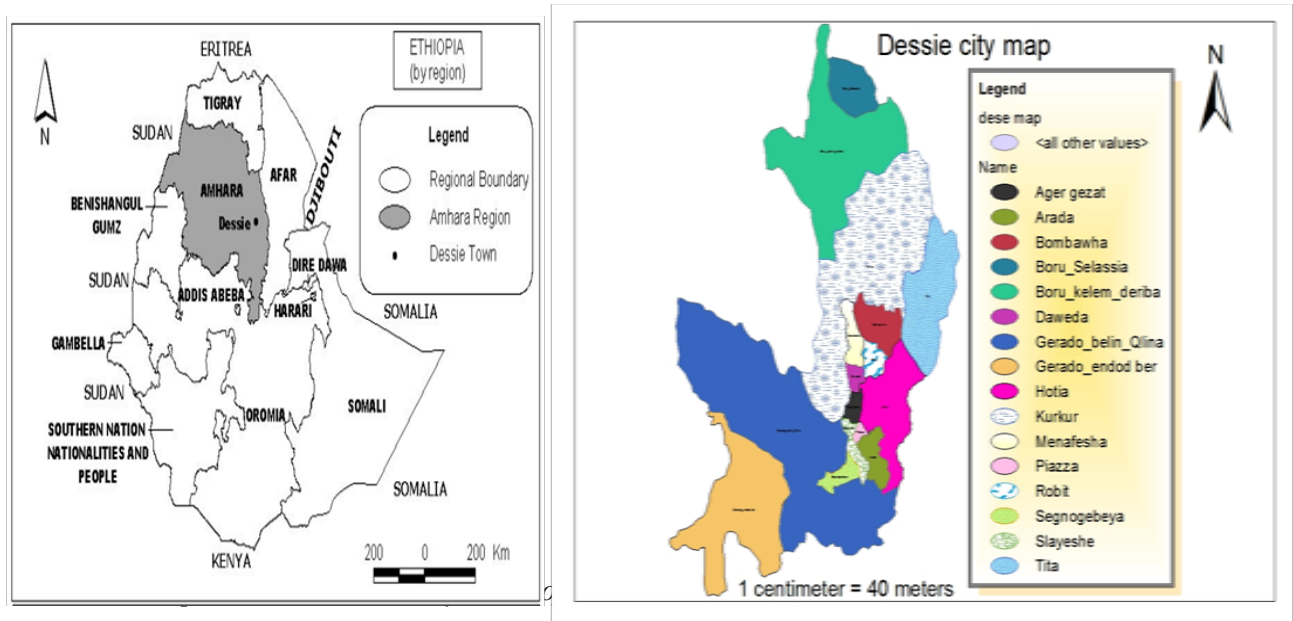
2 RESEARCH METHODS

3.1 The Study Area

3.1.1 Location, Topography and Climate

Dessie city is found in south Wollo zone, eastern margin of Amhara regional state and in north central part of Ethiopia at a road distance of 401km from Addis Ababa. Astronomically, the city lies on the intersection of 11°8'N 39°38'E. The average elevation of the city ranges from 2400 to 2800 meter above sea level. The city is bounded and squeezed by a series of ranges and escarpments with rugged surfaces between the cliffs of Tossa and Azewa, and Borkena River divides this basin in to two parts. Dessie falls within “Dega” agro climatic zone with an average monthly minimum and maximum temperature of 12.370c and 26.270c respectively. As a result, it has cooler temperature and higher precipitation. According to the metrological data record at kombolcha station (which is 10km air distance from Dessie). In Dessie there are two rainy seasons: spring (march-may) and summer (July-September), of which summer season has the highest rainfall. The average annual rainfall for the period between 1994 and 2001were calculated to be 1070mm (Solomon, 1993 cited in Sileshi, 2004).

Figure1: Location Map of the Dessie City



3.1.2 Historical background of Dessie town

Dessie town is one of the relatively older towns in Ethiopia. It came in to being in 1886 following Nigus Michael's selection as a seat of power. Several factors were responsible for the rise of Dessie as a political powerhouse of Nigus Michael. The first reason was Dessie is very strategically situated at the heart of Wollo. There was an economic factor which encouraged Nigus Michael to make Dessie as political center of Wollo.

Dessie was a well-placed site through which the flourishing Tigray-Shewa trade route passed. The availability of water, fire-wood and grain also contributed to selection of Dessie as Michael's seat of power. Thus, in 1886 Nigus Michael established his palace at "Ayteyyef"- a strategic site southeast of the town and became the nucleus of the town. The land between the present days Medhane Alem church through the left side of "Arada" up to "Silk Amba" was allotted to his guards and came to be known as "Zebegna Sefer". The next step taken by Nigus Michael was to distribute land to his chiefs and their retainers. However, the newly-founded town of Dessie showed no significance growth until the late 1890s.

The town was occupied by Italians 15th April, 1936. Dessie became an important administrative center under Italian occupation. In a decree of 1942, Dessie is listed as one of the six "Schedule A" municipalities in Ethiopia, while there were about a hundred in "Schedule B". It was an administrative, military, and commercial center. Dessie has an important marketplace dealing in animal skins and agricultural products. The local handicrafts industry is also a significant economic activity (web page accessed, October 15, 2010 cited in Solomon Cheru 2011).

The town continued in importance as the capital of the province of Wollo until the province's abolition in 1995. Following the severe civil war, in October 1990 Dessie was totally captured by Ethiopian people's revolutionary democratic front (EPRDF). Currently, the town serves as the capital city of South Wollo zone of Amhara Regional State (Draft Strategic plan of Dessie, 2009 cited in Abebe, 2010).

3.1.3 Demographic Characteristics

According to the 2007 national census Dessie town has a total population of 151,094 with growth rate of 3.38% /annum which is almost doubled number to the 1994 national census

report, which were 97,314 of whom 45,337 were males and 51,977 were females. The town has an estimated area of 15.08 square kilometers, which gives the town a density of 11,213.79 people per square kilometer. However according to a recent data from Dessie city administration communication office the current estimated population number registered were 203,095.

3.1.4 Settlement Pattern and Housing Condition

According to the information gained from municipality office, the total numbers of plots that have been distributed during the last five years for residential purpose were 2062 at an average rate of about 412 per year. However, the places which are favorable for urban development have already reached a saturation point during the past three decades (between 1964 and 1994). Consequently, in recent years the new settlement areas have been developed in different directions of the town. Development of settlements on steep gradients has already aggravated the problem of surface run off and thereby causing the concentration of landslides on the weakest part of an area (Samuel Sileshi, 2004).

3.2 Research Approach

There are two basic approaches of research, quantitative approach and qualitative approach. Quantitative approach involves the generation of data in quantitative form which can be subjected to rigorous quantitative analysis. This usually means survey research where a sample of population is studied to determine its characteristics (Kothari, 2004: p. 5).

Qualitative approach to research is concerned with subjective assessment of attitudes, opinions and behavior. Research in such a situation is a function of researcher's insights and impressions. Such an approach to research generates results either in non-quantitative form or in the form which are not subjected to rigorous quantitative analysis. Generally, the techniques of focus group interviews and depth interviews are used (Kothari, 2004: p. 5).

Triangulating both qualitative and quantitative approach (Mixed-method approach) is the most appropriate to reach at a level of truth that enables the researcher to come up with complementary and convergence of facts (Redinour & Newman, 2008). Thus, this study for the purpose of achieving the stated research objectives used both qualitative and quantitative research approaches.

3.3 Study Design

A cross-sectional descriptive design was employed to gather information about the current practice of solid waste management system. Data was collected at one point in time from a randomly selected sample from the population at that time (Yeraswork Admassie, 2010: 171). A descriptive design was used, because it is suitable for describing the existing situation, narrating facts and investigating phenomena in their natural setting (Koul, 1997). It describes what actually exists within a situation, such as current practices, situations of different aspects of the research. Since the present study is concerned with examining socio cultural factors that affect household solid waste production and management system in Dessie Town, the researcher assumes that the descriptive type of research is the most appropriate design.

3.4 Data Sources

Both primary and secondary sources of data were used to attain the objectives of this study.

3.4.1 Secondary Sources of Data

The secondary data are used which includes information that is obtained mainly from different reports, websites and literatures, which are relevant to the theme of the study which is socio cultural factors affecting solid waste production and effective management in Dessie town, Ethiopia.

3.4.2 Primary source of Data

The information gathered from the secondary sources is validated by the information from the primary sources. In this regard, a combination of both quantitative (survey) and qualitative (key-informant in-depth-interviews, focus group discussion (FGD) and observation) are employed to obtain firsthand information from selected respondents in Dessie town. Data was collected via structured questionnaire, in-depth interview, focus group discussion (FGD) and on-site observation.

3.5 Quantitative Data Collection

Survey research method was employed for collecting quantitative data, which is the major data collection method for collecting valid and reliable data, from a sample of respondent household heads.

3.5.1 Quantitative Sampling

Multistage cluster sampling is used to select sample residents for the purpose of achieving the stated objectives of the study; multistage cluster sampling is a sampling design that involves the initial sampling of groups of elements or clusters – followed by the selection of elements within each of the selected clusters. This sampling design is used when it is either impossible or impractical to compile an exhaustive list of elements comprising the target population (Yeraswork Admassie, 2010: 135).

From the five sub-cities found in Dessie, Hotie sub-city was randomly selected and the three kebeles found under this sub-city were all selected again and finally households are selected from the selected kebeles under the Hotie sub-city.

3.5.2 Population of the Study

According to Dessie City Communication Office (2014) Report, the total population of the city is 203,095. Out of these 40,088 people is living in the Hotie sub-city which includes three kebeles under it, namely the Arera, Dawdo and Robit kebeles.

3.5.3 Sampling Frame

The average house hold size of urban area in Amhara is estimated to be 4.3 (CSA, 2007). Dessie is one of the cities in the region; hence the household size can be calculated as total population of the three sub-cities divided by average family size. The population size of Arera, Dawdo and Robit, is 10457, 14569 and 15162 respectively with total 40,188. The average household of each sub-city is also 2432, 3388, 3526 respectively with total households of 9346. Therefore, the sampling frame for this study was 9346 households (Dessie City Administration Industry and Urban Development Office Report (DCAIUDO), 2015).

3.5.4 Sampling Unit

The sampling unit of this study is systematically selected households in three kebeles and purposively selected the solid waste collection workers and four municipality workers under the solid waste management division and the manager of the selected Hotei sub-city.

3.5.5 Sample Size

To make the sample representativeness and data quality, the researcher drowned reasonable number of representatives as a sample from the total population. The target population of this study as indicated above is the total households of the selected sub-city, Hotei sub-city, whose average household number is equal to 9346. To determine the sample size, the researcher used formula of Kothari (1995), Since the target population which is the household, is less than 10,000 then the sample size is determined as: $fn = \frac{n}{1 + \frac{n}{N}}$ Where n = sample size when the population is > 10,000; N= the population of the study; fn = is the sample size of the households. This will be done by using sample size determination formula adopted for our study as

$$n = \frac{(Z_{\alpha/2})^2 pq}{E^2} = (1.96^2) * \frac{0.5 * 0.5}{0.07^2} = 196$$

Where

Z = standard normal with a specified level of significance

α = level of significance

p = proportion of health workers who will be satisfied

q = proportion of health workers who will be dissatisfied = 1 – *p*

d = Acceptance error (absolutely error)

n_o = an unadjusted sample size

n = sample size need for the study

N = total number of population

The researcher used 95% level of confidence, the corresponding standard normal deviate is *Z* = 1.81 and the desired level of significance is 0.05. The reason why the researcher used the *Z* static 95% level of confidence is that, to save time during distribution and collection of the questioners.

The target population which is the household, is less than 10,000 then the sample size is determined as:
$$fn = \frac{n}{1 + \frac{n}{N}} = \frac{196}{1 + \frac{196}{9346}} = 191.974 \sim 192$$

3.5.5 Quantitative Instrument

To gather data related to the issue under this study from the sample participants was a structured questionnaire (See Annex: 1) that was translated in to Amharic. The questionnaire included only close ended questions for obtaining detailed information.

3.6 Qualitative data collection

Among the number of qualitative instruments key-informant in-depth-interview, focus group discussion and observation are employed for collecting data of this study.

3.6.1 Key Informant in-depth-interview

Key informant in-depth-interview was conducted with waste collecting workers in the area and key administrative staffs in the city administration/municipality that were selected purposively through a snow ball sampling. An interview guide (see Annex: 2) was used as a check list of the issues to be covered.

3.6.2 Observation

The observation method is the most commonly used technique in collecting primary data. The main advantage of this method is that subjective bias is eliminated and the information obtained under this method relates to what is currently happening; it is not complicated by either the past behavior or future intentions (Kothari, 2004). Thus it was employed to observe solid waste management practices at the household level in Dessie town. This technique was carried out personally through transect walk in the field area. The observation is intended to see the practice of waste management process.

3.6.3 Focus Group Discussion (FGD)

The focus group discussion was conducted for gathering information from the waste collection workers in the study area. Two focus group discussions, each containing 6 and 12 waste collection workers were conducted with purposively selected respondents through snow ball sampling.

3.6.4 Qualitative sampling

A snow ball sampling was adopted to purposively select the solid waste collection workers and four municipality workers under the solid waste management division and the manager of the selected Hotie sub-city.

3.7 Methodological Triangulation

As can be already anticipated from a look at the various methods of data collection which were employed in the research, the data collected for the study was analyzed quantitatively and qualitatively in combination so as to enhance the require and trustworthiness of the research. The study employed a methodological triangulation which can be briefly summarized in the form of the following table:

Table: 2 Methodological Triangulation

Specific Objectives	Unit of Analysis (Information on What/Study of What?)	Observation Unit/data source (information/data from whom?)	Method of Data collection and Analysis
To identify the current status of household solid waste production and management practice in the town.	The current practice of household solid waste management in Dessie town	Key informants in Woreda and Kebele offices, Garbage collection workers , Sampled household heads in the selected Kebeles	In-depth interview, Focus Group Discussion, Household survey, Observation
To examine the awareness of the members of community towards household solid waste management	Awareness of the members of community towards household solid waste management	Sample of household heads in the selected Kebeles, Key informants in Woreda and Kebele offices, Garbage collection workers	Household survey, Focus Group Discussion, In-depth interview
To investigate the attitude of the members of community towards	Attitude of the members of community towards	Sample of household heads in the selected Kebeles, Key	Household survey, Focus Group

household solid waste management	household solid waste management	informants in Woreda and Kebele offices, Garbage collection workers	Discussion, In-depth interview
To examine socio economic factors that affects the production of solid waste by households.	Socio economic factors that affects the production of solid waste	Sampled household heads in the selected Kebeles, Key informants in Woreda and Kebele offices, Garbage	Household survey, Focus Group Discussion, In-depth interview
To investigate the social factors that affect effective household solid waste management.	social factors that affect effective household solid waste management	Sample of household heads, Key informants in the Woreda, and Kebele offices, Garbage collection workers	Household survey, In-depth interview, Focus Group Discussion

3.8 Method of Data Analysis

The collected data was analyzed both quantitatively and qualitatively by using descriptive statistical techniques such as numbers, means and percentages and descriptive narration. A descriptive statistical technique was used for data collected through questionnaires, whereas descriptive narrations were used for data collected through interview and observation.

CHAPTER FOUR

4 RESULT AND DISCUSSION

4.1 Result of the Study

This part mainly deals with the analysis and result obtained from the sample survey (2018) through questionnaires and qualitative data drawn from key informants in-depth interview, focus group discussion (FGD) and field observation. A total of 192 questionnaires were distributed by the researcher herself and three other data collectors in person to the respondents. Among these 184 questionnaires were properly filled and returned, (96%) response rate, while 8 were not returned.

The in depth interview was held with four workers from Dessie town municipality officers in the solid waste management sector and with the manager of the selected Hotie sub city. The observation which was carried out personally by the researcher through transact walk and focus group discussion (FGD) was held in two groups with waste collection workers of the studied sites.

4.1.1 Socio Economic and Demographic Characteristics of the Sample Respondent Household Heads

Socio-economic and demographic characteristics is one of the main factor affecting solid waste Production and effective management. Description of the socio-demographic characteristics of the target population gives some basic information about sex, age, educational status, occupation, family size and income of the respondents.

Socio-demographic characteristic of a given population has its own implication and relation with solid waste production and effective management. Particularly, it has a direct implication to the quantity and composition of solid waste generation.

4.1.1.1 Sex of the Respondents

Among those sample respondents about 54 (29.3%) of them are female headed households while (70.7%) are male headed households.

Table: 3 Frequency distribution of Sex of the respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	130	70.7	70.7	70.7
	Female	54	29.3	29.3	100.0
	Total	184	100.0	100.0	

Source: Field Survey (2018)

4.1.12 Age of the Respondents

Out of the total respondents about 150 (81.5%) of sample respondents belong to adult age group (26-64) which is the biggest group followed by young about 18 (14-25) household heads which is (9.8%), and about 16 (8.7 %) of the sample households are headed by senior citizens whose age was above 64. This indicated that most of the respondents were found to be in the working age group.

Table: 4 Frequency distribution of age of household heads

Age of the household heads					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	14-25	18	9.8	9.8	9.8
	26-64	150	81.5	81.5	91.3
	above 64	16	8.7	8.7	100.0
	Total	184	100.0	100.0	

Source: Field Survey (2018)

4.1.1.3 Household Size of the Respondents

A little above half of the population about 119 (64.7 %) was found to have 4 - 6 members in the household. The second highest household size was 1-3 (24.5 %) members and the third was 7-9 (10.9 %). Generally one can conclude from this table that the majority of the sample households have four or more household members and the average family size of the respondents was 4-6 people.

Table: 5 Frequency Distribution of Household size of the Respondents

Number of people in the household					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1-3	45	24.5	24.5	24.5
	4-6	119	64.7	64.7	89.1
	7-9	20	10.9	10.9	100.0
	Total	184	100.0	100.0	

Source: Field Survey (2018)

4.1.1. 4 Educational Background of the Respondents

Table 6 shows the highest grades completed by the sample respondents from the field survey (2018). It revealed that those respondents who never crossed formal education and cannot read and write properly accounts about 6 (3.3 %) and about 5 of the respondent household heads (2.7 %) of the respondents have only the ability to read and write. Next, we have 14 (7.6 %) of the population that has completed primary school education while about 13 (7.1 %) completed grade 10 and 20 of them (10.9 %) has completed grade 12 secondary school education. Those respondent household heads that have a diploma level of education constitute about 38 (20.7 %). The data from the field survey shows us 96 (52.3 %) are under a first degree level. While the remaining 62 (33.7 %) had first degree and 23 (12.5 %) had second degree and above, finally only 3 (1.6 %) said other.

Table 6: Educational background of the respondents

Educational status of the H.H heads					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Illiterate	6	3.3	3.3	3.3
	Read and write	5	2.7	2.7	6.0
	Primary education	14	7.6	7.6	13.6
	completed grade 10	13	7.1	7.1	20.7
	completed grade 12	20	10.9	10.9	31.5
	Diploma	38	20.7	20.7	52.2
	First degree	62	33.7	33.7	85.9
	Masters (second degree)	23	12.5	12.5	98.4
	Other	3	1.6	1.6	100.0
Total		184	100.0	100.0	

Source: Field Survey (2018)

4.1.1. 5 Households Average Total Monthly Income

Income is another socio economic factor that tends to have an impact on municipal solid waste management. Information on the income of the household heads is always very difficult information to be obtained honestly due to different reasons such as low level of education which culminates fears of being taxed, inability to keep the record of their sales and the majority are not fixed and their income is not regular. However, by explaining the purpose of the research the researcher was able to come up with table 7 that shows the scale of income of the respondents according to their saying. Only 4 of the total respondents (2.2%) earned less than 1000 birr per month and (14.7 %) of them earned between 1001-2500 birr. About (17.4 %) and (22.3 %)

percents of the respondents earned (2501-4000 birr) and (4001-6000 birr) respectively, While, (26.1 %) of them were included under those who earned greater than 10000 birr. The remaining 2.6 percent belongs to those who cannot mention their monthly income (Refer Table 7).

Table 7: Average monthly income of the households

The Total income of the H.H in birr					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	below 1000	4	2.2	2.2	2.2
	1001-2500	27	14.7	14.7	16.8
	2501-4000	32	17.4	17.4	34.2
	4001-6000	41	22.3	22.3	56.5
	6001-10000	48	26.1	26.1	82.6
	above 10000	32	17.4	17.4	100.0
	Total	184	100.0	100.0	

Source: Field Survey (2018)

4.1.1. 6 Household occupational status

The sample household respondents have different occupations. These include trading, farmers, civil servants, daily laborers and others. As indicated under table 8, out of the total 184 sample households there were no respondents that were farmers. 26 (14.1%) were traders, 110 (59.8) were civil servants or government employers and constitute the highest percent of sample respondents. Finally, daily laborers constitute 6 (3.3 %) of the sample respondents. The remaining 42 (22.8 %) percent of the respondents were engaged in other different occupational activities.

Table 8: Household occupational statuses

Type of occupation of the H.H heads					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Trade	26	14.1	14.1	14.1
	Civil servant	110	59.8	59.8	73.9
	Day laborer	6	3.3	3.3	77.2
	Other	42	22.8	22.8	100.0
	Total	184	100.0	100.0	

Source: Field Survey (2018)

4.1.1. 7 House type and ownership type of the households

The type of houses from the sample 184 houses about 146 (79.3%) were compound houses and about 38 were condominium houses. In addition from the 184 households heads 105 (57.1%)

were owners of the house they were currently living in and 64 (34.8 %) were renting the house and the remaining 15 (8.2 %) were a government owned (kebele) houses.

Table 9: House types and household ownership status

The type of the house the H.H lives in					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Compound	146	79.3	79.3	79.3
	Condominium	38	20.7	20.7	100.0
	Total	184	100.0	100.0	
The house ownership types of the H.H heads					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Owner	105	57.1	57.1	57.1
	Rental	64	34.8	34.8	91.8
	Government	15	8.2	8.2	100.0
	Total	184	100.0	100.0	

Source: Field Survey (2018)

4. 1. 2 Current Solid Waste Management Practice in Dessie Town: Storage Collection, Transportation, Separation, and Disposal Systems

The following are generally the overall process of the current (20/17-18) practices of household solid waste production and management in Dessie town.

4.1. 2.1. Household Solid Waste Storage

The household is responsible for storing the daily wastes produced inside their compound since there are almost non transfer stations. In Dessie town, 171 (92.9 %) of the sample respondents said there were no common waste bin containers in their neighborhood while 13 (7.1%) said there was a common waste bin container in their neighborhood.

Table 10: Availability of waste bin container in the area

Availability of waste bin container in the area					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	13	7.1	7.1	7.1
	No	171	92.9	92.9	100.0
	Total	184	100.0	100.0	

Source: Field Survey (2018)

The municipality workers interviewed also mentioned that the waste bins were almost all removed because they were believed to be causing stink and health hazards for the community. According to one of the interviewed key informant respondents, Ato Birhan Tsegaye, (the team

leader of Dessie - Towns Sanitation and Beautification Authority in the municipality), the community waste bins were avoided for the sake of some community members such as street children and mentally-ill people for feeding from it. Therefore the solid waste generated by the household was stored inside the compound, around the house or dumped on plain sights until the collection service workers from the municipality came to take it.

The solid waste generated by the household was being stored in different types of temporary containers such as plastic bags, sacks, basket and others. In the filled survey (2018) respondent households were asked what type of temporary storage waste container they use and the predominantly used containers were sacks, followed by baskets and plastics 167 (90.8%), 8 (4.3 %) and 7(3.8 %) respectively and the remaining 2 (1.1%) said they used a can container.

Table 11: Frequency Distribution of the Type of Waste Container

Type of waste container					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Plastic	7	3.8	3.8	3.8
	Basket	8	4.3	4.3	8.2
	Sack	167	90.8	90.8	98.9
	Container of can	2	1.1	1.1	100.0
	Total	184	100.0	100.0	

Source: Field Survey (2018)

According to the field Survey, 77 (41.8 %) respondent said they put their waste in a closed container, while 107 (58.2%) said they use an open container for the waste produced by their household.

Table 13: Waste container closed or not

Waste container closed or not					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Closed container	77	41.8	41.8	41.8
	Open container	107	58.2	58.2	100.0
	Total	184	100.0	100.0	

Source: Field Survey (2018)

4.1. 2.2 Household Solid Waste Collection

In the study area, solid waste collection was handled differently by different households. However, the data gathered from the FGD, field observation and filled survey (2018) indicated that the collection system was predominantly covered by the municipality household solid waste collection service, which is currently available in almost all kebeles in Dessie town.

According to the filled survey, 151(82.1 %) of the respondent households mentioned that they used a household solid waste collection service to dispose the solid waste produced by their house hold, 17 (9.3%) said they disposed the solid waste produced by burning it, 12 (6.5%) said they disposed the solid waste produced by dumping on common dump sites (rode, streets and rivers valley) and only 4 (2.2%) said they disposed by using the community waste bins. The survey data showed 160 (87.0 %) paid for the service while 24 (13.0) did not pay for the service.

Table 14: Frequency distribution for way of disposing solid wastes

Way of Disposing Solid Wastes					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Using community waste bins	4	2.2	2.2	9.2
	On common dump sites	12	6.5	6.5	15.8
	community waste collectors	151	82.1	82.1	97.8
	By burning it	17	9.2	9.2	100.0
	Total	184	100.0	100.0	

Source: Field Survey (2018)

Table 15: Frequency distribution for Payment for waste service

Payment for waste service					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	160	87.0	87.0	87.0
	No	24	13.0	13.0	100.0
	Total	184	100.0	100.0	

Source: Field Survey (2018)

The common known price for the waste collection service is 12 birr per a household which is paid with the water bill. However, some respondents mentioned they paid more. In the filled survey (2018), 119(64.7%) of the respondents mentioned they paid 12 birr for the service of waste collection while the remaining paid more (see table 18 below) and 24 (13%) said they do not pay for the service at all. The difference on the amount of money paid for the service was explained by the municipality workers interviewed. They explained that although the common

amount of money for the collection service per a household was 12 birr, if the household owners have occupants living with them, the tenants had to pay for the waste produced by their household through the extra bill prepared by the Dessie municipality.

Table 16: Frequency distribution on Amount of money paid for waste collection service

Amount of money paid for service					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	12 birr	119	64.7	74.4	74.4
	13-15 birr	12	6.5	7.5	81.9
	20-25 birr	19	10.3	11.9	93.8
	above 25 birr	10	5.4	6.3	100.0
	Total	160	87.0	100.0	
Missing	System	24	13.0		
Total		184	100.0		

Source: Field Survey (2018)

The collection service was said to be held twice a week according to the key informant municipality workers, but it was said to be collected every two weeks according to the waste collection workers in the FGD. The waste collection workers mentioned that although they were working three days a week, it is only once in two weeks they could address every household. The data from the survey (2018) showed that the respondent household heads had a different service access but more than half of the respondents 97 (52.7%) said their waste was collected every 15 days while the remaining respondents mentioned different days (see Table 19).

Table 17: frequency of waste collection service

frequency of waste collection service					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	once a week	16	8.7	8.7	8.7
	twice a week	29	15.8	15.8	77.2
	every two weeks	97	52.7	52.7	61.4
	once a month	35	19.0	19.0	96.2
	Other	7	3.8	3.8	100.0
	Total	184	100.0	100.0	

Source survey 2018

Figure 2: waste transition sites on the road



4.1.2.3 Household Solid Waste Transportation and Disposal

Based on the field observation by the researcher, the key informants and the FGD, the household solid waste transportation process in Dessie town took place as follow: the solid waste collected from every house would be put on the side of the road by the waste collection workers about every hundred meters to be picked up by waste collection trucks. Then, when the trucks came, the collection workers would load the sacks filled with waste and take it to dump site.

However, the waste is sometimes left on the road until late in the afternoon or even for a week or so until the next round of waste collection. This caused a stink and animals such as dogs, cats, donkeys and scavengers would spread it on the road seeking to feed from it which is both

unhealthy and unpleasant to see. According to the interviews and the FGD data, the waste was not collected on time because of two main reasons. First, the collecting truck (tractors) were not ready or available to pick up the waste on time because they were small in number and they got broken all the time and second the places where the waste collectors put the waste sacks were already known by the community members and, therefore, even after the truck picked up the waste and left, some people would bring and leave their waste on the same place so that it would be taken on next round.

Figure 3: waste collection and transportation practice



Once picked from all over the places, the waste would be directly driven to the dump site used by the Dessie municipality. The part of the waste collected by the municipality through waste collectors was disposed in a place called **Menber Tsehai**. The place, Menber Tsehai, is located on the exit road to Addis Ababa about 12 kilometers from the center of Dessie town. The Menber Tsehai waste disposal area is not a modern waste disposal place. Rather; it is a cliff with a water body, (Borkrna River), under it.

According to the observation made by the researcher, on the dump site, the waste burnt continually and a lot of smoke came out of it. One could see the smoke even from a far distance. This polluted the residential area around it. According to the interview with municipality workers from solid waste management sector, the waste dumped produced a methane gas which makes the waste burnt continuously on the dump site. However, the people living around the dump site highly disagreed with this statement from the municipality workers. Some residents who lived around the area mentioned that it was people who purposely burnt the waste dumped on the site by bringing matches and even kerosene in order to find the metal materials and sell it. One middle-age man from the villagers said,

“There is no gas ... the municipality knows nothing ... it did not burn like this before, it's the children collecting metals and nails to sell, they purposely bring matches and kerosene and set the waste on fire, that is how they make a living.”

Figure 4: The Menber Tsehai waste dumping sight



Figure 5: The Menber Tsehai waste dumping sight



Source: taken during observation

4.1.2.4 Separation and Recovery

Separation and recovery took place at different places and stages in Dessie town. Waste was separated at the household stage, and then waste was separated again to some extent by waste collection workers and waste loaders. Waste was separated by people at the dump site by poor children to find something to be sold and waste separation was also done by youth cooperative team organized by the municipality to make compost as well.

According to the survey data 98(53.3 %) house hold respondents said they did not separate their wastes, 51 (27.7%) said they sometimes separated their wastes and 35 (19.0 %) said they did separate their wastes.

Table 18: Frequency distribution of Separation

		Separation			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	35	19.0	19.0	19.0
	No	98	53.3	53.3	72.3
	Sometimes	51	27.7	27.7	100.0
	Total	184	100.0	100.0	

Source: Field Survey (2018)

Figure:6 a place where separated waste items are bought and sold



Source: taken during observation

The separation practice went as follow. First, the household members, mostly children, separated their wastes by selling the valuable ones such as tins, cans, and some kind of plastics to 'Qorale/ Arogie Chama'(people who buy recyclable materials door to door). Paper was also sold to local shops and things left from being sold were burned and some of the wastes produced were reused (see tables: below). However this does not count as full separation because most of the waste produced, both decay able and none decay able, was put in the waste container. (See the table below).

Table 19: Type of waste handling methods

Food wastes				
Valid	Frequency	Percent	Valid Percent	Cumulative Percent
Sold	1	.5	.5	.5
Burned	1	.5	.5	1.1
To waste bin	161	87.5	87.5	88.6
Reused	21	11.4	11.4	100.0
Glasses				
	Frequency	Percent	Valid Percent	Cumulative Percent
Sold	8	4.3	4.3	4.3
Burned	4	2.2	2.2	6.5
To waste bin	164	89.1	89.1	95.7
Reused	8	4.3	4.3	100.0
Total	184	100.0	100.0	
Papers				
	Frequency	Percent	Valid Percent	Cumulative Percent
Sold	21	11.4	11.4	11.4
Burned	101	54.9	54.9	66.3
To waste bin	55	29.9	29.9	96.2
Reused	7	3.8	3.8	100.0
Tins and cans				
	Frequency	Percent	Valid Percent	Cumulative Percent
Sold	117	63.6	63.6	63.6
Burned	4	2.2	2.2	65.8
To waste bin	35	19.0	19.0	84.8
Reused	28	15.2	15.2	100.0
Plastics				
	Frequency	Percent	Valid Percent	Cumulative Percent
Sold	29	15.8	15.8	15.8
Burned	31	16.8	16.8	32.6
To waste bin	101	54.9	54.9	87.5
Reused	23	12.5	12.5	100.0

Source: Field Survey (2018)

4.3 The Socio Economic Factors that Affect the Household Solid Waste Production

Socio-economic factors such as family size, amount of income and traditional societal practices has a lot of effect on solid waste production. Socio-economic factors of a given population have their own influence on solid waste production especially on the quantity and composition of solid waste.

4.1. 3 .1 Household Solid Waste Production

The respondent households were asked to put the estimated kilo of their temporary storage waste container in range. Accordingly 54(29.3%) said their waste container had the weight of bellow

15 kilos, 54 (29.3%) said 16-25 kilos, 61 (33.2%) said 26-50 kilos, 9(4.9%) said above 50 kilo, 6 (3.3%) said they did not know how much their waste container weigh (see table 19 below).

Table 20: The size of waste container

The size of waste container					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	below 15 kilos	54	29.3	29.3	29.3
	16-25 kilos	54	29.3	29.3	58.7
	26-50	61	33.2	33.2	91.8
	above 50 kilo	9	4.9	4.9	96.7
	Do not know	6	3.3	3.3	100.0
	Total	184	100.0	100.0	

The maximum number of sacks (kesha or joniya) produced from one household per month was eight and the minimum was one. Therefore an average, $2.4706 \approx 2.5$ sacks (container) of solid waste, was produced per a household.

Table 21: No of waste containers per month

Statistics		
No of waste containers per month		
N	Valid	184
	Missing	0
Mean		2.4706
Minimum		1.00
Maximum		8.00

The data gathered from the field observation and FGD conducted with waste collection workers in the study area showed that, although there were all kinds of wastes generated from different households, the commonly and highly produced wastes were food wastes and ashes. Food waste was said to be the major kind of waste produced by households followed by ash and plastic waste. There are also wastes such as papers and cartons, diapers, glasses and tins and cans. They mentioned that food wastes such as vegetable wastes like onion, tomato, potato and also already prepared food wastes like sauce, injera and cooked food like rice were put inside the waste containers. This made food wastes the main component of waste produced by households. The collection workers also mentioned that the food waste made the job difficult, since it is wet and stinky. They said it's really heavy to carry and stinky. One of the FGD participants put it like this:

“Of all the wastes, the food waste is the most disgusting. They put everything in the sack either it’s a sauce (wot in Amharic) rice or anything which makes it really stinky... the smell that we are fine with... **”we like the smell”**... (she sarcastically smiled while the rest of the participants murmured and laughed at her)hmmm...well it’s our way of life... we have no choice... but it is wet, the sack will leak and the dirt bathe all over our shoes and clothes which is the worst part.”

The filled survey had also a complementary data with this; it shows that from the sample respondents 86 (46.7%) mentioned food wastes as the most difficult wastes to manage. The survey data also shows that 161(87.5%) of the sample respondents put their food wastes in the sack (container) while 21(11.4%) said they reuse it by giving it to animals such as (Dogs, cattle and chickens) in the house or in the neighboring houses.

Table 22: frequency distribution of wastes that is difficult to manage

wastes difficult to manage					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Papers and cartoons	7	3.8	3.8	3.8
	Plastics	36	19.6	19.6	23.4
	Food wastes	86	46.7	46.7	70.1
	Bottles or glasses	38	20.7	20.7	90.8
	Tins and cans	8	4.3	4.3	95.1
	Other	9	4.9	4.9	100.0
	Total	184	100.0	100.0	

Table 23: Frequency distribution of food waste management

Food wastes					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Sold	1	.5	.5	.5
	Burned	1	.5	.5	1.1
	To waste bin	161	87.5	87.5	88.6
	Reused	21	11.4	11.4	100.0
	Total	184	100.0	100.0	

Source: Field Survey (2018)

The FGD participants had also mentioned the amount of waste produced differs seasonally. They said the waste produced in summer was much heavier than it was in the winter season because the rain that fell on the waste sack made it wet and also the service was slower in the summer since the rainy season is not suitable to drive the collecting cars.

According to the FGD held with waste collection workers in the study area, there were variations in the amount of waste produced by different households. They mentioned that some people did not even produce one sack a month, and others especially those who were rich produced more waste. They also mentioned the amount of waste produced by households in rich neighborhoods was much higher than produced by poor neighborhoods. One of the FGD participants said, *“Waste taken out of the big rich houses... (tilik gibi betoch) is a lot, sometimes five up to six sacks(containers) Well it’s their living standards.”*

The FGD participants also mentioned the type and amount of waste coming from condominium housings were different from the compound houses since there are no backyards and other option of dumping waste in condominium houses. The residents in the condominium put every type of wastes in the same container. One elderly waste collection worker woman said in the middle of the discussion: *“The waste from the big building is really nasty and a lot. They put everything there in the sack. It is wet, heavy and stinky.”* (The others told me she meant from the condominium buildings.)

4.1.3.2 The Food Culture and Waste Production

The eating habit of most Ethiopians especially in Amhara region is injera, meat and vegetables which implied the kind of waste they produce. According to the data gathered from observation, FGD and field survey, the waste produced by households in Dessie town was a mixture of peals of different vegetables and seasonal fruits. In addition, due to the lack of modern abattoirs people butcher livestock in their houses. This produced a lot of wastes like bones, unwanted meat remains like fats, intestines, etc, which would be mixed with other kinds of wastes in the same waste container or dumped in plain sight. This kind of waste production and disposal made the waste management work such as collection, separation and recycling very difficult.

4.1.3.4 Consumption and waste production

The largest amount of waste produced was food waste as we had seen above from the survey data (See table 21 above). Income status and consumption had an impact on waste production according to the survey and interview data. The fact that people usually used unpacked food from local markets instead of supermarkets, their eating habits had its own implication on the

amount and type of waste produced by households. The FGD participants said that the common wastes were unpacked food wastes usually vegetable wastes and 'wot in Amharic' (sauce). They mentioned that plastic food packs and canned food items were not commonly found in the wastes they collected. Instead local food items and ashes filled the waste containers. The FGD participants also implied that the amount of waste and its type differed between rich and poor household (They judged this depending on the housing type). They said in big compound houses there was a higher amount of wastes produced, sometimes up to 8 sacks every month, but in small, poor households they said it was sometimes not more than half a sack of waste was produced per month.

The FGD participants also said something on relationship between household size and amount of waste produced. One of the respondents argued that people who lived alone did not produce much waste; they usually produced one or half sack of waste per month.

4.1.3.5 The Socio Economic Factors that Affect Effective Household Solid Waste Management

Generally the data from the survey showed that the most difficult proper waste management challenge was irregular waste collection service, 114 (62.0 %). The second was said to be just bad habit by community members which was 43 (23.4%) and unavailability of waste collection service and affordable collection price were also mentioned as a challenge 14 (7.6) and 13 (7.1 %) respectively. (see the table below).

Table 24: Most difficult proper waste management challenge

Most difficult proper waste management challenge				
		Frequency	Percent	Valid Percent
Valid	Irregular waste collection service	114	62.0	62.0
	There is no service of waste collection	14	7.6	7.6
	The collection price is not affordable	13	7.1	7.1
	It's just bad habit	43	23.4	23.4
	Total	184	100.0	100.0

These data was confirmed by FGD and interview data as well, the following is a detail explanation on the socio economic factors that affect effective household solid waste management.

4.1.4.1 Traditional ways of Solid Waste Management

Waste has been generated in every society since long ago. The key informants said that in Dessie town there had been different ways to deal with the wastes produced before the municipality organized the collection workers and house to house collection system. The community members had had their own traditional ways of waste management. The traditional waste management trend that had been practiced in Dessie town by the community members before the municipality took the responsibility had been different at different times. For example, people used to burn, bury, dump in rivers and gorges, etc.

The municipality used community waste bins as a household waste management approach right before the current system. Community waste bins or common waste dumping garbage bins are now almost completely removed by the Dessie municipality from the places they had been located. Because said the municipality team leader person in the solid waste management section, the community waste bins had been figured out in time to be a cause of health hazards. He mentioned that community members such as children playing around the waste bins, people leaving nearby the waste bins, since the waste bins were located inside residential areas, and also mad (mentally disturbed person) people and street children that had been feeding from dumped food wastes were being exposed to different diseases. During the existence of the community waste bins, people had to bring the produced wastes to the waste bin themselves whenever they wanted to and dumped it inside or around the waste bins. He said the community waste bins were contaminated and used to stink and the FGD participants also said it was the right move to remove the community waste bins because it had been a cause for disease.

According to the FGD, Dessie town had been using the traditional waste management mechanisms for long period of time especially for the household wastes produced from each household. The traditional waste management trend was to mean trends such as dumping on plain sites and on backyards, on streets, valleys and rivers especially the Borekena river found in Dessie town which was equally crossing the town from its beginning to its end. The Borekena River had been the main place of dumping wastes produced especially by households since it is near to most households. The FGD participants also mentioned in the discussion that the main challenge in the current waste management work was that people are not changed and most

people are still trapped in the traditional dumping and unclean habits they have developed before the current household management system. One of the respondents argued

“Even now that we are taking the waste out of their houses if we miss one week they would take out the trash and throw it on the street because it’s how they have always done it and all they care is that it’s out of their own house.”

The other methods used by the community members to remove wastes produced besides dumping was by burning the waste inside or outside their compound. Burning is still practiced as an alternative means of waste management method by some households. The FGD participants and one of the interviewed respondents from municipality office mentioned burning as waste management method still practiced by community members because there were some sites (rural kebeles) that were still not covered by the waste collection service due to topographic restraints. The unreached mostly rural kebeles found around Dessie, the interviewed municipality worker did not mention them by name, were using waste pit holes excavated for the purpose of burning wastes in them.

4.1.4.2 The interaction between waste collectors and community members and its effect on the waste collection process

According to the survey data (2018), the survey respondents had different attitudes towards the waste collection workers. The majority of respondents 91(49.5%) said that the collectors were normal and they fairly performed their work task. However 53(28.8%) believed that the waste collection workers had a difficult and disrespectful attitude and the rest 37 (20.1%) said they have a very respectful behavior while working on collecting the waste.

Table 25: Attitude of the waste collection teams to their costumers

Attitude of the waste collection teams to their costumers				
		Frequency	Percent	Valid Percent
Valid	Respectful	37	20.1	20.4
	Fair	91	49.5	50.3
	Disrespectful	53	28.8	29.3
	Total	181	98.4	100.0
Missing	System	3	1.6	
Total		184	100.0	

Source: filed survey (2028)

On the other hand the FGD participants (the waste collection workers) said that there were different responses from the community members. One of the respondents said that "Some of the people are good people and others are cruel". When I asked what she meant by good people and cruel people she explained that among the community members some household members did not give them due respect while they were working; they would rather insult them or refuse to cooperate.

The waste collection workers said that especially recently there was a system created by the municipality that requires tenants to pay independently for the waste they produce. This started because the salary (780 birr per month) the municipality paid to the waste collection workers was not enough. The municipality created a system for house renting residents to pay their share with a receipt collected by the collection workers. They explained this had been a source of conflict between the waste collection workers and the household heads. One of the waste collection workers said,

"When we get in to the compounds to collect the extra payment with the receipt, some people are willing and happy to pay... Some even say that 'it is appropriate, you guys are suffering a lot' and they respectfully pay and we provide the service happily and some others who are not willing to pay insult and disrespect us and send us out of their houses so we won't be able to do our job."

They also mentioned that everybody wanted the service; it was not the service that they had a problem with but when they were asked to pay money for the service they got then conflict began. They said that almost all customers were grateful for the service. Most people were willing to give away their waste; they are happy that their waste was being taken care of but some were not willing to pay the appropriate amount of money.

The FGD participants from both groups mentioned that the attitude of the people towards them was different from one person to the other. Particularly, since the receipt payment for the house renters came, people's attitude became negative. Another waste collection worker said, *"They say to us you are coming inside the house to count our rooms and to see if there is a rented-in house and they don't want to expose their renters to pay the extra birr... they are very protective of their house renters."*

4.1.4.3 Institutional problems of MSWM in Dessie, Transportation problem and financial constraint

Among the five municipality workers interviewed in the solid waste management section, three of the interviewees and the FGD participants mentioned the transportation problem on the solid waste management process. They explained that the cars used for collecting solid waste were tractors which were not suitable for the topography of Dessie town because the topography of the town is mountainous. The cars were also few in numbers, only 13. Among these only few were working because most of the tractors were broken and it was difficult to get the cars fixed on time since the spare parts were not available in Dessie but only in Adama.

Financial constraints were the other big problem facing the waste collection and management work in Dessie town. The municipality worker respondents interviewed mentioned that the municipality had financial restraints in waste management work as the number and type of cars bought and repairmen budget was limited which caused a delay in collection.

4.1.4.4 Challenges of the waste collection workers

The waste collection workers were organized by the Dessie municipality, small enterprise sector and the kebele in collaboration two years and eight months before this study. Most of the collection workers were daily laborers before they became waste collection workers. There were about 500 waste collection workers in the five sub-Cities, about 50 waste collection workers for each kebele. When they started, they used to work three times a week, Mondays, Wednesdays and Fridays, but now they worked twice a week because of facility shortages such as waste collection trucks. Even though the waste collectors worked twice a week, each household got the service once in every two weeks because of the workload.

The waste collection work in the town rested highly on the shoulder of these waste collection workers. The waste collection work would begin very early in the morning at 6:00 o'clock and would usually continue until 1:00 o'clock in the afternoon. Since there were no waste transition sites or community waste bins, the waste collectors had to knock on every door to take away the waste from the houses. The collectors would give the household owners empty waste container sacks and carry the sacks filled with waste on their back to take it up to the main roads where the

collection car would be able to pick it up. The waste collectors mentioned they had a lot of difficulties on the process of getting the waste collected from each house to the main roads for the cars to pick it up. Due to the topography of Dessie, many houses are found on cliffy places where cars are unable to get to.

One of the FGD participants said, *“Since the car can’t come to the houses to pick up the waste, we have to carry the waste on our back, even if it is from Tossa (Tossa is a big mountain found in Dessie town), up to the road.”*

Figure7: waste collectors working door to door collection



4.1.4.5 Low motivation and Attrition of the waste collection workers

The participants in FGD said that the salary they got for the waste collection work was low, which is 26 birr per day. They mentioned that even though the municipality office that organized and hired them kept promising that it would make salary increment, they didn’t get any salary increment. One of the FGD participants even said, *“My child, if you have a mandate and if you can, just please get them to give us a salary increment”*

Another problem on the household solid waste collection system was attrition of waste collection workers. The FGD participants mentioned that they usually did not get their salary on time every month. They said that sometimes they did not get paid for two months. The low salary and the delay of payment caused attrition of the waste collection workers. They also said most of their friends quitted their job. “We were 50 and now almost half are gone to daily laboring,” one of the workers. Moreover the FGD participants said that the whole situation about the salary and working environment made them loose their motivation to work. An old woman from the FGD participants told me, “*This job is for those who have no other option (lechenekew in Amharic) or else no one would want to be working around waste*”

In addition, in my observation I was able to see that most of the waste collection workers were old women. According to the FGD, most of the collection workers had no other option or means of making a living because they are too weak to handle other more paying jobs or they don't have skills.

4.5.1 The Awareness and Attitude of the Household Heads towards Household Solid Waste Management

General Awareness and Sensitization Education about Solid Waste Management of the community members

The interviewed municipality officials explained the municipality had been giving a sensitization education on solid waste management for the community members in different ways. They mentioned that they bought air time on Dessie FM radio station and give awareness by preparing programs and different mass meetings were held in each kebeles to teach about solid waste management. However, the survey data showed that among the 184 respondents 57 (31.0%) said that they got a sensitization education on solid waste management while the majority 127 (69.0 %) said they did not get education on the issue.

Table 26: Sensitization education on solid waste management

Sensitization education on solid waste management				
		Frequency	Percent	Valid Percent
Valid	Yes	57	31.0	31.0
	No	127	69.0	69.0
	Total	184	100.0	100.0

4. 1.5.1 Rules and regulations of the town

The interviewed municipality officials and the sub-city manager said that here are rules and regulations on solid waste handling and management. They explained the rules require individual households to clean their surroundings up to 20 meters diameter and organizations up to 50 meters diameter.

The respondent household heads were asked if they knew the rules and the regulations about household solid waste management and 45 (24.5) of the respondents said they didn't even know there are rules, 71 (38.6 %) said they didn't know the rules and 68(37.0%) respondents said that they knew the rules.

Table 27: Awareness of rules and regulations on about H.H solid waste management

Awareness of rules and regulations on about H.H solid waste management				
		Frequency	Percent	Valid Percent
Valid	Yes	68	37.0	37.0
	No	71	38.6	38.6
	I did not even know there are rules	45	24.5	24.5
	Total	184	100.0	100.0

The FGD participants also mentioned that they know there were rules by the municipality about waste management, which says if anybody doesn't properly give the waste produced by their household, caught on the act of dumping waste on plain sights or refuse to pay for the service of waste collection they get, they should be punished by paying1000birr .

4.1. 5 .2 Lack of enforcement of rules and regulation

The FGD participants complained that there was a lack of enforcement of rules and regulation about household solid waste management and that they haven't see anyone being punished until now. The FGD participants explained that the municipality officials' responsible wares making them confront with the residents of the town and they have been the ones in one conflict with the community members. The main problem was said to be the municipality was not able to trace the problem or take a measurement on members breaking the rule. The key informant municipality official argued that it was the responsibility of the town security officials to go and give the

punishment according to the rules. The FGD participants argued that they haven't seen any one who was punished or had paid money.

The FGD participants said that they used to report back, household owners who are not acting according to the rules on waste collection process while working. They said they report back to the municipality solid waste management section by writing up the house numbers and their names but the municipality did not give response appropriately. One of the FGD participants said, "Whenever we report back to them they say they are going to look at the case, we should come back tomorrow or the other week and that they would take a measure but they never do something or give us a solution so it is not on us we are doing our part."

However some of the FGD participants from one of the FGD group, did mentioned that there are people who are punished for breaking the rules by them and also by other authority's although they could not remember a specific example. The municipality workers also all mentioned that people dose get punishments if they broke the rule and the procedure is that if a household ownerless are not willing to be included in collection service, are not willing to pay for the service, if they are caught dumping on plain sight and/or are not cleaning their household environment within 20 meters diameter the municipality collaborating with the town security (Denb Askebary) will give a verbal warning to them first and if they did not responded to that they would go to the next step which was punishment by money.

The survey data also shows that there is a gap on enforcement of rules and regulations on solid waste management hadn't been strong in Dessie town. The respondent household heads were asked if they have been punished for violating the rules of solid waste handling or if any one they knew was punished and 136 said tem or any one they knew were not punished while only 48 said they or someone they knew was punished.

Table 28: Penalty for violating the rules of solid waste management

Penalty for violating the rules of solid waste management				
		Frequency	Percent	Valid Percent
Valid	Yes	48	26.1	26.1
	No	136	73.9	73.9
	Total	184	100.0	100.0

Source survey data by the researcher (2018)

4.1. 5.3 The Responsible bodies

The study tried to triangulate the responses from the survey data, the interview and the FGD data to trace the main responsible body for the existing problems of solid waste management despite the fact that there was a system created for household solid wastes to be collected door to door. According to the observation made, the researcher was able to see there was gap in the waste management system because (see pictures taken on site below on figure) there was a water concentration on some places; water drainages tubes were filled with solid wastes, deification on plain sight and dumping on plain sight were commonly seen and the town was clearly not hygienic enough. Therefore the researcher raised the questions to trace back the source of the problem for all the respondents and finding the responsible body for the existing problem. The respondents mentioned the following parities as responsible for the existing problem

Figure8: waste dumping irregularly



Figure 9: waste dumping irregularly



4.1. 5.4 The Town Security

According to the FGD participants, one of the main responsible bodies was the town security office (Denb Askebari). They mentioned that the 'Denb Askebari' is responsible for the problem of ineffective waste management because they were ignoring their responsible to punish the community members who were not acting according to the rules set on the issue. There were rules stating that anyone who dumps waste on plain site such as roads, and cannels should pay a 1000 birr fine. However they do not take effective measures on waste dumpers to set an example for others. One of the FGD participants said that the 'Denb Askebari' was the ones to be blamed because they were ignoring the situation.

4.1.5.5 The Kebele and the municipality

The FGD participants also mentioned the Kebele and the municipality as the responsible body for the inconvenience in the household solid waste management problem and the Dessie town solid waste management problem in general. They mentioned that for example people would lock their houses and close the compound door and may go to the market or to work without taking out the waste or putting it on the door, knowing that the waste collectors were coming to collect the waste. When situations like this happened we went to the Kebele and report that we did not collect the waste from this and this houses that it should be registered but the Kebele did not listen and latter on the house owners would go to the Kebele and report that we did not do our job. One FGD participant complain,

"The main problem is the municipality, they are the ones who should see the problem of both the people and us. (She said the 'general Mikir bet). All the thefts and the corrupt are in the municipality, we blame the municipality, they tell to the people to ignore us and it has been three years and we do all this only for 700 birr"

" they will go to Kebele and report that we didn't do our job at all and the Kebele will consider that we didn't do the work at all and all our efforts will be in vain which is very discouraging... so next time we won't report, we just leave it."

4.1.5 .6 The community members and the household owners

One of the FGD participants disagreed with the first respondent that mentioned the town security to be responsible for the waste management problem and argued that it is the community members who held the lion share of responsibility to the existing household solid waste management problem. He argued that the security cannot see and control everything. If the community members are not cooperative the security cannot do anything. He said first the residents should stop the dumpers in their area who create the problem. He also said that the community members are unwilling to cooperate with the collection workers.

The household owners are the first to be blamed said he FGD participants they all should take care of the waste they produce. The waste coming out of the houses is all wait and not separated or properly handled and almost all FGD participants mentioned that the household owners irresponsibly store and dump their wastes and there is a high gap in awareness and mined set of responsibility among the people.

In the survey data the respondents were asked two questions to check their level of concern about solid waste management and on their experience and knowledge. When they are asked if they ever complained about waste pollution concerns, the majority, 141, said they had never complained about waste pollution concerns. Those who said they had never complained about waste pollution concerns were asked the reason why they had not complained about waste pollution concerns and 39(21.1%) said it is because there was no problem, and 43(23.4%) said they didn't know where they should complain, 89 (48.4%) said it is because they think there is no solution even if they do complain, 10(5.4) said it was not their responsibility and 3(1.6%) said they had other reasons. (See the table below)

Table 29: The reason why respondents did not complain about waste pollution concerns.

The reason why they did not complain					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no problem occurred	39	21.2	21.2	21.2
	we don't know where to go	43	23.4	23.4	44.6
	Because I think there is no solution even if I complain	89	48.4	48.4	92.9
	Because it's not our responsibility	10	5.4	5.4	98.4
	Other	3	1.6	1.6	100.0
	Total	184	100.0	100.0	

4.1.5.7 The household heads that are unwilling to pay

The FGD participants argued that the household heads that are unwilling to pay are responsible bodies to the problem of dumping. One of the respondents said that

There are some people who pay the expected 12 birr by the water bill and they want all the renting households under them to be served by that amount... they want us to bear all the waste just for 12 birr and she argued that it is this people who went out and dump their wastes on the road not to pay the required money.

The FGD participants also argued that these kinds of people put their wastes on the water tubes and block the cannels by dumping waste in it and also threw it on asphalt roads. They accept the service until they are asked to pay. One participant said that "they send us away saying they do not want the service first and then when we leave they toss out their waste wherever they want."

4.1.5 .8 The Attitude of the Household Heads towards Household Solid Waste Management

The problem of the community members was explained to be lacking a sense of belongingness and a sense of responsibility. The current practice of community members is like "what is not in my backyard is not my problem. The key informant municipality worker in the solid waste section Sensitization and Awareness Creation Expert, a 50 year old man with a bachelor degree, said that the community has become more knowledgeable about waste handling due to awareness creation and every person wants to get their waste out of their compounded. However the Sensitization and Awareness Creation Expert said that there are still gaps in the community members' awareness because first people do not separate their waste at home and they do not properly store their waste. Many people just want the waste out of their own house but are not yet concerned about the general cleanness of the town or the environment. He said,

After much training we managed to change the community member's attitude in to hating wastes... People are changed and they hate wastes and they want to get the waste out of their houses but people still have a problem because they are thinking that just because

they are paying they think that they can just throw out the waste to collectors and it ends there.

Another informant also explained that the town is being cleaned three times a day, which is above the required standard two times but there is still waste everywhere because the community members are not behaviorally changed entirely and they don't have a sense of belongingness. The FGD participants said the same thing, the community members are throwing waste on the road everywhere and there is no use even if they cleaned the town 10 times a day if the resident does not stop polluting it. One FGD participant said,

while we are cleaning, people throw waste following our legs, so if we start cleaning the road for example at the beginning of the town by the time we reached the end of the asphalt road they would already ruin the cleaned part before we finish; therefore if people don't say it is our town and stop ruining it there is no use of cleaning.

They explained that maintaining areas outside their home hygienic were not yet attained in the town and the community needed to be trained on this regarded.

They also mentioned to enforce the existing rules and regulations about solid waste management in the town. There is a problem of tracing back the dumpers and rule breakers because there is no transparency among the community members. They also mentioned that most people dump their wastes hiding from the community members. It is usually at night after late 8 o'clock or 10 o'clock at night that they threw out the waste. They mentioned that they never feel belong to the town and they do not report the dumpers. They said there are no sense off accountability and sense of belongingness among the community.

The attitude test by the Likert scale shows that most people resulted to have a positive attitude towards proper solid waste handling and management. The majority of the respondents 89(48.4) scored above 30 in the Likert scale which shows they have a positive attitude and 39 people (21.2%) scored below 20 that shows they have a negative attitude towards proper solid waste handling and management.

Table 30: attitudinal measurement Likert scale.

Likert scale					
Valid		Frequency	Percent	Valid Percent	Cumulative Percent
	19-10	39	21.2	21.2	21.2
	29-20	43	23.4	23.4	44.6
	30-40	89	48.4	48.4	92.9
		184	100.0	100.0	100.0

Source: filed survey (2018) by the researcher

4.2 Discussion of the Study

4.2.1 Socio Economic and Demographic Characteristics of the Sample Respondent Household Heads

Socio-economic and demographic characteristics is one of the main factor affecting solid waste Production and effective management. Description of the socio-demographic characteristics of the target population gives some basic information about sex, age, educational status, occupation, family size and income of the respondents.

In this study, one hundred ninety two questionnaires were distributed while only 182 were collected and analyzed giving a response rate of 96%; the remaining 4% were not analyzed due to inappropriately filled responses and missing questionnaires. The response rate of 92.8% achieved in our study corresponds with the response rate in the study by Adogu and colleagues in the assessment of waste management practices among residents of Owerri Municipal Nigeria (Adogu, Uwakwe , Egenti, Okwuoha & Nkwocha,2015).

In this study, 54 (29.3%) of respondents were females while 130 (70.7%) were males. Although the number of male collection workers is larger than female workers, female collection workers are commonly reported performing the jobs of mowing the lawn or taking out the rubbish better than their partners, and as a result assumed the responsibility of completing these tasks themselves (Hewitt; Baxter; Givans; Murphy; Myers and Meiklejohn,2010).

Besides, the majority of the respondents were aged between 26 - 64 years (81.5%), followed by ages of 14-45 (9.8%), and the age range of greater than 64 years (8.7%) recorded the least occurrence. The current study also revealed that the majority 119 (64.7 %) of the sample

households was found to have 4 - 6 members in the household and the average family size of the respondents was 4-6 people.

The current study also revealed that a sizeable number of the respondents 123 (66.9 %) had tertiary education, 33 (18%), secondary school education , 14 (7.6%) primary school education and just about 6 (3.3%) with no formal education (illiterate).The study shows an indication of a high level of educational status. This is unlike the work done by Margaret Banga on household education level of solid waste management in Urban Kampala which showed that only about 17.5% of the respondents had attained tertiary level education and 43.8% attained secondary level education, while 30.5% had primary education.

4.2.2 Current Solid Waste Management Practice in Dessie Town: Storage Collection, separation, transportation and Disposal Systems

The household is responsible for storing the daily wastes produced inside their compound since there are almost non transfer stations in Dessie town. 171 (92.9 %) of the sample respondents said there were no common waste bin containers in their neighborhood while 13 (7.1%) said there was a common waste bin container in their neighborhood. The municipality workers interviewed also mentioned that the waste bins were almost all removed because they were believed to be causing stink and health hazards for the community. According to one of the interviewed key informant respondents, Ato Birhan Tsegaye, (the team leader of Dessie - Towns Sanitation and Beautification Authority in the municipality), the community waste bins were avoided for the sake of some community members such as street children and mentally-ill people for feeding from it.

Therefore the solid waste generated by the household was stored inside the compound, around the house or dumped on plain sights until the collection service workers from the municipality came to take it. The waste is sometimes left on the road until late in the afternoon or even for a week or so until the next round of waste collection. According to the interviews and the FGD data , the waste was not collected on time because of two main reasons. First, the collecting truck (tractors) were not ready or available to pick up the waste on time because they were small in number and they got broken all the time and second the places where the waste collectors put the waste sacks were already known by the community members and, therefore, even after the truck

had picked up the waste and left, some people would bring and leave their waste on the same place so that it would be taken on next round. This caused a stink and animals such as dogs, cats, donkeys and scavengers would spread it on the road seeking to feed from it which is both unhealthy and unpleasant to see. The finding of his study has agreed with Obiageli , Obed, Chinomnso and Ngozi (2015) who reported a general picture of poor waste management practices among residents of Owerri Municipal because 66.3% of respondents practiced open dumping while 176 (62.4%) preferred to burn their wastes and that these are not ideal since they constitute potential sources of infection, air pollution as well as constitute aesthetic blithe. This finding however does not agree with the Modebe, Onyeonoro, Ezeama , Ogbuagu and Agam(2009) study , which showed that majority of the respondents in Awka (73%) disposed their waste through government waste management agency.

The result of this study showed that 151(82.1 %) of the respondent households mentioned that they used a household solid waste collection service to dispose the solid waste produced by their household. Besides, The solid waste generated by the household was being stored in different types of temporary containers such as plastic bags, sacks, basket and others. In the filled survey (2018) respondent households were asked what type of temporary storage waste container they use and the predominantly used containers were sacks, followed by baskets and plastics 167 (90.8%), 8 (4.3 %) and 7(3.8 %) respectively and the remaining 2 (1.1%) said they used a can container.

This finding agreed with the Modebe *et al.*(2009) study, which showed that the majority of the respondents in Awka (73%) disposed their waste through government waste management agency and only 27% dumped theirs in unauthorized area. Therefore, the result of this study revealed that the practice and management of solid waste was getting improved in Dessie Town. However, the result of this study was not similar to findings of (Gebrie Kassa (2009) who reported that 70% of solid waste in Dessie town was uncontrolled and disposed of anywhere without giving due attention regarding their consequences.

According to the survey data of this study 98 (53.3 %) house hold respondents said that they did not separate their wastes, 51 (27.7%) said they sometimes separated their wastes and 35 (19.0 %) said they did separate their wastes. However this does not count as full separation because most

of the waste produced, both decay able and none decay able, was put in the waste container. This is in line with the outcome of study done by Modebe *et al* (2009), which reported that the majority of household's respondents in Awka (87.8) did not sort their waste prior to disposal. A study in South Africa recorded a similar finding that waste collected is not sorted into recyclables or non-recyclables and is all disposed of at the final dumpsite with no sorting (Ogola, Chimuka & Tshivhase, 2011).

Based on the field observation by the researcher, the key informants and the FGD, the household solid waste transportation process in Dessie town took place as follow: the solid waste collected from every house would be put on the side of the road by the waste collection workers about every hundred meters to be picked up by waste collection trucks. Then, when the trucks came, the collection workers would load the sacks filled with waste and take it to dump site. However, the waste is sometimes left on the road until late in the afternoon or even for a week or so until the next round of waste collection. This caused a stink and animals such as dogs, cats, donkeys and scavengers would spread it on the road seeking to feed from it which is both unhealthy and unpleasant to see. According to the interviews and the FGD data , the waste was not collected on time because of two main reasons. First, the collecting truck (tractors) were not ready or available to pick up the waste on time because they were small in number and they got broken all the time and second the places where the waste collectors put the waste sacks were already known by the community members and, therefore, even after the truck picked up the waste and left, some people would bring and leave their waste on the same place so that it would be taken on next round.

Once picked from all over the places, the waste would be directly driven to the dump site used by the Dessie municipality. The part of the waste collected by the municipality through waste collectors was disposed in a place called Menber Tsehai. The place, Menber Tsehai, is located on the exit road to Addis Ababa about 12 kilometers from the center of Dessie town. The Menber Tsehai waste disposal area is not a modern waste disposal place. Rather; it is a cliff with a water body, (Borkrna River), under it.

The finding of this study has agreed with the result obtained in Nigeria where domestic waste is collected weekly from households by the Municipality trucks (Nkwocha & Okeoma,2009). This

finding, however, does not agree with the Modebe *et al* (2009), which showed that the majority of the respondents (75.9%) have a centralized place for dumping solid waste and the commonest means of transports of waste was by wheel barrow (70.2%).

4.2.3 The Socio Economic Factors that Affect the Household Solid Waste Production

Socio-economic factors such as family size, amount of income and traditional societal practices has a lot of effect on solid waste production. Socio-economic factors of a given population have their own influence on solid waste production especially on the quantity and composition of solid waste

Regarding solid waste production in Dessie Town, the respondent households were asked to put the estimated kilo of their temporary storage waste container in range. Accordingly 54(29.3%) said their waste container had the weight of bellow 15 kilos, 54 (29.3%) said 16-25 kilos, 61 (33.2%) said 26-50 kilos, 9(4.9%) said above 50 kilo, 6 (3.3%) said they did not know how much their waste container weigh. This shows that the production of solid waste is a common problem.

According to the FGD held with waste collection workers in the study area, there were variations in the amount of waste produced by different households. They mentioned that some people did not even produce one sack a month, and others especially those who were rich produced more waste. This result was in line with the Nor consult (1996) research finding that showed waste generated at the household level comprised more than half (55%) of the total municipal solid waste generated in Jamaica, and the average daily per capita generation rate was approximately 0.39 kilograms.

Regarding the types of solid wastes produced 86 (46,7%)of the respondents mentioned that food wastes such as vegetable wastes like onion, tomato, potato and wastes like sauce, injera and rice were put inside the waste containers. This made food wastes the main component of waste produced by households. The collection workers also mentioned that the food waste made the job difficult, since it is wet and stinky. They said it's really heavy to carry and stinks. The result of this study is in line with the study of Modebe *et al.*(2009) showed that the major type of waste generated from households was food residues 271 (97.1%), followed by vegetable 269 (95.4%). This is also similar to findings of the work done by Mode be *et al* (2009) on household

solid waste management in Awka in which the commonest type of waste generated was garbage (100%), followed by cellophane bags (99%). It is however different and from the household waste generated in the City of Johannesburg, South Africa in which 67% were household wastes, 23% from commercial activities and 10% industrial activities (Ogola, Chimuka & Tshivhase, 2011).

4.2.4 The Socio Economic Factors that Affect Household Solid Waste Management

Generally the data from the survey showed that the most difficult proper waste management challenge was irregular waste collection service, which is 114 (62.0 %). The second problem was said to be just bad habit by community members which was 43 (23.4%) and unavailability of waste collection service and affordable collection price were also mentioned as a challenge 14 (7.6) and 13 (7.1 %). The FGD participants also mentioned that the main challenge in the current waste management work was that people are not changed and most people are still trapped in the traditional dumping management system. The traditional waste management trend was to mean trends such as dumping on plain sites and on backyards, on streets, valleys and rivers especially the Borekena river found in Dessie town which was equally crossing the town from its beginning to its end. The Borekena River had been the main place of dumping wastes produced especially by households since it is near to most households.

The result of this study agreed with the findings of other studies. (Etengeneng, 2012; Aderemi and Falade, 2012 & Modebe *et al.*, 2009)). This practice raises some public health concern as it encourages proliferation of houseflies, mosquitoes, rats and other vermin and aid in the spread of infectious diseases amongst other hazards that present threats to human health and the environment (Modebe, Onyeonoro, Ezeama, Ogbuagu & Agam, 2009). This implies that instead of using ideal sanitary landfill (equipped with features such as weighbridge, internal access, treatment plant, leachate collection system, gas recovery system and being sited far from human settlements and existing water bodies to help avert public health nuisance, (Puopiel & Owusu-Ansah, 2014), most of the waste generated in the study area is deposited in environmentally unsafe sites.

4.2.5 The Awareness and Attitude of the Household Heads towards Household Solid Waste Management

Public awareness and attitudes to waste can affect the whole municipal solid waste management system. All steps in municipal solid waste management starting from household waste storage, to waste segregation, recycling, collection frequency, willingness to pay for waste management services, and opposition to siting of waste treatment and disposal facilities depend on public awareness and participation. Thus, lack of public awareness and school education about the importance of proper solid waste management for health and well-being of people severely restricts use of community based approaches in developing countries and also crucial factor for failure of a MSWM practice in developing countries (Zurbrugg, 2003).

Lack of public awareness and attitudes creation was another challenge for the municipal solid waste management in Dessie town. The result of the survey data showed that among the 184 respondents 57 (31.0%) said that they have got a sensitization education on solid waste management while the majority 127 (69.0 %) said they did not get education on the issue. The survey result shows that awareness creation by the municipality of the town on solid waste management is very low. This is agreed with study conducted by (Abi, 2004) who mentioned that the majority of the households about (83.1 %) reported that they did not have any awareness and education concerning solid waste management.

5 CHAPTER FIVE

Conclusion and Recommendation

5.1 Conclusion

This study has been conducted to assess socio economic factors affecting household solid waste production and effective management in Dessie town. Based on the literature revised, the data collected, and the findings obtained, conclusions drawn are attempted as follows: analysis based on the key elements of solid waste management such as waste handling and processing, waste collection and disposal practiced in the town shows that the current municipal solid waste management practiced was ineffective.

The result indicated that the main type of waste produced by households is food waste followed by plastic wastes and food waste was also mentioned to be the most difficult type of waste to manage. The majority of the respondents said they put their food wastes in their sack containers. The production of waste affected economic status and family size.

In the study area solid waste management and waste handling is ineffective since there is a problem of solid waste storage, collection, separation, transportation and disposal. The majority of respondents use solid waste collection service presented by the municipality; however, there are residents who dispose their solid wastes inside drainage channel, on the street and other vacant places. The study also indicated that there is gap in awareness

Although there is a solid waste management system in Dessie town there are gaps both on the system itself and its application by the community members. The result revealed the problems of the existing system are institutional and social factors such as transportations problem for the waste collected, Low motivation and attrition of the waste collection workers, financial constraint of the municipality, lack of awareness of the household heads towards household solid waste management, unwillingness to pay for the service, problems of sharing accountability and responsibility among household owners, town security waste collection workers and the municipality.

Currently, in Dessie town there are no public solid waste storage containers and no transfer stations for the waste produced and therefore the household owners would dump the wastes on the road whenever there is a delay on the collection service.

The rules and regulations of the town with regard to municipal solid waste collection and disposal are not well known by the community. There were no adequate awareness raising and provision to proper training of households with regard to residential solid waste management methods in the town. This has aggravated the waste management problems and challenges.

5.2 Recommendations

The finding of the study shows that the existing municipal solid waste management practice in Dessie town was ineffective and the services given by municipality were inadequate. Therefore, to improve this the following recommendations are forwarded:

- The community has to be provided with adequate education and develop awareness on how to handle its solid wastes at home and about the consequences of disposing solid wastes everywhere illegally, and not placing of solid wastes into the disposal sites properly.
- One of the basic obstacles to proper solid waste management in the town was inaccessibility of community waste bins to provide a transition sit for the waste between the waste collectors and the hawse hold owners. Therefore, the municipality should prepare additional common waste disposal sites.
- The municipality should give adequate emphasis for solid waste management in general and requires policy priority and adequate budget allocation.
- The municipality should create awareness about the specified rules and regulations about the town's solid waste management and about sustainable solid waste management options,
- The municipality should also strictly enforce the rules and regulations under close supervision and inter organizational linkage.
- It is clear that the practice of municipal solid waste management is a complex activity that involves collection, segregation, transportation and final disposal; it needs strong coordination among concerned institutions with brief roles and responsibilities.

- The solid waste production in Dessie town is rapidly growing; the problem of its solid waste is strengthening, therefore, it requires additional strong rules and regulations of solid waste management accompanied by reasonable penalties.
- Finally the municipality should encourage the private sector and NGOs to involve in municipal solid waste management activities particularly in the solid waste collection, transportation and disposal services.

6 Reference

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ANNEX: 1 QUESTIONNAIRE

ADDIS ABABA UNIVERSITY

COLLEGE OF SOCIAL SCIENCES

DEPARTMENT OF SOCIOLOGY (MA PROGRAM)

Preamble

Dear respondent! This questionnaire is to be filled for the purpose of collecting data about Socio Economic factors affecting effective solid waste production and Management in Dessie Town, Ethiopia. The primary purpose of this research is to try to better understand the Socio Economic factors that affecting solid waste Management and production among households in Dessie Town, Ethiopia. Data attained will be used only for research paper purpose and will also be confidentiality kept.

General Instruction: respondents are kindly requested to follow the instructions and attempt all the questions in each of the segments.

Thank you in advance for your cooperation!

Segment 1: Certification

Interviewer's Name: _____

Signature: _____

Date Western (D-M-Y): _____

Field Supervisor's Name: _____

Signature: _____

Kebele: _____

Questionnaire ID Number:

Segment 2: Demographic and Socio-economic conditions of the respondents

Instruction: choose the best answer and please put the number of your choice in the box provided

1. Sex (Male=1, Female=2)
2. Age of household heads.....
3. Family size (number of people living in the house).....
4. Type of dwelling (1= Villa, 2= Condominium).....
5. House ownership status (1=owner resident, 2= Rented private, 3= rented government/kebele, 4= If other specify_____).....
6. Household head's Educational status (1= Cannot read and Write,2= Read and write, 3= Primary(1-8), 4= completed 10, 5= completed 12,6 = Diploma,7= Degree, 8= Masters, 9= If other, please specify_____)
7. Total Monthly income in Ethiopian Birr (1=Less than 500, 2=501-1500, 3=1501-2500, 4=2501-3500, 5=3501-4500, 6=4501- 6000, 7=above 6000).....
8. Household head Occupation: (1=Trading, 2=Farming, 3= civil service, 4= Daily laborer, 5=If other, please specify_____).....
9. How long have you been leaving in this house?
10. Do you have a car.....

Segment 3: Solid waste production and management practice

Problem	degree of seriousness				
	Extremely	very	quite	not very	not at all
a. safety and security	1	2	3	4	5
b. water portable	1	2	3	4	5
c. solid waste	1	2	3	4	5
d. liquid waste	1	2	3	4	5

e. poor housing condition	1	2	3	4	5
f. traffic	1	2	3	4	5
g. crime	1	2	3	4	5
h. noise pollution	1	2	3	4	5
i. other specify	1	2	3	4	5

11. Circle the degree of the problems which you consider to be major in this town. (please put a

12. circle on the numbers)

13. What kind of solid waste comes out of your household and to what extent?

	Too Much	Much	Quit	Not Much
a) Papers and cartoons	1	2	3	4
b) plastics (bags and bottles)	1	2	3	4
c) food wastes	1	2	3	4
d) bottles glasses	1	2	3	4
e) tins and cans	1	2	3	4
f) others specify _____				

14. How often do you go to the market per month?.....

15. How much money do you spend for house consumption per a month?.....

16. In what type of container (sack) do you collect the waste from your house? (1= plastic bags, 2= baskets/ buckets, 3= fiber bags, 4= tins / cans, 5= if others please specify _____).

17. How big do you estimate is your waste collection container (sack), (1= less than 15, 2=16-25 kg, 3= 26-50, 4= more than 50 kg, 5= I don't know).....

18. How many sack (container) of wastes do you produce per month.....

19. Do you have waste storage for your daily generated wastes? (1= Yes, 2= No).....

20. If yes what kind _____ if no why _____

21. Is there community waste bin (CWB) in your locality? (1= Yes, 2= No).....

22. Where do you usually put away the waste? (1= In the public bin, 2= on the road or street side, 3= There is a collecting truck coming, 4= There is a common dumping site in the neighborhood, 5= if others please specify _____).

23. Do you cover your waste containers? (1= Yes, 2= No).....

24. How often do you clean your compound? (1= Once a day, 2= Once a week, 3= every two weeks, 4= Once a month, 5= if others please specify _____).

25. How often is the house waste container emptied? (1= Once a day, 2= Once a week, 3= every two weeks, 4= Once a month, 5= if others please specify _____).

26. Who usually carries this from the house? (1= Father, 2= Mother, 3= Servant, 4= Children in the house, 5= professional collectors come to collect it door to door.....
27. Do you separate the waste generated by your household? (1= Yes, 2= No).....
28. How do you dispose your wastes? (1= by using formal pre-collectors 2= Using community waste bins 3= by burning it, 4= if others please specify _____)......
29. What types of wastes are difficult for you to manage properly? (1= Papers and cartoons, 2= plastics, 3= food wastes, 4= glasses, 5= tins and cans, 6= others specify)
30. Do you pay to your waste collectors? (1= Yes, 2= No).....
31. If your answer is yes, how much per month? _____
32. Which of the following are the most difficult waste management problems faced by your household? (1=Irregular waste collection (1= we don't know when and where they collect, 2= No availability of waste collection service, 3= the collection price is not affordable, 4= It's just bad habit we are not use to using the service we dump like before, 5= if others please specify _____)......
33. How do you describe the behavior of the waste collection teams towards their clients? (1= Respectful, 2= Fair, 3=Disrespectful).....
34. How do you evaluate the problem of solid waste disposal in Dessie town? (1= Very high, 2= High Moderate, 3= Little No problem.....

Segment 4: Sensitization/education and awareness

35. Which of the following statements best describe waste to you?
 1= Waste is something harmful that we need to avoid?
 2= Waste is something that can be made useful if handled properly.....
36. Have you ever had sensitization education on waste management? (1= Yes, 2= No).....
37. If you answered yes for question number 28, in what way were you sensitized? (1= over radio or TV, 2= In kebele meetings, 3= In school / work place trainings, 4= with posters, 5= if other please specify _____)......
38. Do you know who to go to if you have any waste related concerns?
 (1= Yes, 2= No).....
39. Have you ever complained orally or in writing for the concerned bodies about waste management? (1=Yes, 2= No).....

40. If you answered no to question number 31, why didn't you? (1=there is no problem occurred, 2= we don't know where to go,3= there isn't been a solution even if we do complain, 4=because it's not our responsibility to do so, 5= if others please specify_____).
41. Have you ever had talked or discussed with your family about the wise management of solid waste. (1= Yes, 2= No).....
42. Do you know about the rules and regulations with regard to solid waste management? (1= Yes 2= No).....
43. Do you believe that waste management problem is related to our cultural habits and believes? (1=Yes, 2= No).....
44. Do you know where pre-collectors disposed the collected wastes? (1=Yes, 2= No).....
45. Do have wastes that reused? (1=Yes, 2= No).....
46. If your answer is yes, for question No 37, what type of wastes are reused?(1= Food wastes, 2=Paper, 3= wood and plastics , 4= Cans and bottles, 5= if Others specify _____)....

Segment: 5 attitudes towards proper solid waste management

Instruction circle one item the answer that most closely express your feelings				
1. Waste constitutes non-essential materials that should be destroyed.	4	3	2	1
	Strongly agree	Agree	Disagree	Strongly disagree
2. I believe waste management is the biggest problem in our town.	1	2	3	4
	Strongly agree	Agree	Disagree	Strongly disagree
3. Solid waste management is the duty of the municipality alone.	4	3	2	1
	Strongly agree	Agree	Disagree	Strongly disagree
4. We should not be worried about solid wastes, since our main goal is growth and development as a country.	4	3	2	1
	Strongly agree	Agree	Disagree	Strongly disagree
5. Individuals cannot control (minimize) the amount of waste they generate.	4	3	2	1
	Strongly agree	Agree	Disagree	Strongly disagree
6. I believe it's proper that I pay for waste collection service.	1	2	3	4
	Strongly agree	Agree	Disagree	Strongly disagree
7. I think recycling is important.	1	2	3	4
	Strongly agree	Agree	Disagree	Strongly disagree
8. It is the individual household members who should be separating the waste generated by their household.	1	2	3	4
	Strongly agree	Agree	Disagree	Strongly disagree
9. Waste generated by individual household is harm full to the Environment.	1	2	3	4
	Strongly agree	Agree	Disagree	Strongly disagree
10. Environmental hazards are created by wastes generated from factories not from individual households.	1	2	3	4
	Strongly agree	Agree	Disagree	Strongly disagree
SUM TOTAL OF SCORES (for use by the researcher).....				<input type="text"/> <input type="text"/>

ANNEX: 2 KEY INFORMANT INTERVIEW GUIDE

Part I: Background Information

- I. Name of the respondent-----
- ii. Sex of the respondent-----
- iii. Age of the respondent-----
- iv. Responsibility of the respondent-----
- v. Educational background of the respondent-----
- Vi. Years of service in the current position----

Part II: Interview Questions on Solid Waste Management Practice of the Town.

1. The problem of solid waste management practice.
2. The responsible body for the problem of solid waste management.
3. Solid waste collection service availability.
4. Solid waste management education to the public.
5. Factors that affect municipal solid waste management practice in the town.
6. Attitude of community members towards solid waste management.
7. Level of community member's participation to proper solid waste management.
8. Rules and regulations regarding waste management in the town.
9. Future plans regarding to solid waste management problem at the household level.
10. Recommendation on improving the existing solid waste management practice in the town.
11. Consequences for refusing waste collection service.

ANNEX: 3 FGD Guide for Household Waste Collection Workers

- The problem of solid waste management practice
- The responsible body for the problem of solid waste management.
- Major problems faced by collectors form the community members while working.

- Attitude of community members towards solid waste collection service.
- Traditional practices in the community that made the waste collection service difficult.
- Process of collection when, where, how and to where.
- What kinds of wastes.
- Wastes easily manageable.
- Wastes difficult to manage.
- The amount and type of waste produced by different households. (according to status and no of family etc.)
- Seasonal variations in type and amount of waste.
- Rules and regulations regarding waste management in the town at household level.
- Consequences for refusing waste collection service.

1. መጠይቅ

የጽሁፍ መጠይቅ

በአዲስ አበባ ዩኒቨርሲቲ

በማህበራዊ ሳይንስ ኮሌጅ የሶስተኛ ትምህርት ክፍል

መግቢያ

ውድ ተሳታፊዎች የዚህ መጠይቅ አላማ በደሴ ከተማ በደረቅ ቆሻሻ አፈጣጠር፣ አያያዝ እና አወጋገድ ማህበራዊ እና ኢኮኖሚያዊ ተጽኖዎች ላይ መረጃ ለመሰብሰብ ነው ። የተሰበሰበው መረጃ ለጥናታዊ ጽሁፍ አገልግሎት ብቻ የሚወጣ እና በሚስጥር የሚያዝ ነው ። ስለዚህ ተሳታፊዎች ሁሉንም ጥያቄዎች በትእዛዙ መሰረት እንድትመልሱ በትህትና እጠይቃለሁ ። በቅድሚያ አመሰግናለሁ!!

ክፍል አንድ: መግለጫ

የጠያቂው ስም: -----

ፊርማ: -----

ቀን ፣ ወር ፣ ዓ/ም: -----

የአጥኒው ስም: -----

ፊርማ: -----

ቀበሌ: -----

የመጠይቁ መለያ ቁጥር:-----

ክፍል ሁለት፡ የተሳታፊዎች የግል መረጃ

መመሪያ፡ እባክዎዎትን የምርጫዎን ሃሳብ የያዘዉን ቁጥር በተሰጠዉ ሳጥን ዉስጥ ያስቀምጡ ፡፡

1. ጾታ (ወንድ=1 ሴት =2)-----
2. የቤቱ ባለቤት እድሜ -----
3. በቤቱ ውስጥ የሚኖሩ የሰዎች ብዛት-----
4. የመኖሪያ ቤቱ አይነት (1=ጊቢ ቤት2=ኮንዶሚኒየም) -----
5. የቤት ባለንብረትነት-ሁኔታ(1=ባለቤት2=ተከራይ 3= የቀበሌ ቤት/የመንግስት ቤት 4=ሌላ ካለ-----)-----
6. የቤቱ ባለቤት የትምህርት ደረጃ (1= ማንበብና መጻፍ የማይችል 2= ማንበብና መጻፍ የሚችል 3= አንደኛ ደረጃ 4= 10ኛ ያጠናቀቀ 5= 12ኛ ያጠናቀቀ 6= ድፕሎማ 7= የመጀመሪያ ድግሪ 8= ሁለተኛ ድግሪ(ማስተር) 9. ሌላ-----)
7. የቤተሰቡ አጠቃላይ የወር ገቢ (1= ከ1,000 ብር በታች 2= ከ1001-2,500 3= ከ2501-4,000 4= ከ4,001-6,000 5=ከ6,001-10,000 6=ከ10,000ብር በላይ-----)
8. የቤቱ ባለቤት የስራ አይነት (1=ንግድ 2=ግብርና 3=የመንግስት ሰራተኛ 4=የቀንሰራተኛ 5=ሌላ ካለ-----)
9. በዚህቤት ውስጥ ለምን ያህል ጊዜ ኖሩ-----
10. መኪና አላችሁ ወይ (1. አወ 2.አይ) -----

ክፍል ሶስት፡የደረቅ ቆሻሻ አፈጣጠር፣ አያያዝ እና አወጋገድ ሁኔታዎች

11. በደሴ ከተማ ዋና ችግር ነው ብለው የሚያምኑትን በደረጃ ያስቀምጡ

ተ.ቁ	የችግር ዓይነት	በጣም ከፍተኛ	ከፍተኛ	መካከለኛ	ዝቅተኛ	በጣም ዝቅተኛ
ሀ	የደህንነት እና ሰላም	1	2	3	4	5
ለ	የውሃ ችግር	1	2	3	4	5
ሐ	የደረቅ ቆሻሻ ብክለት	1	2	3	4	5
መ	የፈሳሽ ቆሻሻ	1	2	3	4	5
ሠ	የመኖሪያ ቤት ችግር	1	2	3	4	5
ረ	የትራፊክ አደጋ ችግር	1	2	3	4	5
ሰ	የወንጀል ችግር	1	2	3	4	5
ሸ	የድምጽ ብክለት	1	2	3	4	5
ቀ	ሌላ ካለ					

12. በሳምንት ስንት ጊዜ ወደ ገበያ ይሄዳሉ? በአማካኝ-----
13. በግምት ለቤት ወጭ በወር ምን ያህል ገንዘብ ያወጣሉ-----
14. ከቤትዎ የሚወጣውን ቆሻሻ በምን ዓይነት እቃ ያስቀምጣሉ (1= በፌስታል/በፕላስቲክ እቃ 2=በቅርጫት 3= በኬሻ 4= በቆርቆሮ እቃ 5= ሌላ ካለ-----
15. የደረቅቆሻሻ ማጠራቀሚያዎት የሚከደን ነው? (1= አዎ 2= አይ)-----
16. የቆሻሻ ማጠራቀሚያ እቃዎት በግምት ምን ያህል ክብደት ይይዛል?(1=ከ15 ኪሎቦታች2=ከ16-25 ኪሎ3=ከ26-50ኪሎ 4=ከ50ኪሎበላይ5=አላውቅም)-----
17. ምን ያህል ኬሻ/ማጠራቀሚያ/ ቆሻሻ በወር ከቤት ይወጣል-----
18. የጋራ የቆሻሻ ማጠራቀሚያ ገንዳ በሰፈራችሁ አለ? (1.አዎ 2.የለም)-----
19. ግቢዎን በምን ያክል ጊዜ ያጸዳሉ (1= በቀን አንድ ጊዜ2= በሳምንት አንድ ጊዜ 3= በሁለት ሳምንት 4= በወር 5= ሌላ-----)-----
20. በምን ያህል ጊዜ የተጠራቀመውን ቆሻሻ ይደፋሉ(1= በቀን አንድ ጊዜ2= በሳምንት አንድ ጊዜ 3= በሁለት ሳምንት 4= በወር 5= ሌላ-----)-----
21. ይህን ቆሻሻ ማን ነው ከቤት የሚያወጣው እና የሚደፋው (1= አባት2= እናት 3=ልጆች 4= የቤት ሰራተኛ 5= ሰብሳቢዎች ግቢ ገብተው ይወስዳሉ 6. ሌላ-----)
22. ከቤት የሚወጣውን ደረቅ ቆሻሻ እንደት ነው የሚያስወግዱት? (1= የጋራ ቆሻሻ ማጠራቀሚያ ገንዳ ውስጥ2=በተለምዶ ቆሻሻ የሚጣልባቸው ታዋቂ ስፍራዎች አሉ /መንገድ፣ ገደል ወዘተ/ 3= ቆሻሻ ለሚሰበስቡ ሰራተኞች ነው የምንሰጠው 4=እናታችሁን 5. ሌላ ካለ ይግለጹ-----
23. ከቤትዎ የሚወጣውን ቆሻሻ በዓይነት ይለያያሉ ወይ? (1= አዎ2= አይ 3= አልፎ አልፎ -----
24. ምን ዓይነትቆሻሻዎች ናቸው ለማስወገድ የሚያስችግሩዎት? (1= ወረቀት እናካርቶን2= ፕላስቲክ ነክ 3= የምግብ ተረፈ ምርቶች 4= ብርጭቆዎች 5= ቆርቆሮ እና ብረት 6=ሌላካለ ይግለጹ-----)
25. ለቆሻሻ ሰብሳቢዎች ገንዘብ ይከፍላሉ ወይ? (1= አዎ2= አይ)-----
26. ለጥያቄ ቁጥር 25 መልስዎ አዎ ከሆነ ምን ያህል-----

27. ከቤትዎ የሚወጣውን ቆሻሻ በአግባቡ ለማስወገድ አስቸጋሪ የሚያደርግብዎት ምንድን ነው? (1= ሰብሳቢዎቹ የሚመጡበት ቀን አይታወቅም፣ ይቀያየራል2= የቆሻሻ ሰብሳቢ ሰራተኞች በአካባቢያችን የሉም3= ለቆሻሻ ሰብሳቢዎች የሚከፈለው ገንዘብ ብዙ ነው 4= እንዲሁ በልማድ አገልግሎቱን መጠቀም ስላልተለመደ ነው 5= ሌላ ካለ -----)
28. ቆሻሻ በመሰብሰብ ሥራ ላይ የተሰማሩትን ሰራተኞች ባህሪ እንደት ይገልጹታል? ከናንተ ከደንበኞቻቸው ጋር ያለው ግንኙነት ምን ይመስላል? (1= በጣም ሰው እና ስራቸውን አክባሪ ናቸው 2= መካከለኛ ናቸው 3= በጣም አስቸጋሪ ናቸው ሰው ይንቃሉ)-----

ክፍል አራት: የደረቅ ቆሻሻ አያያዝ እና አወጋገድ ግንዛቤ እና ትምህርት

29. የቆሻሻን በአግባቡ አያያዝ እና አወጋገድን በተመለከተ ትምህርት (ግንዛቤ) ተሰጥቶዎት ያወቃል? (1=አዎ 2= አይ)-----
30. ለጥያቄ ቁጥር 29መልስዎ አዎን ከሆነ በምንመንገድ ነው ትምህርቱን ያገኙት (የት ነበር? (1= በመገናኛብዙሃን 2= በቀበሌ ስብሰባ 3= ትምህርት ወይም ስራ ቦታ 4= ከሚለጠፉ ፖስተሮች 5= ሌላ ካለ-----
31. ቆሻሻን በተመለከተ ቅሬታ ወይም ስጋት እና ችግር ቢያጋጥመዎዎደት መሄድ እንዳለበዎት (የሚመለከተውን አካል) ያወቃሉ? (1=አዎ 2=አይ)-----
32. የቆሻሻን ችግር በተመለከተ በቃል ወይም በጽሁፍ ቅሬታ አቅርበው ያወቃሉ ወይ? (1=አዎ 2= አይ)-----
33. ለጥያቄ ቁጥር32 መልስዎ (አይ) ከሆነ ለምን ቅሬታ አላቀረቡም? (1= ምንም ችግር ስላልተከሰተ ነው 2= የት ሂጄ ቅሬታ እንደማቀርብ ስለማላውቅ ነው 3= ባቀርብም ምንም ለውጥ አላመጣም ብዬ ነው 4= ሃላፊነት ያለብኝ እኔ ስላልሆንኩ ነው 5= ሌላካለ -----)
34. ከቤተሰብዎ ጋር ተገቢ ስለሆነ የቆሻሻ አያያዝና አወጋገድ ተወያይተው ያውቃሉ?(1.አዎ 2. አይ)-----
35. የደረቅ ቆሻሻን አያያዝ እና አወጋገድ በተመለከተ ያሉትን ህጎች እና ደንቦች ያውቃሉ? (1=አዎ 2= አይ 3= ህግ እንዳለም አላውቅም)-----
36. የደረቅ ቆሻሻ አያያዝ እና አወጋገድን በተመለከተ ያሉ ህጎች እና ደንቦችን ባለማክበራቸው የተቀጡ ግለሰቦችን አይተው ወይም ሰምተው ያወቃሉ ወይ?

(1=አዎ 2= አይ)-----

37. የቆሻሻ አያየዝ እና አወገገድ ችግር ከባህላችን እና ከአመለካከታችን ጋር ይያያዛል ብለው ያስባሉ? (1. አዎ 2. አይ)-----

38. ከየቤቱ የተሰበሰቡ ቆሻሻዎች በመጨረሻ የት እንደሚጣሉ ያውቃሉ? (1. አዎ 2. አይ)-----

ክፍል: አምስት

ቆሻሻን መለየት እና በድጋሜ ጥቅም ላይ ማዋል

ትእዛዝ: እባክዎትን በሰንጠረዥ ውስጥ ቆሻሻውን እንዴት እንደሚያስወግዱ ምልክት (X) በማድረግ ያሳዩ

ተ.ቁ	የቆሻሻዓይነት	ቆሻሻው ምን ይሆናል			
		መሸጥ	ማቃጠል	ቆሻሻውን ማጠራቀሚያ ውስጥ መጣል	በድጋሜ መጠቀም
1	ወረቀትና ካርቶኖች				
2	ፕላስቲኮች				
3	የምግብተረፈ ምርት-ቆሻሻዎች				
4	ብርጭቆዎች				
5	ቆርቆሮ እና ብረቶች				

ክፍል፣ ስድስት

የማህበረሰቡ አባላት አመለካከት በደረቅ ቆሻሻ አያያዝ እና አወጋገድ ላይ ትእዛዝ፣ በሚቀጥለው ገጽ ላይ በተሰጠው ሰንጠረዥ እባክዎትን አመለካከትዎን /ሃሳብዎን/ በትክክል የሚገልጽልዎትን ቁጥር ያክብቡ።

1. ቆሻሻ አሳስፈላጊ የሆኑ ነገሮች ጥርቅም ነው።	4	3	2	1
በጣም እስማማለሁ	እስማማለሁ	አልስማማም	በጣም አልስማማም	
2. የቆሻሻ አያያዝ እና አወጋገድ ችግር በደሴ ከተማ ትልቅ ችግር ነው ብለው ያስባሉ?	1	2	3	4
በጣም እስማማለሁ	እስማማለሁ	አልስማማም	በጣም አልስማማም	
3. የደረቅ ቆሻሻን በአግባቡ ማስወገድ የማዘጋጃ ቤት ኃላፊነት ብቻ ነው።	4	3	2	1
በጣም እስማማለሁ	እስማማለሁ	አልስማማም	በጣም አልስማማም	
4. ስለ ደረቅ ቆሻሻ አያያዝ እና አስተዳደር ብዙ መጨነቅ የለብንም ምክንያቱም ዋና አላማችን የአገራችን አብሮነት እና ልማት ነው።	4	3	2	1
በጣም እስማማለሁ	እስማማለሁ	አልስማማም	በጣም አልስማማም	
5. ግለሰቦች የሚያመርቱትን /የሚፈጥሩትን/ የቆሻሻ መጠን መቆጣጠር አይችሉም ።	4	3	2	1
በጣም እስማማለሁ	እስማማለሁ	አልስማማም	በጣም አልስማማም	
6. ለቆሻሻ ሰብሳቢ መክፈል ተገቢ ነው ብዬ አስባለሁ።	1	2	3	4
በጣም እስማማለሁ	እስማማለሁ	አልስማማም	በጣም አልስማማም	
7. ከቆሻሻ የሚወጡ ነገሮችን በድጋሜ መጠቀም አስፈላጊ ነው።	1	2	3	4
በጣም እስማማለሁ	እስማማለሁ	አልስማማም	በጣም አልስማማም	
8. ከግለሰብ ቤት የሚወጣውን ቆሻሻ ለያይቶ ማስቀመጥ የግለሰቡ እንጂ የቆሻሻ ሰብሳቢዎች ሃላፊነት ያይደለም ።	1	2	3	4
በጣም እስማማለሁ	እስማማለሁ	አልስማማም	በጣም አልስማማም	
9. ከግለሰብ ቤቶች ውስጥ የሚወጡ ቆሻሻዎች /ለአለም/ ለአካባቢ ብክለት ምክንያቶች ናቸው።	1	2	3	4
በጣም እስማማለሁ	እስማማለሁ	አልስማማም	በጣም አልስማማም	
10. የአለም ከባቢ አየር ብክለት ከፋብሪካ በሚወጡ ቆሻሻዎች እንጅ ከግለሰብ ቤት በሚወጡ ቆሻሻዎች የሚከሰት አይደለም።	4	3	2	1
በጣም እስማማለሁ	እስማማለሁ	አልስማማም	በጣም አልስማማም	