Addis Ababa University

College of Social sciences

Department of Geography and Environmental Studies

Knowledge, attitude and practice of people towards urban environmental sanitation in *wereda* nine administration of *Gullele* sub-city of Addis Ababa

by

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May, 2015

Addis Ababa

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Declaration

The researcher declare that knowledge, attitude and practice of people towards urban environmental sanitation in *Wereda* nine administration of *Gullele* sub-city of Addis Ababa is my own work and that all sources that I have used or quoted have been indicated and acknowledged by means of complete references and that this work has not been submitted before for any other degree at any other institution.

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Table of Contents

List of tables **page**

List of Figures **page**

Abbreviations

AMREF - African Medical and Research Foundation

CBOs - Community Based Organizations

CLTS -Community Led Total Sanitation

CSA -Central Statistics Agency

DFID -Department for International Development

DHS -Demographic and Health Survey

ECOSAN -Ecological Sanitation

EPA -Environmental Protection Authority of Ethiopia

FDRE -Federal Democratic Republic of Ethiopia

NGOs -Non-governmental Organizations

HEHD -Hygiene and Environmental Health Department

HEP -Health Extension Program

HEWs -Health Extension Workers

HSDP -Health Sector Development Program

HSEP -Health Services Extension Program

HTN -Health Telematic Network

IEC -Information, Education and Communication

IRC -International Rescue Committee

ISWM -Integrated Solid Waste Management

MDGs -Millennium Development Goals

MOH -Ministry of Health

MOU -Memorandum of Understanding

ORC - operation research consultancy

PHAST -Participatory Hygiene and Sanitation Transformation

PPPs -Public Private Partnerships

RHB -Regional Health Bureau

RSA -Republic of South Africa

RWSSH -Rural Water Supply, Sanitation and Hygiene

UN -United Nations

UNEP -United Nations Environmental Program

UN-HABITAT -United Nations Human Settlement Program

UNICEF -United Nations Iternational Children's Fund

WASH -Water, Sanitation and Hygiene

WATSAN -Water and Sanitation

WHO -World Health Organization

WSF -Water and Sanitation Forum

WSSCC -Water Supply and Sanitation Collaborative Council

WRI -Water Resource Institute

WUP -Water Utility Partnership

Definition of terms

Attitude-is an expression of favor or disfavor toward a person, place, thing or event.

Environment- the sum total of conditions within which organisms live.

Environmental sanitation- is activities aimed at improving or maintaining the standard of basic environmental conditions affecting the well being of people.

***Kebele*-** the smallest administrative unit in Ethiopia.

Knowledge- is awareness or understanding of someone or something, such as facts, information, or skills, which is acquired through experience or education, discovering or learning.

Off- site sanitation- is a system where part or all of the excreta are transported away from the household for treatment or disposal at a central point.

On-site sanitation-is the collection and treatment of waste is done where it is deposited. Wastes are stored at the point of disposal and usually undergo some degree of decomposition on site.

Practice-is the way in which people demonstrate their knowledge and attitude through their actions.

Sanitation- the state of cleanliness of a place, community or people particularly relating to those aspects of human health.

Sewage- is the mixture of human waste with wastewater.

Sludge -is domestic wastewater other than that which comes from the toilet.

Wereda-is an administrative division in Ethiopia, equivalent to a district. *Wereda* is composed of a number of *Kebeles*.

Abstract

The aim of this study was to assess knowledge, attitudes and practices of people towards urban environmental sanitation in Wereda nine administration of Gullele sub-city of Addis Ababa. Purposive and simple random sampling method was used to conduct the research. A total of 345 respondents had participated in the study. Knowledge, attitudes and practices associated with urban environmental sanitation questionnaires and personal observation were the instruments used for data collection. The collected data were analyzed using tables, frequency distribution, percentages, means, graphs and chi-square test. The finding of the study revealed that respondents were knowledgeable about urban environmental sanitation, however it was not adequate. Knowledge of residents' on environmental sanitation should be promoted. Those with lower level of education should be the focus group. This can be achieved through organizing workshops, seminars and conferences on environmental sanitation by environmental sanitation authorities and public health educators. Majority of the respondents had favorable attitude to urban environmental sanitation, but there was some inconsistencies on residents' attitude towards various urban environmental sanitation matters. Health education and hygiene awareness should be promoted to influence the resident's attitude that target personal, household and community hygiene and sanitation. The result of the study also revealed that there were improper practices of the residents associated with urban environmental sanitation. Special attention should be given on practical engagement of the residents in the community through developing urban garden, urban beautification and urban agriculture. Lastly, based on the findings, it is also possible to conclude that there was no statistically significant relationship between gender and knowledge of people but there was statistically significant relationship between age and level of education on knowledge of people, there was statistically significant difference in the influence of gender, age and level of education on attitude of people and there was statistically significant difference in the influence of gender, age, level of education ,level of income and family size on practice of people in relation to urban environmental sanitation. Based on the research findings it was recommended that, in order to improve people's urban environmental sanitation knowledge, attitude and practice all stakeholders should have to play their own roles.

Key words*: environmental sanitation, knowledge, attitude, practice*

Chapter one

1. Introduction

1.1. Background of the study

In the last fifty years, the world urban population has increased fourfold, and now around 50% of the world's population lives in urban centers. In 2014, 54% of world's population lives in urban areas, a proportion that is expected to increase to 66% by 2050(UN, 2014). While urban population grew rapidly without proper expansion of sanitation services. Spending on sanitation has not kept pace with growth, and there are dramatic differences in infrastructure expenditure between cities in low and high income countries. As a result it is estimated that between 30% and 60% of the urban population in most nations is not being adequately served (Brocklehurst, 2004).

Worldwide, an estimated 2.5 billion people lack access to basic improved sanitation, and 780 million lack accesses to improved drinking water (WHO, 2012). Although safe water has been receiving media attention and funding in the past decade, the global sanitation crisis has not shared the same spotlight or made the same amount of progress as safe water campaigns. The Millennium Development Goals (MDGs) recognize the importance of water and sanitation. According to the 2006 MDG update from the World Health Organization (WHO) and United Nations Children's International Education Fund (UNICEF), the world has met the 2015 goal for improved water but will miss the goal for improved sanitation coverage by half a billion people. (UNICEF, 2006) Most of the population without access to improved sanitation and water is in southeastern Asia and Sub Saharan Africa. While most places without improved drinking water are rural, lack of sanitation facilities affects both urban and rural areas (UNICEF, 2006).

By 2025, urbanization in Africa, will have progressed from 32% to 50% with the urban population increasing from 300 million to 700 million (WUP, 2003).If such current trends prevail, majority of urban dwellers living with poverty and without access to basic sanitation services that affect public health adversely. Many areas lack the infrastructure to serve these growing populations, and so many urban and peri-urban areas do not have enough roads, housing, and access to clean water, and sanitation that is needed to support their populations (WSSCC, 2012). Open defecation is prevalent in areas without adequate sanitation infrastructure,

and besides the obvious ethical implications for so many people lacking basic necessities, open defecation creates multiple environmental and health concerns (WSSCC, 2012).

The rapid and mostly uncontrolled demographic growth and spatial expansion of large cities in developing countries often results in considerable damage to environmental sanitation. This particularly true in the case of Addis Ababa, which today is suffering from high level of water and air pollution and soil contamination (UN-habitat, 2007). The sanitation problem of Addis Ababa is one of the worst in the country. For instance 26 percent of the houses - and the majority of slum-dwellers, have no toilet facility, and thus use rivers, ditches and open spaces (UN-habitat, 2008). Whereas according to Ministry of water resources, 2011, more than 30% of the households in Addis Ababa have toilet facilities. A shortage of water-supply, ensure that the same areas are used for public baths and washing. The existing sewerage system is inadequate, and sucking by trucks is common. Hence, the sanitary situation may get worse in the coming few years, unless extensive funding and participatory urban plans are developed (UN-habitat, 2008).

Poor environmental sanitation practices also affect the environment in diverse ways. In regions where a large proportion of the population are not served with adequate water supply and sanitation, sewage flows directly into streams, rivers, lakes and wetlands, affecting coastal and marine ecosystems, fouling the environment and exposing millions of children to disease. Particularly in the context of urbanization, indiscriminate littering, domestic wastewater, sewage and solid waste improperly discharged presents a variety of concerns as these promote the breeding of communicable disease vectors as a result of air, water and soil pollution (WHO, 2008).

To assess environmental sanitation, knowledge, attitude and practice study tell us what people know about environmental sanitation, how they feel about the environmental sanitation and how they respond to it. The knowledge possessed by a community refers to their understanding of the topic of interest for example for this study it is an environmental sanitation. Attitude refers to their feelings toward environmental sanitation, as well as preconceived ideas they may have towards it. Practices refers to the ways in which they demonstrate their knowledge and attitude through their actions (Eckman, k-2008).

1.2. Statement of the problem

Urban environmental sanitation addresses environmental issues that exist in the urban areas. Environmental sanitation is one of the most basic services in human life. Improving environmental sanitation is known to have a significant beneficial impact on health both in households and across community's. However, in *Wereda* Nine Administration of *Gullele* sub-city of Addis Ababa, rivers, open spaces, market places, car parks and many other public and private places are littered with refuse. In most cases, drains are blocked by solid waste, posing health threats to the people who live in the area. (See figure.1.1 and 1.2)

Figure.1.1. Drain blocked by solid waste, Wereda nine saint Rufael church area (photo: Researcher's field observation, 2014)

Although, it lacked uniformity, some efforts have been made by the *Wereda* Administration and NGO like AMREF Health Ethiopia to sustain environmental sanitation in the area, for instance, putting solid waste bins on the sides of the streets, house to house solid waste collection by small enterprises, create sanitation awareness by health extension workers, maintenance and opening of sewerage facilities, etc, but, the behavior and attitude of many inhabitants towards environmental sanitation did not enhance this effort *(wereda* nine administration sanitation and beautification office,2014).Many People do not seem to care about good environmental sanitation practices and constantly litter indiscriminately without considering the future effects of these poor sanitation practices on their health.

Figure.1.2. River polluted with wastes, Wereda nine, 03 Area (photo: Researcher's field observation, 2014)

The data of Wereda nine Selam Health Centre showed that the ten-top diseases that cause morbidity in 2014 in the Wereda are: acute respiratory infections **(32. 3%),** diarrhea **(17.8%),** parasitic diseases **(13.3%),**disease of the musculoskeletal and connective tissue **(11.1%),**dyspepsia**(7.2%),**pneumonia **(4.6%),** infection of the skin and subcutaneous tissues **(4.4%),** urinary tract infection **(3.4%),** acute febrile illness **(3.1%),** and unspecified disease of the ear and eye **(2.8%)** (Wereda Nine Selam Health Centre information and record office, 2014). This data indicated that more than **60%** of the diseases that cause morbidity in the Wereda were environmental sanitation problems related diseases. According to World Health Organization 1991, environmental conditions that favor the spread of communicable diseases are described hereunder:

a)Lack of an adequate and safe water supply is associated with typhoid fever, cholera, hepatitis, gastrointestinal diseases, a number of parasitic diseases, trachoma and skin infections.

b) Insanitary disposal of excreta is a major cause of infant diarrhea, gastrointestinal infections, cholera and parasitic diseases.

c) Inadequate disposal of solid wastes is a major factor in the spread of gastrointestinal and parasitic diseases, primarily as a result of the proliferation of insect and rodent vectors.

d) The absence of or inefficient drainage of surface waters, as a result of flooding, Waste water accumulation or poor run-off of heavy rain, also encourages vector breeding and infections due to contact with contaminated water.

e) Inadequate personal and domestic hygiene increases risks of the fecal-oral, skin, eye and vector-borne infections and poor food safety practices increase those of gastrointestinal and diarrheal diseases and malnutrition.

The other reason that the Wereda was selected for this study is because there was no adequate research so far conducted on environmental sanitation in the area. Most studies conducted on environmental sanitation in Addis Ababa focused on at the city or sub city level. But at the wereda level not adequate research yet carried out. This situation necessitated research work to look at environmental sanitation situation in Wereda nine administration of Gullele sub city of Addis Ababa.

Further, since the researcher lives in the area of study, the researcher had personally observed many environmental sanitation problems in the area. Therefore, the study targeted to assess knowledge, attitude and practice of people towards urban environmental sanitation conditions in Wereda nine administration of Gullele sub-city of Addis Ababa, their effects on health and to suggest intervention that could help to ensure sustainable environmental sanitation in the area.

1.3. Objective of the study

1.3.1. General objective

The general objective of this study was to assess knowledge, attitude and practice of people towards urban environmental sanitation in *Wereda* nine administration of *Gullele* sub- city of Addis Ababa.

1.3.2. Specific objectives

The specific objectives of this study were: to

1. distinguish the knowledge of the people of the *wereda* towards urban environmental sanitation.
2. categorize the attitude of the people of the *wereda* towards urban environmental sanitation.
3. identify the practices of the people of the *wereda* towards urban environmental sanitation.

1.4. Research questions

In order to give direction to the study, the following research questions were posed:

1. What is the knowledge of the people of the *wereda* towards urban environmental

sanitation?

2. What is the attitude of the people of the *wereda* towards urban environmental sanitation?

3. What kinds of practices do the people of the *wereda* towards urban environmental sanitation?

1.5. Significance of the study

Knowledge, attitudes and practices are important components for people's way of life. Influenced by the norms and values that communities uphold, these attributes have immense implications on the well-being of communities, and on their overall health. Urban environmental sanitation is the main problem in the whole world but predominates in poor countries like Ethiopia. Hence, the study result would:

i.show that the existing environmental sanitation situation of the dwellers of the *Wereda* by assessing their knowledge, attitude and practice.

ii. provide insight to policy makers, NGOs, Community Based Organizations and other stakeholders who are concerned with urban environmental sanitation.

iii. add to the literature of environmental sanitation issues.

iv. serve as the base for other researchers who will be interested in the area.

v. suggest some possible solution for the problem.

1.6. Scope of the study

Environmental sanitation is a broad term which includes solid waste management, liquid waste management, industrial waste treatment, and noise and pollution control. However, it is difficult to cover the problem at once in all areas. Thus, this study mainly focuses on knowledge, attitude and practice of people towards urban environmental sanitation particularly on household solid and liquid waste management in *wereda* nine administration of *Gullele* sub-city of Addis Ababa.

1.7. Limitation of the study

The following limitations are encountered in this study:

i.shortage of finance and time were the major challenges to accomplish this study.

ii. The reluctance of some respondents to give answer to the entire questionnaire due attentively as could not duly understand the long term outcome of the study.

1.8. Organization of the study

This study has five chapters. The first chapter deals with introduction :background of the study, statements of the problem, objectives of the study, research questions, significance of the study, scope of the study, limitation of the study and organization of the study. The second chapter is review of the related literatures. The third chapter is methodology of the study: research design, sources of data, data collection instrument, sampling methods, variables of the study, data analysis and presentation and pilot study. The fourth chapter is data analysis and presentation and the fifth chapter is about conclusions and recommendations.

Chapter two

2. Review of the related literatures

2.1. General overview of environmental sanitation

2.1.1. Environment

Environment (from the French word: to circle or surround) can be defined as (1) the circumstances and conditions that surround an organism or group of organisms, or (2) the social and cultural conditions that affect an individual or community. The concept of "environment" is an all-embracing term describing the terrestrial, aquatic and atmospheric systems of the world. In its widest use, it refers to all the biophysical features, organic and inorganic resources and all bio-diversity disposable to humankind (Curringham, 1995).

Barrow (1995) defines environment as the sum total of conditions within which organisms live. It is the result of interaction between living (biotic) and nonliving (abiotic) parameters. The concept of environment encompasses all the natural resources which interlink in a complex global ecosystem embodying many sub-systems. Disruption in such systems, which is as a result of cumulative indiscriminate degradation which takes place in localized environments such as villages, towns and cities, distort the delicate ecological balance and has terrible consequences for mankind.

2.1.2. Sanitation

The concept of sanitation has been defined in a number of ways. Mensah (2002) define sanitation as the state of cleanliness of a place, community or people particularly relating to those aspects of human health including the quality of life determined by physical, biological, social and psychological factors in the environment.

Schertenleib (2002), define sanitation as interventions to reduce people's exposure to diseases by providing a clean environment in which to live and with measures to break the cycle of disease. This usually includes hygienic management of human and animal excreta, refuse and wastewater, the control of disease vectors and the provision of washing facilities for personal and

domestic hygiene. It also involves both behaviors and facilities which work together to form a hygienic environment (World Bank, 2002).

Nyamwaya (1994) also defines sanitation as the proper disposal of human waste, i.e. faeces and urine. It includes keeping the human environment free of harmful substances which can cause diseases.

Sanitation means the prevention of human contact with wastes, for hygienic purposes. It also means promoting health through the prevention of human contact with the hazards associated with the lack of healthy food, clean water and healthful housing, the control of vectors (living organisms that transmit diseases), and a clean environment. It focuses on management of waste produced by human activities (Ministry of Health, 2011b).

Sanitation is a system to increase and maintain health life and environment .Adequate sanitation include both facilities and behaviors that form a hygienic environment and reduce people's exposure to disease causing organisms (Bruijne et al, 2007).The main objectives of sanitation is to decrease the spreading of diseases by adequate waste water excreta and other waste treatment, proper handling of water and food by restricting the occurrence of cause of diseases (Korkeakoski, 2006). Korkeakoski also described that the purpose of sanitation is assuring people enough clean water for washing and drinking. Typically, health and hygiene education is connected to sanitation in order to make people recognize where health problems originated and how to better sanitation by their own actions.

Wherever humans live together, their waste also accumulates. Progress in sanitation and improved hygiene has greatly improved health, but many people still have no adequate means of appropriately disposing of their waste. This is a growing nuisance for heavily populated areas, carrying the risk of infectious disease, particularly to vulnerable groups such as the very young, the elderly and people suffering from diseases that lower their resistance. Poorly controlled waste also means daily exposure to an unpleasant environment.

2.1.3. Environmental sanitation

Environmental sanitation refers to activities aimed at improving or maintaining the standard of basic environmental conditions affecting the well being of people.

These conditions include (**1**) clean and safe water supply, (**2**) clean and safe ambient air, (**3**) efficient and safe animal, human, and industrial waste disposal, (**4**) protection of food from biological and chemical contaminants, and (**5**) adequate housing in clean and safe surroundings (Business Dictionary, 2010).

Environmental sanitation refers to the control of environmental factors that form links in disease transmission. This category includes solid waste management, water and wastewater treatment, industrial waste treatment and noise and pollution control (Ministry of Health, 2011b).

Environmental sanitation refers to efforts or activities aimed at developing and maintaining a clean, safe and pleasant physical environment in all human settlements. It comprises a number of complementary activities, including the construction and maintenance of sanitary infrastructure, the provision of services, public education, community and individual action, regulation and legislation (Ministry of Local Government and Rural Development, 1999).

Environmental sanitation therefore involves controlling the aspects of waste that may lead to the transmission of diseases. According to the International Water and Sanitation Centre, the term "environmental sanitation" is used to cover the wide concept of controlling all the factors in the physical environment which may have an impact on human health and well-being (IRC, 2006). In developing countries, environmental sanitation normally includes drains, solid waste management, and vector control, in addition to the activities covered by sanitation (DFID, 1998).

The WHO Expert committee on environmental sanitation in 1950 defined environmental sanitation as "the control of all those factors in man's physical environment, which exercise or may exercise a deleterious effect on his physical development, health and survival" (Dwivedi & Sharma, 2007). In particular it refers to the control of community water supplies, excreta and wastewater disposal, refuse disposal, vectors of disease, housing conditions, food supplies and handling, atmospheric conditions, and the safety of the working environment (Franceys et al, 1992).

According to Nwankwo (2004) environmental sanitation deals with: Provision of safe and adequate supply of water, proper and efficient disposal of wastes, safeguarding of food, provision of insect vectors and other pests control measures, control of animal reservoir or

infection, air hygiene and prevention of atmospheric pollution and elimination of environmental hazards, pollution like noise, radiation.

Environmental sanitation comprises disposal and treatment of human excreta, solid waste and wastewater, control of disease vectors, and provision of washing facilities for personal and domestic hygiene. It aims at improving the quality of life of the individuals and contributing to social development. It has been defined by the Water Supply and Sanitation Collaborative Council as "Interventions to reduce people's exposure to disease by providing a clean environment in which to live, with measures to break the cycle of disease." Environmental sanitation comprises both a change in behavior and facilities to form a hygienic environment (Mmom & Mmom, 2011).

A reciprocal relationship exists between man and his total environmental, i.e., physical, biological, social and economic. The aim of a good environmental sanitation is to modify human environment towards the maintenance and promotion of health and prevention of diseases (Nwankwo, 2004)

On the other hand, environmental sanitation is an often-misconstrued subject matter. The average person on the street and even in government circles understands it as no more than the routine evacuations of municipal solid and liquid waste. As long as waste is removed from the streets, the average individual seems completely satisfied with the state of the environment, not wanting to be bothered by other aspects of life that might be infringing on the well being of the individual in the neighborhoods or the society at large (Nwankwo,2004).

2.1.4. Urban sanitation

Rapid urbanization adds greatly to the need for urban sanitation services both in the developed and developing countries. In order to meet the sanitation target in urban areas, additional 1 billion people would need to gain access to sanitation facilities by 2015, taking into account population increase (UN, 2004).

The situation is particularly serious in peri-urban and informal urban settlements, where coverage is extremely low, and untreated human waste threatens the water supply and human health. According to World Health Organization, in Asia, some 330 million people lack access to

improved sanitation facilities, accounting for 73 percent of the world's unserved urban population. Thus, particular effort will be needed in that region. Regions where large cities are growing rapidly are also those with low coverage of conventional sewers. Africa and Oceania have very low rates of sewerage systems, while the industrialized regions of Europe and North America have high rates. Latin America, the Caribbean and Asia lie in between. Asia has done better than the other regions of the developing world in extending the use of septic tanks and pour-flush system (UN, 2004).

In the large cities of Africa, septic tanks are not common, and a large proportion of the population uses pit latrines or ventilated improved pit latrines than in other regions. There are cities in Asia and Oceania that could make greater use of dry pit latrines, particularly in settlements where the water supply is limited, expensive or unreliable. In parts of Africa, Latin America and the Caribbean there is an unexploited potential for the use of pour-flush toilets, which can give a service that is aesthetically little different from a flush toilets, at a lower cost(UNICEF, 2001).

2.2. Knowledge, attitudes, and practices of people about urban environmental sanitation

To reduce the ever increasing flow of waste is a challenge because the amount of waste has been increasing in every household .People's behavior and attitudes regarding environmental sanitation differ from the types of neighborhoods they live in (Refsgaard et al, 2008).

The poor environmental sanitation attitudes and practices may be adduced to poor knowledge of the impact of improper sanitation on health. Sufficient knowledge of the impact of proper sanitation on health may help people to protect themselves from diarrhea, typhoid fever, cholera, hepatitis, malaria and other infections. Adequate knowledge of the negative impact of poor refuse disposal may encourage people to adopt positive waste management practices and positive waste management practices may also promote personal hygiene and the health of the environment (Refsgaard et al, 2008).

2.3. Norms, attitudes and gender perspectives in environmental sanitation

Environmental sanitation represents a shift in the way people think and act upon human excreta(Esrey et al 2005).Environmental sanitation refers to technologies and practices in which human excreta is collected and processed in a manner such that; it does no pollute water, human

excreta is processed to a point that it is safe for human handling; and the materials can be utilized in ways that take advantage of its nutrient properties (Hannah,2002).

Environmental sanitation is not a singular technology, but "an approach which takes economic, ecologic, and social parameters into account by promoting new sanitation principles and concepts"(Mullegger et al,2004).Although there is a universal consensus that body wastes are sordid, our elimination behavior and our feelings about it are all learned from our experiences, and evolve and change overtime. As a result, there is no absolute right or wrong behavior or attitude except within a cultural context (Warner et al, 2000). Therefore, the understanding of social issues is paramount if one tends to introduce an alternative sanitation system. Psychology, religion and gender are some of the cultural influences that affect the acceptance (or rejection) of an alternative sanitation system. Environmental sanitation note that when people see for themselves how a well managed system works, most of their reservations about handling human waste disappear(Winblad,1998).

With the exception of toilet training, the core of psychological literature is limited primarily to attitudes about human waste. Technically seeking, "attitude" includes three elements of behavior; Cognition, perception and tendency to act (Warner et al, 2000). Values did however influence attitude; and attitude about the inconveniences sanitation influenced sanitation behavior. Experts in Gender issues are primarily a concern when toilet facilities are multifamily or public. Worldwide, the majority of toilet users are women. Women generally have fewer facilities than men, and the lack of provision particularly affects women because they are more likely to be the ones out in public places in the daytime (either shopping, travelling on public transport (for essential food gathering) or making care related trips (Warner et al, 2000).

2.3.1. The effect of attitude of people to environment sanitation

An understanding of the ebb and flow of individuals and collective attitudes vis-à-vis specific issues, and the mind set associated with various options, is very crucial. And this is more clearly demonstrated in environmental affairs. Social scientist psychologist have defined "attitude" as a predisposition to a specific kind of behavior. By this began in the 1960s with an attitudinal revolution. It was sparked by growing concern about local problems and propelled by articulated warnings, notably from Rachel Carson (1960) in silent spring. We see, in retrospect that it predisposes the generation of the 1960s to embrace environmental activism. Since the 1960s

throughout the democratic industrialized world, public awakening to environmental danger has consistently been the catalyst for environmental' policies and programmes.

Attitude is referred to as a kind of "mental set" representing a predisposition to form a certain opinions (Kelly, 2001). This definition signifies that individual has different opinions to situations. Most people have non- chalent attitude towards environmental sanitation this kind of person could be perceived as one who litters the environment like no man's business with no regards or respect to the environment. They don't consider the need to appraise or talk to people and neighbors around them for positive or negative behavior. For example, if an individual is seen littering papers or any form of waste anywhere they do not seem to exhibit any annoyance or correction to such situation. They do not consider living in a clean as essential hence they cannot keep clean environment. They play passive role in sanitation activities and refuse to co-operate with others in cleaning up residential surroundings because of their negative attitude.

Some educated and enlightened citizens also participate in these misconduct, According to Stahrl, E (1992) the main reason for the incessant growth of waste volumes in our urban centers is as a result of the ignorance of some dwellers towards the effect of indiscriminate dumping of refuse and the care free attitude of most of the dwellers, who know what should be done but they are careless about it.... this is supported by Simon J. A.(1994) by saying that everybody wants their refuse to be taken away, nobody wants to take part in its disposal and management.

Nest (1991) adds that people lack interest towards the management of the refuse they generate. According to him, although waste is generated by people, they show no concern towards its final disposal. This poor attitude may also be ascribed to the environmental protection agencies. Most times people pack their waste in dustbins for weeks without the agencies coming to evacuate them to the final point of disposition. As a result most people resort to pouring dirt recklessly on the streets gutters expecting erosion to wash them into the river. Some dwellers also prefer to use undeveloped plots of land around their residence as the convenient point for waste disposal.

Another scholar, Peter (1993) defines attitude as the mental and neutral state of mine (readiness) organized through experienced exerting a directive or dynamic influence upon individual response to all objects and situations with which it is related. The use of mental and neutral state" in the foregoing definition indicates that attitudes could not be observed directly but inferred from behaviors that is, the type of response possessed by an individual having the attitude. Observation here means that it is possible to train and motivate human being to develop attitudes

and values, which culminate undesirable behavior towards environmental. The directing of behavior towards an environment normally result in conscious utilization, manipulation and transformation of the environment in the manner consistent with the goals of environmental management, peoples negative attitude to waste disposal is a manifestation of their internal behavior through Socio-cultural and transitional orientation. It is true that if a person has a positive attitude towards an object, he /she will go a long way to support the object, so if an individual holds positive attitude to waste disposal, he will definitely increase his efforts to environmental sustenance. Attitude in this context can be defined in terms of the level of education, income rate and gender.

2.4. International Formative frameworks on environmental sanitation

2.4.1. United Nations International Drinking Water Supply and Sanitation Decade (1980-1990)

It is believed that the benefits of environmental protection, such as clean water, air and suitable sanitation facilities should be available to all, but in reality a disproportionate burden of protecting the environment is borne by the poor, especially the urban poor. An increasing awareness about the environment since 1970's has led to significant budgetary allocations for the water and sanitation sector. The 1980s were declared the United Nations International Drinking Water Supply and Sanitation Decade during, which the international community set an ambitious target of achieving 100% coverage in water supply and sanitation by 1990 (Pathak et al, 2002).Unfortunately, progress over the decade could not keep up with the population growth. Subsequently, significant investments have been made in that sector, yet progress in sanitation has been limited, resulting in consistently lower coverage for sanitation. According to the WHO-UNICEF (2006), 2.5 billion people are without access to improved sanitation (corresponding to a global access rate of 62%) and one billion people in rural areas still practice open defecation.

2.4.2. The UN Millennium Development Goals

The effects of inadequate water supply and sanitation keep poor people in a vicious poverty trap, which can be difficult to escape from. The UN Millennium Development Goals (MDGs) which aim to reduce the proportion of people living in poverty by half by 2015, recognized provision for safe water as part of the problem of world poverty, and the goal of providing access to

adequate sanitation was added at the World Summit on Sustainable Development in Johannesburg in 2002. The fact however remains that due to population increase the world has to run hard to stay in the same place. The numbers of new water supplies and sanitation facilities required to reach the MDGs are staggering, with in excess of 440 million people in Africa alone requiring safe water and sanitation by 2015, if the international coverage targets are to be met (WHO/UNICEF,2000). Added to this, existing facilities are all too often falling into disrepair, demonstrating their lack of sustainability, and making the danger of a slide backwards in the numbers served a real threat. For example, of the estimated 250,000 hand pumps in Africa, fewer than half are reckoned to be functional (HTN, 2003).

The lack of sustainability of many WATSAN interventions was made clear in the following quote: *"*In developing countries, a significant number of projects, including those in the water and sanitation sector, fail to deliver benefits to society over the longer term. Part of the cause of this failure lies in poor understanding of the issues of impact and sustainability." The cause of this poor understanding is according to the WSSCC (2004) a lack of willingness to learn from past failures and listen to those who have pioneered new approaches.

2.5. National formative framework on environmental sanitation

2.5.1. The 1995 Constitution of the Federal Democratic Republic of Ethiopia

The 1995 Constitution of the Federal Democratic Republic of Ethiopia has recognized and given due attention to environmental protection. The overall policy goal is to improve and enhance the health and quality of life of all people.

Article 44 of FDRE Constitution under the title ''Environmental Rights'' provides as follows;

Article 44(1) provides that, ''All Persons have the right to a clean and healthy environment''.

Article 92 of the same Constitution proclaims the general 'Environmental Objectives'' of Ethiopia as follows;

Article 92(1); '' Government shall endeavor to ensure that all Ethiopians live in a clean and healthy environment''.

Article 92(2); ‘’the design and implementation of program and projects of development shall not damage or destroy the environment’’.

Article 92(3); ‘’People have the right to full consultation and to the expression of views in the planning and implementation of environmental policies and projects that affect them directly’’.

Article92 (4);”government and citizens shall have the duty to protect the environment.”

2.5.2. Policy issues on environmental health and water in Ethiopia

The health policy was issued by the Government of Ethiopia in 1993 (Ministry of Water Resources, 2004). The Ethiopian National Health policy considers that hygiene and environmental health is one of the cornerstones of the strategy for the promotion of health and wellbeing of people. More than 60-80% of communicable diseases in Ethiopia are believed to be preventable using environmental health interventions, so targeting environmental health is vital for improving the health of the population at large (Ministry of Health, 2011b).

The government has established a Health Sector Development Program (HSDP), which incorporates a 20 years health development strategy through a series of 5-years investment programs. This program calls for the democratization and decentralization of health services, development of preventable health care, capacity building within the health service system, equitable access to health services, self reliance, promotion of inter-sectoral activities and participation of the private sector, including non-governmental organizations and cooperation and collaboration with all countries in general and neighboring countries in particular and between regional and international organizations (Ministry of Water Resources ,2004).

The health policy gives emphasis to the preventive aspect of health services. Strategies adopted to meet environmental health service needs include: accelerating the provision of safe and adequate water supply for urban and rural populations; developing safe disposal of human, household, agricultural and industrial wastes, and encouraging recycling; developing measures to improve the quality of housing and work premises for health; encouraging the awareness and development of health promotive life-style and attention to personal hygiene and healthy environment (Ministry of Water Resources, 2004).

In fact, sanitation in terms of protecting the environment and safeguarding human health is also given due importance in the Environmental Policy, Water Resources Management Policy and in the Public Health Proclamation. The Water Resources Management Policy places particular emphasis on creating a favorable environment for the promotion of appropriate sanitation services. The Water Resource Management Policy also calls for more decentralized decision-making; promoting the involvement of all stakeholders, including the private sector; increasing levels of cost recovery; as well as integrating water supply, sanitation and hygiene promotion activities (Water Supply and Sanitation Collaborative Council, 2009).

Ethiopia has no separate environmental sanitation policy of its own but has a National Hygiene and Sanitation Strategy that derived from the Health Policy. Health Sector Strategy emphasizes the preventive aspect of health care without neglecting essential curative services with a focus on communicable diseases, common nutritional disorders and on environmental health and hygiene (Water Supply and Sanitation Collaborative Council, 2009).

The Hygiene and Sanitation Strategy is implemented through several major program such as:

a)the Health Service Extension Program (HSEP) which is a new program and perceived to be the primary vehicle for driving sanitation improvements at the *kebele* level *(kebele* is the smallest government administrative unit);

b) the Ministry of Health (MoH)/Regional Health Bureau (RHB)/UNICEF supported water and sanitation community based programme (disease prevention for women and children); and

c) the World Bank supported Rural Water Supply and Environment Programme and the Water, Sanitation and Hygiene (WASH) Initiative. The Hygiene and Sanitation Programme gets financial support from the World Bank, non-governmental organizations (NGOs)/Civil Society, WHO and other donors (Government of Ethiopia 2007).The National Hygiene and Sanitation Strategy was developed to enable 100% adoption of improved sanitation and hygiene practice particularly in the rural settings of Ethiopia. According to the national strategy, hygiene promotion should mainly address the 3 key behaviors: toilet use, hand washing and keeping water safe (Water Supply and Sanitation Collaborative Council, 2009).

The National Protocol for Hygiene and “On-site” Sanitation is designed to follow the National

Hygiene and Sanitation Strategy with its focus on universal access (100% hygienic and sanitized households) primarily in rural or peri-urban environments. Both the national strategy and the protocol stress a zero subsidy approach for household sanitation facilities but with some allowance for supporting the vulnerable. Hygiene promotion, capacity building, support to create and maintain an enabling environment, as well as public and institutional sanitation facilities are to be financed by the public (Water Supply and Sanitation Collaborative Council ,2009).

2.6. Environmental sanitation in Ethiopia

2.6.1. Excreta disposal status of the country

The latrine coverage provided by the Central Statistics Agency for 2005 shows that 62 percent of Ethiopian households do not have a toilet facility. Overall a small proportion (7 percent) of households use improved toilets that are not shared. Urban households are more than three times as likely as rural households to have access to improved toilet facilities. In urban areas, a pit latrine with a slab (12 percent) is the major type of improved toilet facility. There has been a decline recently in the proportion of households with no toilet facilities from 82 percent in 2000 to 62 percent in 2005. The decline was observed in both urban and rural areas (from 30 percent to 12 percent in urban areas and from 92 percent to 70 percent in rural areas) (Central Statistical Agency & ORC Macro, 2006). However, according to data of Ministry of Health of Ethiopia (2009:16), 60% of households have access to excreta disposal.

The proper disposal of children's stools is extremely important in preventing the spread of disease. According to Demographic and Health Survey (DHS) of Ethiopia of 2005, sixty-seven percent of children's stools are left uncontained: 7 percent are put or rinsed into a drain or ditch, 11 percent are thrown into the garbage, and 49 percent are left in the open. Slightly more than one in five children's stools is disposed of hygienically. Two percent of children under five use a toilet or latrine. Additionally, 17 percent of children's stools are disposed of in the toilet or latrine, and 2 percent are buried in the yard (Central Statistical Agency & ORC Macro, 2006).

2.6.2. Urban sanitation and waste disposal in Ethiopia

Although urban sanitation figures generally far outstrip rural access, it is widely known that the poor, unplanned, densely populated areas are badly underserved. This density, therefore, poses a greater risk of contamination than thinly populated rural areas. Limited sanitation options and high demand are compounded by poverty and limited space, creating a major challenge. Mobile urinals and communal latrines meet only a fraction of the unmet excreta disposal needs of the urban poor who resort to high risk disposal practices (Ministry of Health, 2005b).

Public sanitation services such as public toilet facilities, sludge (seepage) collection and related environmental health services, they are generally inadequate and do not meet demands. (Ministry of Water Resources, 2004).

The assessment of existing situation of solid waste management in the country shows that the services are inadequate and the coverage is very low. The problem of solid waste management is critical in densely populated urban centers. Domestic solid wastes are dumped at the river banks, road sides, ditches, drainage pipes and pit latrines (Ministry of Water Resources, 2004). Refuse disposal sites in urban areas are often insufficient and unorganized (Ministry of Water Resources, 2004).

2.7. Environmental sanitation and communicable diseases

Numerous studies indicate a direct link between environmental health risks and limited access to clean water, sanitation facilities and services on the one hand, and poor hygiene practices on the other. Water-borne pathogens alone infect around 250 million people per year, resulting in 10–20 million deaths. This leads to negative health impacts, environmental degradation and related economic impacts on the affected population. Access to qualitatively good drinking water, adequate sanitation facilities and services and satisfactory hygiene practices significantly contribute to reducing the rate of morbidity and mortality among populations (Dongo et al, 2010). There are a number of diseases related to excreta and wastewater which commonly affect people in the developing countries and which can be subdivided into communicable and non communicable diseases (Franceys et al, 1992).

Communicable diseases flourish where the environment fails to provide barriers against

pathogens. Environmental conditions that favor the spread of communicable diseases is described hereunder (World Health Organization, 1991):

i)Lack of an adequate and safe water supply is associated with typhoid fever, cholera, hepatitis, gastrointestinal diseases, a number of parasitic diseases, trachoma and skin infections.

ii) Insanitary disposal of excreta is a major cause of infant diarrhea, gastrointestinal infections, cholera and parasitic diseases.

iii) Inadequate disposal of solid wastes is a major factor in the spread of gastrointestinal and parasitic diseases and leptospirosis, primarily as a result of the proliferation of insect and rodent vectors.

iv)The absence of or inefficient drainage of surface waters, as a result of flooding, wastewater accumulation or poor run-off of heavy rain, also encourages vector breeding and infections due to contact with contaminated water.

v) Inadequate personal and domestic hygiene increases risks of the skin, eye and vector-borne infections and poor food safety practices increase those of gastrointestinal and diarrheal diseases and malnutrition.

All of the transmission routes of excreta-related diseases particularly the fecal-oral routes can be blocked by changes in domestic hygiene practice. Improved technologies, such as water and excreta disposal facilities, can also contribute to preventing transmission. Environmental health interventions for the prevention of diarrheal disease typically include steps to improve the proper disposal of human feces, improving water quality, water quantity and access, and promoting hand washing and other hygiene practices (Clasen et al, 2010).

2.8. Available technology options for environmental sanitation

Neto and Tropp (2000) stated that, there are numerous technical options for environmental sanitation, many of which, if properly designed, constructed, operated and maintained will provide adequate and safe service as well as health benefits. It is necessary to choose technically, economically and financially feasible options for sustainable environmental

sanitation. Equally important is the involvement of all stakeholders playing a role in sanitation development, including users (or customers), community organizations an authorities. In particular, it is essential to involve women in the design and selection of domestic sanitation facilities. Franceys et al. 1992; Mara, 1996; UN-habitat, 2006; and WHO, 2010 also state that, sanitation systems can be divided into two principal categories; i.e. onsite and offsite.

2.8.1. Onsite sanitation

On-site sanitation is the main form of excreta disposal in most sub-Saharan African cities and will remain the most appropriate level of service for the urban poor in the medium term. Despite heavy public investment in sewerage systems in most primary and some secondary cities, typically only 10-15% of the urban population benefit from access to the sewer network. According to Water Utility Partnership Africa, (2003); Ahmed and Nalubega (2001) and Mara (1996), onsite sanitation include SanPlat' latrines, ventilated improved pit latrines, pour flush toilets, and ecological sanitation ('EcoSan') toilets. In these systems, wastes are stored at the point of disposal and usually undergo some degree of decomposition on site. Onsite systems either require periodic emptying or construction of new facilities once they fill up.

2.8.2. 0ff-site sanitation

Offsite systems are forms of sewerage where part or all of the excreta are transported away from the household for treatment or disposal at a central point. Sewerage may be conventional (typically, connected to flush toilets and household grey water, and in many cases storm water) or modified where only liquid matter is piped away (small-bore sewerage) or where sewerage works on a non-constant flow principle (shallow sewers) and does not take storm water (WHO,2010).

In order to minimize environmental pollution and disease transmission it is important that the sewage is properly treated and not allowed to flow untreated into rivers or other water bodies (WRI, 1998). It is important to note that there is no single appropriate technology for all circumstances and all socio-economic segments of a community, town or city. The more costly or, apparently, convenient technologies may not provide the greatest health benefit or may be unsustainable from an economic or technological point of view (Franceys et al. 1992). On the

other hand, Sewers are not just limited to pipes below ground. Open channels may also be used. These may be unlined, pitched with stone or lined with concrete. Where the lining is not water tight, the channel can act as an infiltration trench. This may be acceptable for surface runoff, but is not recommended for conveyance of foul sewage. Surface run-off can flood the channel, causing pollution, which is a greater risk to health than the indirect route of infiltration to groundwater. Where open channels are used for foul sewage and no alternative is possible, they should be routed away from populated areas and have raised sides to limit the ingress of rainwater (WHO, 2010).

2.9. Principles that guide the provision of sanitation

Provision of sanitation is vital in rich and poor communities, in rural and urban areas, and whether sanitation is for individual households or provided as a system for an entire community. The White Paper on Basic Household Sanitation (RSA, 2001) points the principles that guide the provision of sanitation as:

a. Development should be demand-driven and community based:

Household sanitation is, first and foremost, a household responsibility and is demand-driven. Sanitation must respond to the demands of communities, and should link to improved hygiene awareness. For people to benefit from sanitation improvements, everybody must understand the link between their own health, good hygiene and toilet facilities.

b. Basic services are a human right

In fulfillment of its obligation, governments must create an enabling environment through which all people can access services and support in obtaining those services, but in the end it is the individuals who are responsible. Citizens have rights, but also responsibilities in taking charge of their own health.

c. “some for all” principle rather than “all for some”

The use of scarce public funds must be confined to assisting those who are unable to attain a basic level of service. Individual householders are ultimately responsible, although communities may require a degree of conformity to achieve the healthy environment. A careful

balance needs to be achieved between what is affordable to households, communities and the national economy. Therefore, scarce public funds must be prioritized to help those most at risk.

d. Integrated development

Sanitation development is not possible in isolation from other sectors. Sanitation must be provided in conjunction with water supply and other municipal services. Co-ordination is necessary between the different departments, all tiers of government and other stakeholders.

e. Environmental integrity

The environment must be considered in all development activities. Appropriate protection of the environment must be applied, including if necessary, prosecution under the law. Sanitation services, which have unacceptable impacts on the environment, cannot be considered to be adequate.

f. Sanitation is about health

Sanitation is more than just toilets, it must be accompanied by environmental and health education. The aim is to encourage and assist people to improve their health and quality of life.

g. Sanitation is a community responsibility

Improvements in health through improved sanitation are most likely to be achieved when the majority of households in a community are involved. Sanitation is therefore a community responsibility, and this must be emphasized through sanitation awareness programs.

2.10.Management of environmental sanitation

2.10.1.Liquid Waste management

Liquid waste includes human waste, runoff (storm water or flood water), sludge, industrial wastewater and other forms of wastewater from different sources. The mixture of human waste with wastewater is known as sewage. Runoff is simply rainwater that collects on the ground and runs off into channels, ditches and rivers (Ministry of Health, 2011c).

Sludge is domestic wastewater other than that which originates from the toilet. It results from

food preparation, personal washing, and washing of cooking and eating utensils and clothes (Franceys et al, 1992). Management of liquid waste focuses on finding a way to dispose of the waste in a way that is safe for humans and the environment (Ministry of Health, 2011c).

2.10.1.1. The characteristics of domestic wastewater

Domestic wastewater can be divided into two categories: sewage and sludge. Sewage includes human wastes (i.e. feces and urine), as well as wastewater from various sources. Sludge is the wastewater that arises from domestic activities such as washing in bathrooms and kitchens, including water from food preparation and dishwashing; it does not contain human excreta (Ministry of Health, 2011c).The nature of the sludge is markedly influenced by factors such as diet, methods of washing clothes and utensils, habits of personal hygiene, and the existence of bathrooms and other facilities (Franceys et al, 1992). About 99 percent of wastewater is water, and only one percent is solid wastes (Vigneswaran & Sundaravadivel, 2004).

2.10.1.2. Health problems caused by poor drainage

Proper disposal of storm water and household wastewater (sludge) is an important environmental health intervention for reducing disease. Poorly drained storm water forms stagnant pools that provide breeding sites for disease vectors. Because of this, some diseases are more common in the wet season than the dry season. Household wastewater may also contain pathogens that can pollute groundwater sources, increasing the risk of diseases. Poor drainage can lead to flooding. Flooding may also damage water supply infrastructure and contaminate domestic water sources (Howard, 2002).

Pond of sludge is caused by excessive discharge on to the ground, by blockage of surface drains, or by unsatisfactory construction or maintenance of open channels to carry the sludge (Franceys et al, 1992). If sludge or storm water is discharged into fresh surface water (e.g. streams, rivers, lakes), the surface water will be polluted with excreta. This will result in a risk of fecal-oral infections and beef and pork tapeworm if people and animals use this water as drinking-water (Rottier & Ince, 2003).

2.10.1.3.Wastewater management in developing countries

Urban sanitation is a priority issue for cities everywhere. Major deficiencies in the provision of this basic service contribute to environmental health problems and the degradation of scarce water resources. The rapid growth of cities and the accompanying concentration of population lead to increasing amounts of human wastes that needs to be managed safely. The relative success in providing cities with usable water has led to greater volumes of wastewater requiring management, both domestic and industrial (Bartone, 1997).

As population densities in cities increase, the volumes of wastewater generated per household exceed the infiltration capacity of local soils and require greater drainage capacity and the introduction of sewer systems. Wastewaters flowing out of cities can, in turn, affect downstream water resources and threaten their sustainable use (Bartone, 1997). A staggering 80–90 percent of all wastewater generated in developing countries is discharged directly into surface water bodies (Corcoran et al, 2010).

2.10.1.4. Disposal methods of domestic wastewater

There are different methods of disposing wastewater which are described as follows:

(a) The drainage of storm water

Storm water drains should be designed to collect water from all parts of the community and lead it to a main drain, which then is discharged. The size of the drains should be calculated according to the amount of water they would be expected to carry in a storm (Howard, 2002).

(b) Sludge disposal methods

Every household generates sludge. Sludge may be disposed of either at home, using on-site methods, or through the drainage system. When sludge is disposed of at home, a soak away pit can be constructed. Alternatively, sludge can be used to irrigate small gardens, thus improving the crop yield and nutrition, and this should be promoted if possible. However, sludge can be reused this way only if it contains little or no detergent, which may damage crops (Howard, 2002). Soak away pits and trenches can be used where wastewater could be polluted, space is available, and the infiltration capacity of the soil is sufficient. A soak away will have to be

adapted to the physical situation and the characteristics of the sludge to prevent blockage or overloading (Rottier & Ince, 2003).Sludge can be treated on-site to make it more acceptable for final disposal or reuse. Septic tanks can be used; they are effective in removing grease and solids, and do not require frequent dislodging (Franceys et al, 1992).

(c) Other types of surface water

Temporary ponds or unwanted reservoirs can be filled to reduce the health risks. No new ponds should be created when sourcing the filling material. Where filling is not feasible, the vegetation along the sides of the water can be removed to make it less attractive to snails and mosquitoes, or the shoreline can be made steeper to control the vegetation (Rottier & Ince, 2003).

2.10.2. Solid waste management

According to Tchobanoglous et al, (1993), solid waste is all the waste arising from human and animal activities that are normally solid and that are discarded as useless or unwanted. To keep the household and village environment clean and to reduce health risks, solid waste (refuse) should be disposed of properly. Untreated refuse degrades both the quality of the environment and the quality of life in the community. It also provides a breeding ground for disease vectors, such as mosquitoes, flies and rats. If waste is not properly disposed of, animals can bring it close to the home and children can come into contact with disease vectors and pathogens. To be effective, solid waste disposal programmes require action at both household and community levels - if only a few households dispose of waste properly, the village environment may remain dirty and contaminated (Howard ,2002).

2.10.2.1. Types of solid wastes

In urban settings, municipal waste refers to the solid waste that is collected by local government (the municipality) and may include household, commercial, industrial waste and street sweepings. Solid waste from general housekeeping can be described as residential waste, household waste or domestic waste (Ministry of Health, 2011c). Residential waste generated by households may contain organic waste (for example, from the kitchen and gardens), recyclable waste (for example, plastics, paper, cans, etc.), non-recyclable waste (that has no

recycling value), and household hazardous waste (batteries, some oils, etc.) (United Nations Environment Programme, 2009).

2.10.2.2. Health and environmental risks of solid waste

There are some human health risks associated with solid waste handling and disposal in all countries to some degree, but certain problems are more acute and widespread in underdeveloped nations. This risk has classified into **four** main categories: **1**) presence of human fecal matter, **2**) presence of potentially hazardous industrial waste, **3**) the decomposition of solids into constituent chemicals which contaminate air and water systems, and **4**) the air pollution caused by consistently burning dumps and methane release. Human fecal matter is present in every solid waste system; in developing nations the problem varies with the prevalence on inadequate sanitary disposal systems such as municipal sewerage or on-site septic systems, outhouses, etc. In areas where such facilities are lacking (especially shantytowns and over-crowded municipal districts), the amount of human fecal matter present in the solid waste stream is likely to be higher. This presents a potential health problem not only to waste workers, but also to scavengers, other users of the same municipal drop-off point, and even small children who like to play in or around waste containers (Zerbock, 2003).

Piles of rubbish in the streets or at dump sites can provide a habitat for rats and flies, and thus contribute to the spread of a number of diseases; rats are major vectors of plague, leptospirosis and other infections. Apart from these direct health impacts, solid waste is also linked to the fecal-oral transmission route in a number of ways (Department for International Development, 1998).

2.10.2.3. Solid waste management in developing countries

Municipal solid waste management is an important part of the urban infrastructure that ensures the protection of environment and human health. The accelerated growth of urban population with unplanned urbanization, increasing economic activities and lack of training in modern solid waste management practices in developing countries complicates the efforts to improve solid waste services. The changes in consumption patterns with alterations in the waste characteristics have also resulted in a quantum jump in solid waste generation (Nabegu, 2010).

A significant proportion of the urban population of Africa has poor access to refuse collection for proper solid waste management. Poorly managed waste presents a health risk to communities. This is primarily because untreated waste and waste that remains uncollected or improperly disposed of can be a source of contaminants and breeding sites. Such wastes contribute to diarrhea, vector-borne disease, and the contamination of drinking water and other water resources (World Health Organization Regional Office for Africa, 2009).

2.10.2.4. Managing solid waste

Proper management of solid waste is critical to the health and well-being of urban residents (Nabegu, 2010). The overall objective of solid waste management is to minimize the adverse environmental effects caused by indiscriminate disposal of solid wastes (Kaseva & Mbuligwe, 2003).

Solid waste management can be classified into **five** main stages. These stages are also referred to as the functional elements of solid waste management. These are onsite handling, storage and processing; collection; transfer and transport; resource recovery and processing; and disposal (Ministry of Health, 2011c).

Some methods for managing household solid waste are described as follows:

(a) Solid waste storage

Onsite storage means the temporary collection of waste at the household level. It is important that waste is stored in proper containers. These could be baskets, preferably made from locally available materials, plastic buckets or metal containers (Ministry of Health, 2011c).

(b) Solid waste collection

In urban centers, collection is a function that has its own process and services. Waste is collected and held at central transfer stations where waste is stored before it is transported to a final disposal site. In rural areas, waste is not normally collected in this way and disposal is limited to onsite processing options, although sometimes there may be communal collection of solid waste using animal carts (Ministry of Health, 2011c).

In developing countries, the householder is responsible to convey their waste to a communal bin or transfer point provided in the locality. The municipality then collects the waste from these points and takes it to the final disposal site. Communal bins are often too far away for easy transfer of waste by householders. As a result, waste builds up in local areas of cities (Appleton et al, 2000).

Primary solid waste collection schemes have been initiated in many developing countries in response to this problem. These schemes are managed by non-governmental organizations (NGOs), community groups, or micro-contractors. They provide the door-to-door collection of waste and its subsequent transportation to the local municipal bins. The service charges are usually made directly to the users of the service but sometimes supplemented by external funding (Appleton et al, 2000).

(c) Resource recovery and processing

Resource recovery means finding a way to use the waste so it becomes a valuable resource, rather than just a disposal problem. This is a very important part of waste management. Resource recovery includes a range of processes for recycling materials or recovering resources from the waste, including composting and energy recovery (Ministry of Health, 2011c).

(d) Solid waste disposal methods

Even after recycling and resource recovery, there will be some residual waste that needs final disposal. Methods of disposal can be sanitary or unsanitary. Open field dumping is the most unsanitary method of refuse disposal and is most likely to cause a health hazard. Sanitary methods include controlled tipping or controlled burial, incineration and sanitary landfill (Ministry of Health, 2011c).

2.10.2.5. Integrated solid waste management

Ideally, waste management should go beyond pollution prevention and disease prevention for humans and should benefit society by providing economic gain for families and communities. The preferred approach for dealing with solid waste is integrated solid waste management

(ISWM) (Ministry of Health, 2011c). Integrated solid waste management (ISWM) is defined by Tchobanoglous et al (1993) as the selection and application of appropriate techniques, technologies, and management programmes to achieve specific waste management objectives and goals.

ISWM means considering not only the appropriate disposal of solid waste but integrating this with other management options such as minimizing waste production, recycling, composting and other waste recovery options. The advantages of ISWM are that it considers all options and aims to manage waste in ways that are most effective in protecting human health and the environment. ISWM can also have many economic and social benefits for the community (Ministry of Health, 2011c).

2.11. Challenges to improve environmental sanitation

There are many obstacles to populations and geographical areas gaining access to improved sanitation, including economic, political, and logistical barriers. Sanitation systems cost money, both to build and maintain. While many non-governmental organizations fund the building of various latrines or septic tanks, there is often no system set up to maintain the latrines and tanks, and the interventions prove unsustainable. Even when there is a system set up to maintain facilities, such as a public latrine charging for use, it is often the case that people refuse to pay for a service they may feel is inadequate or unnecessary. (Foundation, 2011)

Politically, the issue of sanitation coverage is complex because often the people who need access the most are also the most impoverished and disenfranchised, with the least amount of political capital and persuasive power. There are also segments of the population that are accustomed to open defecation and do not see the need for other sanitation options. Although many organizations have attempted to change this view with programs such as Community-Led Total Sanitation, which attempts to shame communities to move away from open defecation, in some areas of lack of demand for improved sanitation is still a problem. (Foundation, 2011)

Forty percent of the world's populations still do not have access to basic sanitation facilities. The most important reason for this is that in many circumstances there is far less demand for

sanitation than there is for water and other services, both among communities and decision makers. Successful and sustainable sanitation programmes begin with demand creation – at both the political and household level (United Nations Children's Fund, 2008). The barriers to the progress in providing sanitation outlined by UNICEF include: lack of political will, low prestige and recognition, weak institutional framework, inadequate and poorly used resources, inappropriate approaches, low demands from households, ineffective promotion, and low public awareness (United Nations Children's Fund ,1997).

The slow pace of improving sanitation coverage demonstrates that so far promotion efforts have been insufficient. New sanitation promotion initiatives rely on a variety of techniques to accelerate coverage. These include improved research and baseline surveys to better assess awareness levels and motivation of target audiences, using a wide variety of communication methods and media, and using social marketing approaches to better package and promote sanitation to communities (United Nations Children's Fund, 2008).

Improving sanitation coverage has many challenges. Sanitation coverage has focused on sustainability and equity, which can often be at odds with each other as far as providing improved sanitation. The environmental sustainability of how waste is physically being disposed of, and its impact on the surrounding environment, can affect all people, regardless of socio-economic status. Water resources for sanitation systems are also an important aspect of environment sustainability. Financial sustainability, how the sanitation systems and facilities will be operated and maintained and who is paying for them, depends in a large part on the consumer. The long-term sustainability of a system requires some sort of user fee and input from the people benefiting from the service. These fees are important to make sure people have ownership of their services and for accountability to make sure the system is functioning correctly. However, they can also be a barrier to sanitation for the poorest, which leads to unequal sanitation access and benefits. (Moe & Rheingans, 2006)

Cultures where open defecation is socially acceptable may not see a need to change their attitudes and practices, and populations without an understanding of germ theory may fail to see the public health benefits of sanitation. One reason for this is that sanitation coverage must be high in order for a community to see the effects of reduced disease and environmental

impact. Even 90% latrine coverage can be negated by 10% open defecation, and such high coverage numbers are rare in the developing world. (Cairncross, 1992)

Populations that recognize the need for or want sanitation facilities may also be limited by finances and logistics. Often it is the poorest of the poor that lack adequate sanitation and practice open defecation, and they cannot afford to pay for public facilities or the construction and upkeep of personal ones.(Cairncross, 2005)

Several methods have been used to increase sanitation coverage in low resource areas with mixed results. One of the more universal ideas, with many possible inputs and outputs, is to create new markets for sanitation. This involves incentivizing sanitation, either for health reasons, or other motivations such as privacy, hygiene, and social status. (Curtis & Cairncross, 2003) Once demand exists for sanitation, there are many options for fulfilling that demand including through NGOs and outside donors, working with local artisans, and/or working with the local or state government. Social marketing has been successfully used for other public health products and services, such as household drinking water treatment and insecticide-treated bed nets. (Waterkeyn & Cairncross, 2005)

One method of changing community perception of sanitation is Community-Led Total Sanitation (CLTS), (Foundation, 2011) This involves a trusted community member or outsider gathering the community together and explaining how open defecation results in feces movement to places where food is grown, children play, public areas, and water sources. (Kar, 2008) The purpose is to shame the community into rejecting open defecation, and empower the community to tackle the problem of open defecation. By addressing the community as a whole, the issue of partial sanitation coverage is avoided.

Sanitation is a challenging issue of today's world especially in poor countries where inadequate resources and awareness of community. Thus, it would be decent to launch community teaching and expanding community driven programs, encouraging local institutions such as; civil society organizations, community based organizations and private investors on the sector. In general, to win the battle against poor sanitation in developing countries like Ethiopia, several programs has to be applied otherwise sanitation is a rampant threat of health

in these countries.

2.12.The impact of sanitation

2.12.1. The impact of good sanitation

Good sanitation is important for a number of reasons, not least of all human dignity. Investing in sanitation services is a key element in improving urban living conditions, spurring rural development and reducing future costs associated with pollution, poor water quality and waste management. UNICEF and WHO (2001) present the benefit of investing in sanitation as: reduced morbidity and mortality and increased life expectancy, savings in health care costs, reduced time caring and sick leave (back to work), higher worker productivity, better learning capacities of school children, increased school attendance especially by girls, strengthened tourism and national pride, direct economic value of high quality water such as irrigation water for crops, and reduced water treatment costs.

2.12.2.The impact of poor sanitation

Poor Sanitation has impact on various areas of social development, which are discussed below.

a. Impact on health

Lack of access to safe sanitation facilities is a significant cause of ill health (Evans, 1994). Poor sanitation promotes the spread of health problems. Many infections of human beings are spread through inadequate sanitation. Viruses, bacteria, protozoa and worms may spread through direct contact, indirectly via carriers and vectors. Cholera deaths are an indication of a poor health system and certainly poor sanitation (Hall, 2003). Poor sanitation impacts on the health, quality of life, and development potential of communities. Poor sanitation is a major cause of diarrhea. The White Paper on Basic Household Sanitation (RSA; 2001) affirms that adequate basic household sanitation facilities can have dramatic health benefits to communities.

b. Impact on the economy

Inadequate sanitation, through its impact on health and environment, has implications for economic development, (UNICEF, 2001). People absent themselves from work due to excreta-

related diseases. Poor health's keep families in a cycle of poverty and lose of income. The national cost of productivity, reduced education potential and curative health care is substantial. The increasing pollution of rivers and shorelines negatively impact on businesses such as tourism and agriculture, which are vital to nations' economic growth. Lack of excreta management also poses a fundamental threat to global water resources. The White Paper on Basic Household Sanitation (RSA, 2001) highlights the benefits of improving sanitation: reduced morbidity and increased life expectancy, savings in health care costs and reduced time for caring and sick leave (back to work).

c. Impact on the environment

Sanitation systems involve the disposal and treatment of wastes. A lack of adequate sanitation system constitutes a range of pollution risks to the environment, especially the contamination of surface and ground water resources. This, in turn, increases the cost of downstream water treatment as well as the risk of disease for people who use untreated water. According to The White Paper on Basic Household Sanitation (RSA, 2001) the effects of pollution include: waterborne diseases, blue baby syndrome in bottle-fed infants, excessive growth of aquatic plants which are toxic and depletion of oxygen in the water. Poor environmental sanitation practices also affect the environment in diverse ways. Particularly in the context of urbanization, indiscriminate littering, domestic wastewater, sewage and solid waste improperly discharged presents a variety of concerns as these promote the breeding of communicable disease vectors as a result of air, water and soil pollution.

Poor waste management also contributes to a loss of valuable biodiversity. In the case of coral reefs, urban and industrial waste and sewage dumped directly into the ocean or carried by river systems from sources upstream, increase the level of nitrogen in seawater. Increased nitrogen causes overgrowths of algae, which in turn, smother reefs by cutting off their sunlight. Improved environmental sanitation management reduces environmental burdens, increases sustainability of environmental resources and allows for a healthier, more secure future for the population. (WHO, 2008).

d. Impact on social aspects

Inadequate sanitation facilities, disposal of wastes and poor sanitation practices result in loss of privacy and dignity, exposure and increased risks to personal safety, The White Paper on Basic Household Sanitation (RSA, 2001).

2.13. The role of stakeholders in environmental sanitation

2.13.1. Government

Following the decentralization policy of the Ethiopia Government, sanitation and hygiene mandate has been given to different levels of governments.

i) Ministry of Health

At federal level the Ministry of Health, through its Hygiene and Environmental Health Department (HEHD), has the primary responsibility for sanitation and hygiene promotion in the country. The instruments governing sanitation in the country are the Health policy, the Environmental Health policy, the National Water Resources Management policy, and the recently developed Sanitation Strategy (MoH, 2005b).

The major responsibilities of the MoH are finalize and enact the sanitation and hygiene promotion strategy and guidelines through a consultative process; develop the advocacy campaign by raising the sanitation profile, lobbying for ear marked funds and seeking influential sanitation champions; support the testing and development of appropriate Information, Education and Communication (IEC) materials (e.g. PHAST approaches); liaise closely with training institutions to ensure consensus on the sanitation strategy, the inclusion of 'best practice' in the curriculum, and the equipping of extension staff with appropriate tools; source funds from donors and the private sector promote the sector wide approach; support research, development and dissemination; and collect, develop and disseminate examples of legal and regulatory documents (bylaws) (MoH, 2005b).

ii) National Coordinating Forum

Membership will be drawn from the Ministries of Health, Water Resources, Education and

Agriculture as well as the EPA, NGOs, Academic Institutions, private sector sanitary suppliers and donors. As a coordinating and advisory body, the main general responsibilities of the National Coordinating Forum are; implementing policy overview and co-ordination, monitoring and evaluation of national sanitation strategy; facilitating inter sectoral convergence and broad based stakeholder participation; set standards for sanitary facilities and water including quality monitoring; build up extensive sanitation network; develop impact monitoring systems and assessments; disseminate information and, ensure national meetings rotate between regions(MoH,2005).

iii) Regional Health Bureaus

The regional health bureaus will be the principal drivers of sanitation and hygiene promotion through their existing institutional mandates. They will work in tandem with water and education bureaus to ensure integrated planning and coordinated complementary activities. Their work will focus on strengthening *wereda* capacity and commitment through the following approaches:

Wereda **mobilization**: The region will mobilize *wereda* administrations to take responsibility for 100% adoption of improved sanitation and hygiene in their respective *weredas.*

Wereda **advocacy**: The region will develop a convincing advocacy package reflecting examples of best practice (emphasizing the methods used) using attractive mixed media for presentation to *wereda* administrators. This process will be ongoing with examples of best practice continually documented and disseminated.

Capacity building: Human resource assessment and development will be required supporting inter-*wereda* exchange visits. In addition, regular supportive supervision to *weredas* to monitor progress against performance contractual agreements will be needed.

Research, monitoring, evaluation and feedback: The region will implement research, development and dissemination of cost effective software and hardware options to facilitate choice and application of appropriate technology such as EcoSan and biogas.

iv) *Wereda* Health desks:

At *wereda* level, administrator is the key body to spearhead sanitation and hygiene promotion throughout the *wereda* and to ensure targets set are achieved. The health desk will take the lead but work closely with water, education and rural development desks.

The Key responsibilities of *Wereda* Health desks are integrated *wereda* sanitation and hygiene promotion planning and budgeting; planning and implementation arrangements for sanitation and hygiene promotion with *kebeles* including schools and other institutions; sanitation and hygiene promotion campaigns; budget and resource mobilization; the development of appropriate and sustainable methods (testing a variety of mixed media) to promote enduring individual and collective behavior, and ultimately social change; community contract management for school and institutional latrine construction; the enactment and enforcement of by-laws for sanitation and hygiene (including water quality); the provision of a sustainable system for supportive supervision and monitoring of sanitation and hygiene promoters. This includes sanitarians, health\ extension workers and contact women (MoH, 2005).

v) *Wereda*/Zonal Sanitation and Hygiene Coordinating Forum

The *Wereda* Coordinating Forum is led by the *wereda* administrator. Membership is primarily drawn from the Health, Water, Education, Rural Development and Agriculture desks but could also co-opt Women's Affairs, women's associations, the youth and prominent persons such as *Kebele* administrators, NGOs, learning institutions and HEWs. The main responsibilities of the *Wereda* Co-coordinating Forum are to oversee and monitor hygiene and sanitation promotion throughout the *wereda* and ensure coordinated and linked development (MoH, 2005).

vi) Local Contractors

NGOs, community based organizations (CBOs) or the private sector could be identified at the *wereda* or zonal levels to carry out sanitation and hygiene assessments with the community, leading to institutional latrine construction through technical support. Tasks could also include pit digging, slab production, toilet construction (including institutional and public toilets), soap making and the distribution of sanitary products such as soap, taps, jerry cans and pans. Beside, the private sector has been playing the role of consultants, contractors, suppliers of equipment

and spare parts in the water sector (MoH, 2005).

vii) *Wereda* Support Groups and Local Service Provider

In the RWSSH Program there will be a role for designated organizations to support the *weredas*. This role will be to effectively formalize the existing roles of NGOs and local consultants (MoH, 2005).

2.13.2. NGOs

There are an increasing number of local NGOs active in the sanitation and hygiene sub-sector such as Progynist, Water Action, Nacid, Kale Heywot Church and Sudea (EcoSan) as well as international NGOs like Water-Aid, Care Ethiopia, Oxfam and Concern. Almost all of these NGOs are involved in the actual implementation of hygiene and sanitation work at the grassroots level. In the past NGOs were known for doing the software component of the hygiene and sanitation along with financing household latrines to the extent of building them themselves. At present most of the NGOs are abiding with government policy and strategy requirements and have shifted all their focus to the software part of promotion and capacity building. NGOs play a significant role in WASH particularly in introducing new promotion methods (Water supply & sanitation collaborative council, 2009).

The Water and Sanitation Forum (WSF) is established specifically for the civic societies for sharing experiences and best practices, for strong policy advocacy and lobbying in the sector, networking and building partnership amongst members, and for collective impact in WASH (water supply & sanitation collaborative council, 2009).

2.13.3. Private Sectors

Involvement of the private sector in hygiene and sanitation is somehow limited. Garbage collection from house to house in main urban centers is mostly done by private sectors; in fact some are street kids that have organized themselves to do so. Construction of private latrine facilities in towns is done by private masons or contractors. There are also a number of artisans (men and women) who have received training in slab production and latrine construction even in rural Ethiopia. Roto Molder is producing square plastic latrine slabs and there are local

porcelain sanitary ware producers notably making a urine diversion unit for ecological sanitation (water supply & sanitation collaborative council, 2009).

2.13.4. Others

Improved sanitation and hygiene is the responsibility of all individuals, households, and communities. In short it is the responsibility of all Ethiopians. The communities should empower themselves through individual and collective behavior change to own and lead sanitation improvements. It will be achieved through collective responsibility with mutually reinforcing roles played at each level. While sector professionals have responsibility to create the enabling environment, success will depend on committed political, administrative and budget support. (MOH, 2005).

Chapter three

3. Research methodology

3.1. Research design

The main objective of this study is to assess knowledge, attitude and practice of people towards urban environmental sanitation; the target population of this study are selected residents of *Wereda* nine administration of *Gullele* sub –city of Addis Ababa. The major sources of data are both primary and secondary sources. The main instruments of data collection for this study are personal observation and questionnaires. For this study, the study area is selected through purposive sampling method and the respondents are selected through simple random sampling method. In the analysis part of this study descriptive statistics was used. To check the existing of statistically significant relationship of the independent variables and dependent variables chi-square test was employed. Finally, based on the result of the findings appropriate conclusions and recommendations was made.

3.2. Sources of data

All the necessary data required for the study were obtained from both primary and secondary sources. Primary sources of data were personal observation of the researcher and questionnaires with selected sample residence of *Wereda* nine administration of *Gullele* sub-city. Secondary sources of data were data that help to review the overall environmental sanitation. Relevant documents concerning environmental sanitation were the major sources of secondary data.

3.3. Data collection instruments

3.3.1. Personal observation

Since environmental sanitation is highly linked with the day to day life of the people, personal observation enabled the researcher to observe the situation of environmental sanitation in the study area. Besides, personal observation also has the advantage to observe how the residents of the area exercise environmental sanitation.

3.3.2. Questionnaires

The questionnaires had two sections:

Section A: It provided information on demographic characteristics of respondents (age, gender, income level, level of education and family size.)

Section B: It gave information about knowledge, attitude and practice of people about urban environmental sanitation. The complete questionnaires were scored along the dimensions of knowledge, attitude and practice of people about urban environmental sanitation.

3.4. Sampling methods

It is necessary to take a part of the population from which information is drawn to represent the entire population in the selected *Wereda*. The samples for this study were taken from the households of *Wereda* Nine Administration of *Gullele* sub-city of Addis Ababa. The *Wereda* has 2509 number of households and 35344 number of population (*Wereda* nine administration communication office, 2014).

The study employed two types of sampling techniques including purposive sampling and simple random sampling. Wereda Nine Administration which is located in Gulele sub-city of Addis Ababa was selected with purposive sampling. Simple random sampling method was used to select households which are the sampling units of the study. All households in the Wereda were included as a sampling units having equal chance of being selected. The sampling frame was the lists of registered households of the Wereda and this list was obtained from the registration performed by the Wereda Administration and used for the selection of the households. Using the simple random sampling method, houses in Wereda Nine Administration were selected randomly by means of the table of random numbers from the registered list of households in the Wereda which is the sampling frame.

The households were randomly selected from the registered list of all the households of the Wereda according to the inclusion and exclusion criteria, a number was assigned to each heads of household name on the list, and then using a table of random numbers the households were selected from the registered lists. Inclusion sampling criteria for this research was being a household lived in a registered house unit of the Wereda Nine Administration. Exclusion

sampling criteria for the research were being institutions (such as offices, hotels shops etc) other than households and households that were not registered in the Wereda Administration.

The respondent from the randomly selected household was filled questionnaires following informed consent. The eligibility criterion for being a respondent was household head, who is responsible household work and the female household head was given priority, because they are more knowledgeable about household sanitation. Where the two respondents were not available a person of at least 20 years of age, preferably an adult female of the household, who is most familiar concerning environmental sanitation, was filled questionnaires.

During the data collection, respondents from the randomly selected households that were eligible and willing to participate in the study were made to take part in the study.
As to sample size determination, the estimation of the total sample size is derived from the formula below (Acheampong at al, 2010)

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

Where n= is the sample size

N= is the total number of households

∂ = is the margin of error

$$n = \frac{2509}{1+2509(0.05)2} \quad or \quad n = \frac{2509}{7.27} = 345$$

3.5. Variables of the study

The independent variables of this study were gender, age, income level, level of education and family size while the dependent variables were knowledge, attitude and practice of people about urban environmental sanitation in *Wereda* nine administration of *Gullele* sub-city of Addis Ababa.

3.6. Data analysis and presentation techniques

The study was analyzed both qualitatively and quantitatively to give clear understanding about the problem. Therefore, qualitative data was analyzed and presented through description, narrating and interpreting the situation deeply and contextually so that people's knowledge, attitude and practice towards urban environmental sanitation are revealed.

Similarly, quantitative data was analyzed and presented using descriptive statistics like tables, means, frequencies, percentages and graphs to give clear understanding of the issues quantitatively. In addition, to check whether there is statistically significant relationship in people's knowledge, attitude and practice towards urban environmental sanitation based on age, gender, income level, level of education and family size, chi-square test was employed.

3.7. Pilot study

Bless and Higson-Smith (2000:155) define "pilot study" as a small study conducted prior to a larger piece of research to determine whether the methodology, sampling, instruments and analysis are adequate and appropriate.

Twenty respondents were selected as part of the pilot study for this research. The aim was to test reliability, validity and feasibility of the research methodology. The face validity of the instrument was obtained through the judgment of other researchers and expert. The result of the pilot study indicated that the respondents understood the questionnaires. These respondents were also included as part of 345 sampled respondents.

By using the result of the pilot study the reliability of items, which were prepared to measure people's knowledge, attitude and practice towards urban environmental sanitation, was checked. The reliability of knowledge items was calculated using split-half reliability Kuder and Richardson formula-20, which yielded a coefficient of r= 0.75. The reliability of attitude and practice items were calculated using split-half reliability Spreaman-Brown coefficient, which yielded a coefficient of r=0.71 and r=0.73, for attitude and practice respectively, in all cases it was reliable.

Chapter four

4. Data analysis and presentation

In this chapter analysis and discussion of the findings in relation to people's knowledge, attitude and practice towards urban environmental sanitation was made. Discussion of demographic characteristics of the respondents also provided. The findings were interpreted and explained with the help of tables, means, graphs, frequencies, percentages and other statistical information. In addition, analysis was made and discussed on the relationship between the dependent variables and independent variables by using chi-square test.

4.1. Demographic characteristics of the respondents (see appendix-A)

The category on demographic characteristics of the respondents had five variables. They were gender, age, level of education, level of income and family size. The data were presented in the tables below.

Table.4.1.Gender characteristics of the respondents

Variable(gender)	frequency	percent
Male	151	43.8
Female	194	56.2
Total	345	100

Females, traditionally, played a major role in terms of environmental sanitation, as they implemented most of the household activities such as preparation of food, cleaning of their children, houses, compounds and their surroundings. In this research as indicated in the sampling method, the female household head was given priority because they are more knowledgeable about household sanitation. It is evident from the research findings that this study had more female respondents than the male respondents. Females comprised 194(56.2%) of the sampled respondents while the male constituted 151(43.8%) of the sampled respondents.

Table.4.2. Age characteristics of the respondents

Variable(age) in year	Frequency	percent
20-29	119	34.5
30-39	83	24.1
40-49	78	22.6
50-59	48	13.9
60-69	17	4.9
Total	345	100

The result in table.4.2 shows that the mean age of the respondents was 33.4 years. The study required sample respondents from each household to be over the age of 20 years. The selection was based on the fact that they were matured and they would provide responsible answers. Table.4.2 reveals that the majority of the respondents in the sample i.e., 119(34.5%) were in the age group of 20-29years.Followed by 83 (24.1%) of the respondents were in the age group of 30-39 years. The third group of the respondents whose age group 40-49 years constituted 78(22.6%).The other group of the respondents belonged to the age group between 50-59 years comprised 48(13.9%).The final group of respondents whose age group between 60-69 years accounted 17(4.9%) of the sample respondents.

Table.4.3. Education level of the respondents

Variable(level of education)	frequency	percent
No formal education	27	7.8
Primary education	89	25.8
Secondary education	172	49.9
Tertiary education	57	16.5
Total	345	100

The level of education that a person has, determine the level of understanding about environmental sanitation in the household or across the community. The research findings in table.4.3, indicated that the majority of the respondents 172(49.9%) had secondary education. The respondents who had primary education comprised 89(25.8%) of the sample. Those with tertiary education constituted 57(16.5%) of the sample respondents. There were few number of respondents 27(7.8%) who had no formal education.

Table.4.4.Income level of the respondents

Variable(level of income in month)	Frequency	percent
Less than 500 birr	43	12.5
501-1000 birr	116	33.6
1001-1500birr	101	29.3
1501-2000 birr	46	13.3
Above 2000 birr	39	11.3
Total	345	100

Provision of sanitation and the type of the facility is determined by affordability and the ability of the households to pay for such services. People may want sanitation very badly, yet be powerless to express that desire in financial terms (UNICEF, 2000). For the convenience of analyses the researcher classified the income level of the respondents by 500 class interval. The results of the study in table.4.4 showed that the mean income level of the respondents was 996 birr. The majority of the respondents, which constituted 116 (33.5%), had monthly income between 501-1000 birr. Those respondents who earned monthly income between 1001-1500 birr comprised101 (29.3%) of the sample. The other group of respondents who earned monthly income between 1501-2000 birr accounted 46(13.3%).Those respondents who earned monthly income less than 500 birr consisted 43(12.5%) and the rest part of the respondents who earned monthly income above 2000 birr constituted 39(11.3%).

Table.4.5. Family size of the respondents

Variable(family size)	frequency	percent
1-3 individuals	91	26.4
4-6 individuals	159	46
7-9 individuals	82	23.8
Above 10 individuals	13	3.8
Total	345	100

Family size is closely linked to socio-economic status of households and their prospects in life. The size of the household has an impact on environmental sanitation and the use of

environmental sanitation facilities (Weeks, 2005). Table.4.5 indicated that the mean family size of the respondents was 4.9 individuals. It is evident that most of the respondents had the family size between 4-6 individuals constituted 159(46%) of the sample and 91(26.4%) of the respondents indicated that their families size were between 1-3 individuals. Households which belonged to 7-9 individuals comprised 82(23.8%). Only about 13(3.8%) of the respondents had family members of above 10 individuals.

4.2. Analysis of people's knowledge, attitude and practice towards urban environmental Sanitation

4.2.1. Analysis of people's knowledge towards urban environmental sanitation

4.2.1.1. People's level of knowledge

Measuring the knowledge of people's towards urban environmental sanitation is somehow challenging as there is no a standardized set value. In this study the researcher observing the distribution people's score in the knowledge section; judgmental values were assigned to categorize the level of residents' knowledge about urban environmental sanitation issues included in the research. A total of 16 items were included in the knowledge category. Residents who answered 1-4 questions correctly were classified as having 'low' knowledge level regarding the environmental sanitation issue raised in the study. Those residents who answered from 5-8 questions correctly were considered to have 'moderate' level of knowledge on that matter, residents who answered from 9-12 correctly were placed as 'moderately' high level of knowledge ,and residents who answered 13-16 questions correctly were classified as having 'high' level of knowledge on the issues included in this study.

Table.4.6. people's level of knowledge

Knowledge score	frequency	Percent
1-4	46	13.3
5-8	97	28.1
9-12	121	35.1
13-16	81	23.5
Total	345	100

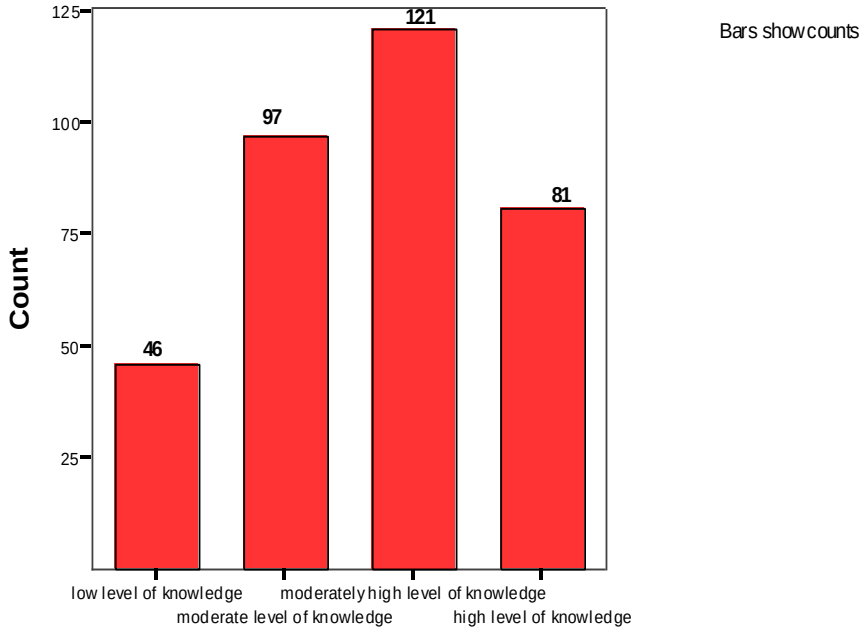

Figure 4.1.Frequency distribution level of Knowledge of people towards urban environmental sanitation

The result showed that the majority of the residents had moderately high level of knowledge on those issues covered in this section. It may be due to the fact that the majority of the respondents had secondary education. But, the result was not as such satisfactory as environmental sanitation is one of the basic elements of the health living of human being, most of the residents were expected to acquire high level of knowledge .This lack of knowledge may be due to lack of information as well as lack of residents' motivation and initiation on urban environmental sanitation issues.

4.2.1.2. Analysis of residents' knowledge towards urban environmental sanitation based on each individual item

In the following section analysis of residents' responses to individual item was made. This individual item analysis was important to indicate areas of urban environmental sanitation in which most residents have knowledge and lack of knowledge. Correct response implies that people have knowledge in that particular issue and wrong response implies lack of knowledge on that issue. The sixteen items were presented in a paraphrased form using frequency and

percentage distribution of respondents in relation to water, waste, population and solution related issues. (See appendix-B).

4.2.1.2.1. Resident's knowledge to water related issues (questions 8 and 11)

In the case of item 8, "improper management of waste pollute the source of water and cause typhoid fever", around 279(80.9%) of the respondents gave correct answer whereas 66(19.1%) of the respondents provided wrong answer. Thus, due to lack of knowledge, improper waste management is one of the major sources of water pollution that causes different water –borne diseases. The White Paper on Basic Household Sanitation, RSA, 2001, described that a lack of adequate sanitation system constitutes a range of pollution risks on the environment, especially the contamination of surface and ground water sources. This in turn increases the risk of disease for people who use untreated water.

In the case of item 11, 150(43.5%) of the respondents provided the correct answer while 195(56.5%) of the respondents provided wrong answer to" the provision of a safe water source is a key entry point to improve sanitation and hygiene". This result is not satisfactory because higher respondents who were not clearly understand the importance of safe water supply to improve sanitation and hygiene of the community. Korkeakoski, 2006 described that, "access to clean water can be considered as one of the basic needs and rights of a human being. Health of people and dignified life is based on access to clean water."

4.2.1.2.2. Resident's knowledge to waste related issues(questions1,2,3,4,5,6,7,9,10,14 and 15)

As to item 1, it reveals that high number of respondents 289(83.2%) were knowledgeable on the matter that "sanitation is a group of method to collect human excreta, urine and community waste in a hygienic way." whereas 56(16.8%) of the respondents had wrong response on the issue. In line with this, WHO, 2006 described that sanitation as a group of methods to collect human excreta and urine as well as community waste in a hygienic way where human and community health are not altered.

In the case of item 2, "environmental sanitation is the control of environmental factors that form links in disease transmission", 271(78.6%) of the respondents gave correct response whereas 74(21.4%) of the respondents gave wrong response to the issue. According to the Ministry of Health (2011b), environmental sanitation is the control of environmental factors that form links

in disease transmission. This category includes solid waste management, water and wastewater treatment, industrial waste treatment and noise and pollution control.

As to item 3, "environmental sanitation is keeping our environment clean", the highest number of respondents 304(88.1%) provide positive response while 41(11.9%) of the respondents had negative response on the issue. According to the Ministry of Local Government and Rural Development (1999), environmental sanitation is efforts or activities aimed at developing and maintaining a clean, safe and pleasant physical environment in all human settlements.

In the case of item 4 ,53(15.4%) of the respondents agreed that environmental sanitation is avoiding waste in an open space, this is one of the major cause to the occurrence of urban environmental sanitation problems ,whereas 292(84.6%) of the respondents awarded that environmental sanitation is not avoiding wastes in an open space. If only a few household dispose of waste properly, the village environment may remain dirty and contaminated (Howard, 2002:52).

With regard to item 5, it was found that 207(60%) of the respondents identified that burying of household wastes can bring to environmental sanitation in their living area whereas 138(40%) of the respondents identified as burying of household wastes cannot bring to environmental sanitation in their living area. In both cases there may be a possible correct answer here, if the household waste is organic one burying can be an option to avoid waste without environmental contamination, whereas if the waste is inorganic (chemical) one burying can bring environmental pollution, especially it lead underground water and soil contamination.

In the case of item 6, 147(42.6%) of the respondents agreed that "burning of household waste can bring to environmental sanitation" whereas 198(57.4%) of the residents were against the issue of "burning household wastes can bring environmental sanitation". Thus the result implied that large number of respondents were unable to associate the harmful effect caused by burning of household waste on the environment and its population. It also causes ozone layer depletion.

In the case of item 7, "improper waste management attracts the multiplication of micro-organisms like fungi, virus, bacteria which affect human health", 301(82.2%) of the respondents who awarded the issue that the multiplication of such micro-organisms affect human health negatively while 44 (12.8%) of the respondents were unable to understand the multiplication of

such micro-organisms affect human health. World Health Organization regional Office for Africa, 2009, described that "poorly managed waste presents a health risk to communities. This is primarily because waste that remains uncontrolled or improperly disposed of can be a source of contamination and breeding sites, such wastes contribute to diarrhea, vector –borne diseases and contamination of drinking water and other water sources."

With regard to item 9, "dirty environment breeds flies which precipitates the occurrence of diarrhea", around 274(79.4%) of the respondents understood that dirty environment breeds flies which precipitates the occurrence of diarrhea whereas 71(20.6) of the respondents were unable to understand on how dirty environment affect human health. The White Paper on Basic Household Sanitation, RSA, 2001, described that poor sanitation is a major cause of diarrhea. Howard in 2002 also described that untreated refuse degrades both the quality of the environment and the quality of life in the community. It also provides a breeding ground for disease causing vectors such as mosquitoes, flies, and rates. To be effective, waste disposal programs require action at both household and community level. If only a few households dispose of waste properly, the village environment may remain dirty and contaminated.

As to item 10,309(89.6%) of the respondents had knowledge with regard to the matter, "inaccessibility of adequate sanitation facilities strengthen the cycle of diseases" whereas 36(10.4%) of the respondents were not understand well that where lack of accessibility of adequate sanitation facilities aggravate the cycle of diseases. According to Bruijne,Geurts and Appletion,2007 "adequate sanitation include facilities that form a hygiene environment and reduce people's exposure to disease causing organisms." Pathak et al, 2002 also described that "inaccessibility of adequate sanitation facility strengthens the cycle of disease, poverty and weakness. Expanding access to basic water supply and sanitation, integrated with hygiene education can reduce the burden of water related diseases significantly by improving the lives of a large part of the world's population."

In the case of item 14, around 297(86.1%) of the respondents were able to identify that waste disposal method is a problem in their neighborhood while 48(13.9%) of the respondents gave opposite response. The result states that, there is a problem of waste disposal method in the residents' neighborhood of *wereda* nine administration. This may be due to lack of knowledge how to dispose their waste or lack of waste disposal facilities in their living area. According to

Ministry of Health 2011c, methods of waste disposal can be sanitary or unsanitary. Open field dumping is the most unsanitary method of refuse disposal and is most likely to cause a health hazard. Sanitary methods include controlled tipping or controlled burial, incineration and sanitary landfill.

As to item 15, 203(58.8%) of the respondents awarded that leaving waste around their house or in the immediate surrounding as an offense whereas 142(41.2%) of the respondents not awarded the issue as an offense. The result indicated that the importance of awareness creation of environmental sanitation law through different means by the concerned bodies to the public in general.

4.2.1.2.3. Residents' knowledge related to population (question 12)

In the case of item 12, around 38(11%) of the respondents gave wrong answer while 307(89%) of the respondents provided correct answer to "all section of the societies are proportionately affected by urban environmental sanitation problems". This result supported in many literatures that poor people were identified as disproportionately affected by urban environmental sanitation problems. Pathak et al, 2002 explain that "the benefits of environmental protection, such as clean water, air and suitable sanitation facilities should be available to all, but in reality a disproportionate burden of protecting the environment is borne by poor, especially the urban poor." Waterkeyn and Cairncross, 2005 also stated that "often the poorest of the poor that lack adequate sanitation and they cannot afford to pay for public facilities or the construction and upkeep of personal ones."

4.2.1.2.4. Residents' knowledge related to solution of environmental sanitation (questions 13 and 16)

As to item 13, "environmental sanitation is achieved through engaging the services of waste collectors", around 236(68.4%) of respondents understood that environmental sanitation is achieved through engaging the services of waste collectors whereas 109(31.6%) of the respondents had opposite response on the issue. According to Hoornweg & Giannelli in 2007 described that "Small community-based organizations (such as cooperatives) and private microenterprises play an important part in providing waste management services. These small-

scale service providers offer several advantages, including low-cost, labor-intensive approaches and greater community participation, which encourage better collection and source separation."

In the case of item 16,277(80.3%) of the respondents agreed that "the best solution to improve urban environmental sanitation condition in their living area is environmental sanitation education" whereas 68(19.7%) of the respondents not supported the issue. The results showed that majority of the residents considered that environmental sanitation education is an instrument to improve environmental sanitation in *wereda* nine administration. Korkeakoski, 2006, described that "health and hygiene education is connected to sanitation in order to make people recognize where health problems originated and how to better sanitation by their own actions."

This study in general indicated that the respondents were knowledgeable about urban environmental sanitation. It may be due to the fact that the majority of the respondents had secondary education and few of them had tertiary education, however it was not adequate as environmental sanitation is one of the basic element of the health living of human being. This lack of adequate knowledge may be due to lack of residents' motivation and initiation on urban environmental sanitation matters.

4.2.2. Analysis of people's attitude towards urban environmental sanitation

Sustainable urban environmental sanitation requires changes in the values and attitudes of people's toward urban environment and sanitation. Although it is important to create knowledge upon the people concerning urban environmental sanitation, knowledge alone is not enough unless efforts are applied to their attitudes and practices.

One of the main objectives of this research is to investigate people's attitude towards urban environmental sanitation. Similar to that of knowledge measuring attitude element is also challenging as it is a human behavioral element, so still there is subjective judgment of the researcher. To identify people's attitude concerning urban environmental sanitation a standardized Likert type of scale was employed. Likert scale applies scales from strongly agree, agree, undecided, disagree and strongly disagree. There were twenty two items presented to measure residents' attitude, of these some of the items forward definite favorableness while the remaining items forward definite unfavorableness.

In assigning values to favorable items the scale were weighted going from strongly agree, agree, undecided, disagree, strongly disagree, having 5, 4,3,2,1 values respectively. But, in the case of unfavorable items these values were reversed in the scale strongly disagree, disagree, undecided, agree, strongly agree, having 5, 4,3,2,1 values respectively.

Thus in this study people's attitude mean score was taken into consideration to conclude on people's urban environmental sanitation attitude. Accordingly, there are twenty questions written on a five-point Likert scale. The maximum score is 100 if a resident has scored 5 for all of the 20 items. The minimum score is 20 if a resident has scored 1 for all of the 20 items. A score of 60 is in the middle position if a resident score 3 for all of the twenty questions. If the mean score of the residents are below 60 it is considered as the residents have unfavorable attitude and a score of greater than 60 it is considered as the residents have favorable attitude. In this study the mean score of the residents' attitude was calculated and obtained 61.7 which indicate that the respondents have generally favorable attitude towards urban environmental sanitation.

In addition, to analyse residents' attitude on issues raised in each item the mean value on a five-point Likert scale is taken into consideration. The criterion mean of 3 was derived by adding all the weighted points and divided them by 5. That is 5+4+3+2+1=15/5=3 Thus if the mean on a five-point scale is 3, it is a middle position indicating residents' unclear stand, an average for item greater than 3, is taken as favorable, and an average value less than 3, is considered unfavorable attitude. Accordingly considering the entire 22 attitude questions the residents had favorable attitude having mean greater than 3 except in question 5, 7, 12, 13, 14, 15, 17, and 20. (See table.4.7 and figure.4.2)

Table.4.7.people's attitude based on the mean value on a five point scale

Questions	1	2	3	4	5	6	7	8	9	10	11	12
mean	3.8	4.2	3.4	3.1	2.2	3.2	2.5	3.8	3.5	3.1	3.9	2.3
Questions	13	14	15	16	17	18	19	20				
mean	2.2	2.1	2.6	3.6	2.5	3.6	3.6	2.5				

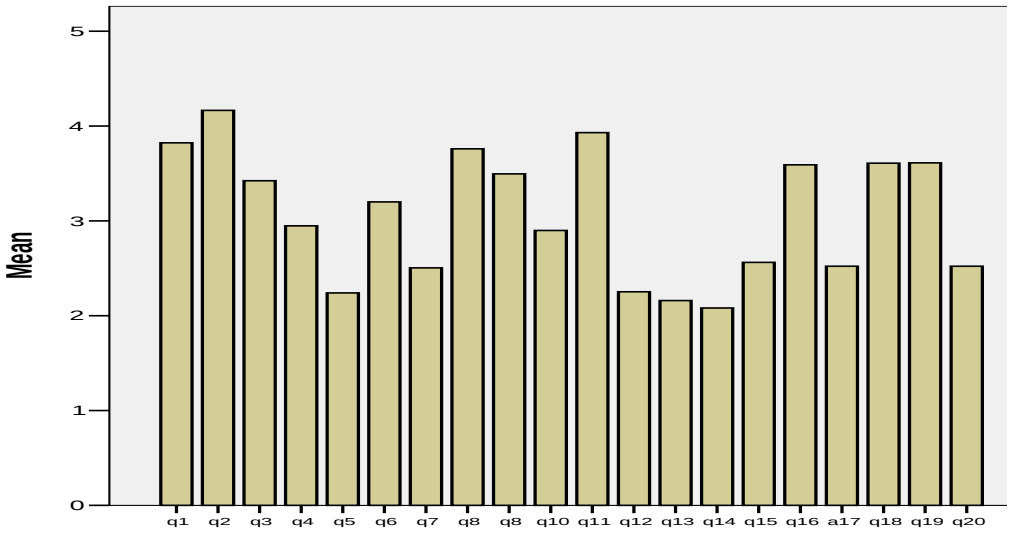

Figure.4.2.Attitude of people's towards urban environmental sanitation based on the mean value of each individual item.

In the following section analysis is made on the percentage share of residents with favorable, neutral and unfavorable attitude category based on attitude of residents' on environmental sanitation problems, environmental sanitation issues in *Wereda* Nine Administration and on the solution of urban environmental sanitation problems. (See appendix-C)

4.2.2.1. Attitude of residents' on environmental sanitation problems (questions 1,2,5 and10)

In the case of question 1, there were only 17.4% of the respondents who had unfavorable attitude to the issue that "the underlying cause of urban environmental sanitation problem is poverty" whereas 14.8% and 67.9% of the respondents respectively had neutral and favorable attitude towards the view. Thus from the data; majority of the residents supported that poverty is a major cause of urban environmental sanitation problem. Cairncross in 2005 explained that "often it is the poorest of the poor that lack adequate sanitation and practice open defection, and they cannot afford to pay for public facilities or the construction and upkeep of personal ones."

In the case of question 2, 51.4% of the respondents had favorable attitude while 24.6% and 24% of the respondents respectively had neutral and unfavorable attitude to the view that "the impact of inappropriate dumping wastes in open fields and around road sides causes the area loses its natural beauty, bad odor to the community, health problems on the society and pollution of surface and ground water". The result shows that majority of the respondents were supported that the bad impact of inappropriate waste disposal since it creates problems on the environment and

the health of human being. Ministry of water resources, 2004 described that "the existing situation of waste management in the country shows that the services are inadequate, and the coverage is very low. The problem of waste management is critical in densely populated urban areas. Wastes are dumped at rivers banks, roads, ditches, drainage pipes and pit latrines."

As to question 5, 69.9% of the respondents had unfavorable attitude, they were against the idea that "open burning of wastes has no impact on the health of human being." Whereas 17% of the respondents had favorable attitude and13.1% of the respondents had neutral attitude on the case. Thus the majority of the respondents trusted that open burning of waste causes environmental pollution that also affects the health of people; it also causes ozone layer depletion.

As to question 10, 39% of the respondents had unfavorable attitude whereas 18.6% and 42.4% of the respondents respectively had neutral and favorable attitude to the issue that "environmental sanitation problem is a temporary problem so there is no need to worry about it." As the highest numbers of respondents support this idea, it showed people failed to recognize that environmental sanitation problem is not as temporary problem. This implies that greater part of residents could not identified that environmental sanitation problems which are affecting the present generation can also affect the coming generation.

4.2.2.2. Attitude of residents' on environmental sanitation issues in *Wereda* Nine Administration (3, 4, 8,9,12,13,14,15 and 20)

As to question 3, 58.5%, 15.4% and 26.1% of the respondents respectively had favorable, neutral and unfavorable attitude to the issue that "the residents of *wereda* nine are severely creating environmental sanitation problems." Thus, the majority of the respondents supported that *wereda* nine people created environmental sanitation problems. Therefore, the *wereda* residents have responsibility to make their surroundings clean by working together, this helps either to protect themselves from sanitation problem related diseases or to beautify their *wereda.*

In the case of question 4, 37.7% of the respondents had unfavorable attitude whereas 23.3% and 39% of the respondents had neutral and favorable attitude respectively to the issue that "one should not blame the residents of *wereda* nine who dump wastes on the road sides and rivers because that is the only choice they have to dispose waste." Ministry of water resources, 2004, explained that "refuse disposal sites in urban areas are often insufficient and unorganized."

In the case of question 8, 62% of the respondents had favorable attitude whereas 19.7% and 18.3 of the respondents had neutral and unfavorable attitude respectively to the idea that "the most serious environmental sanitation problems in my living area are disposal of solid and liquid wastes." This result showed that the highest percentage of the respondents face problems with regard to disposal of solid and liquid waste. Ministry of water resources in 2004 also described that "public sanitation services such as public toilet facilities, sludge (seepage) collection and related environmental health services, they are generally inadequate and do not meet demands."

As to question 9, 62.3% ,23.5% and 14.2% of the respondents had favorable, unfavorable and neutral attitude respectively to the view that " sanitation services in my living area including networks and systems are bad and need to maintenances, development and replacement." The majority of the respondents had favorable attitude to the view, so the *wereda* administration and other stakeholders have the responsibility to improve sanitation services in the area through improving the existing sanitation networks and systems as well as building new networks or replacement the existing ones. Otherwise environmental sanitation condition of the area would continue as it is. According to WSSCC, 2012, "the exponential growth of cities especially in developing countries throughout Sub-Saharan African and South East Asia, many areas lack the infrastructures to serve these growing populations, and so many urban areas do not have enough roads, housing, and access to clean water and sanitation that is needed to support their population. Open defection is prevalent in areas without adequate sanitation infrastructures; open defection creates multiple environmental health concerns."

In the case of question 12, 63.7% of the respondents had unfavorable attitude while 20.9% and 15.3% of the respondents had neutral and favorable attitude to the view that "the current environmental sanitation problems in my *wereda* make the future of life bleak and hopeless." The highest numbers of respondents opposed this view. This implies that the present environmental sanitation condition in the study area may not as such serious to the health living of people in the future. However the real situation of the *wereda* environmental sanitation problem is far from the residents view, if the present generation can't make difference on environmental sanitation there is no guarantee for the health living of the people in the future. Therefore the present generation should introduce sustainable environmental sanitation that would not affect the coming generation.

With respect to question 13, 69% of the respondents had unfavorable attitude while 23.2% and 7.8% of the respondents had neutral and favorable attitude to the issue that "a sanitation condition in my neighborhood is good and I am satisfied with it." The figures indicated that the highest numbers of respondents were unsatisfied with the existing sanitation condition of their neighborhood. Thus, the existing sanitation condition among the neighborhoods is not as such good for the healthy living of the community.

In the case of question 14, 68.8%, 20.3%and 11.8% of the respondents had unfavorable, neutral and favorable attitude respectively. This implies that the majority of the respondents had unfavorable attitude, opposing the idea that "maintaining economic growth is more important than protecting the environment." The result revealed that residents realized environmental protection needs attention with that of economic growth. UNICEF, 2001 explain the relationship between environment and economy as "the increasing pollution on rivers, soil and shorelines negatively impact on business such as tourism and agriculture, which are vital to nations' economic growth."

As to question 15, 44.3% of the respondents opposed the view that "the main environmental sanitation problems affecting health in my living area is diarrhea and typhoid fever." Whereas 40 9% and 14.8% of the respondents had neutral and favorable attitude to the view. However, according to *Selam* health center record, diseases that are caused by sanitation problems were the major diseases that cause morbidity on the residents of the area.

As to question 20, 52.4% of the respondents had unfavorable attitude while 27%, and 20.6% of the respondents had favorable and neutral attitude respectively to the view that "from the level of services provided, can you feel that environmental sanitation service is the priority of the *wereda* authority?" The result showed that majority of the respondents did not feel that the *wereda* give priority for environmental sanitation. This means that environmental sanitation service provision of the wereda was not adequate, this may be due to ignorance, inadequate man power and finance, weak coordination among the offices, failure to implementing the policies as it was written on the paper and failure to mobilize the community and make them active participants in environmental sanitation services provisions with the *wereda* administration.

4.2.2.3. Attitude of residents' on the solutions of urban environmental sanitation problems (questions 6, 7, 11, 16, 17, 18 and 19)

In the case of question 6, 43.2%, 35.1%, and 21.7% of the respondents had favorable, neutral and unfavorable attitude respectively towards the view that "educated people are more concerned on environmental sanitation than non- educated people." The result implies that the majority of the respondents had favorable attitude to the issue, this indicated that awareness has its own role concerning environmental sanitation.

In the case of question 7, 55.1% of the respondents had unfavorable attitude to the issue that "it is the responsibility of the government to keep the environment clean.", while 27.8% and19.1% of the respondents had neutral and favorable attitude respectively. The result implies that majority of the respondents against this idea. This indicated that cleaning the environment is not as such easy to be done only by the government without the cooperation of different stakeholders and the society. According to the White Paper on Basic Household Sanitation, RSA, 2001, "sanitation development is not possible in isolation from other sectors. Sanitation must be providing in conjunction with water supply and other municipal service, coordination is necessary between the different department of all tiers of government and other stakeholders." Neto and Tropp, 2000, said that "all stakeholders playing a role in sanitation development including users (customers), community organizations, authorities and entrepreneurs"

In the case of question 11, 66.7% of the respondents had favorable attitude while 21.7% and 11.6% of the respondents had neutral and unfavorable attitude to the view that "the present and future generations in my living area can be benefitted if the environment is protected and healthy." Large percentage of respondents (66.7%) had favorable attitude to the view. This showed that majority of respondents believed that if the environment is protected and healthy not only the present generation but also future generations' will get benefit. WHO in 2008 described that improved environmental sanitation management reduces environmental burdens, increases sustainability of environmental resources and allows for a healthier, more secure future for the population.

In the case of question 16, 65.5% of the respondents had favorable attitude while 25.5% and 8.7% of the respondents had unfavorable and neutral attitude respectively to the view that

“sanitation improvement is gradual and it may take a long time to notice the impact.”The result showed that the highest percentage of the respondents trusted that sanitation is a gradual process that improves from time to time. This may be achieved through creating awareness on the bad impact of poor sanitation to the public health, cooperation among various stakeholders and take responsibility in introducing and implementing rules and laws that are related to environmental protection and sanitation by the government.

With respect to question 17, 52.4% of the respondents had unfavorable attitude while 27% and 20.6% of the respondents had favorable and neutral attitude respectively to the view that “the existing environmental sanitation problems in my living area can be solved through civilized way of life.”The result indicated that 52.4% of the respondents against the idea. Thus majority of the respondents did not trust civilized way of life as a solution for urban environmental sanitation problems. This shows that there is some inconsistency in the attitude of the residents toward environmental sanitation.

In the case of question 18, 62.1%, 24.4% and 13.6% of the respondents had favorable, unfavorable and neutral attitude respectively. The result showed that the highest percentage of respondents had favorable attitude to the view that “I can do a lot to protect the environmental sanitation in my community.” It implies that that many residents knew their responsibilities to protect environmental sanitation in their living area.

In similar manner in question 19,61.5%, 27%, and 11.6% of the respondents respectively had favorable, neutral and unfavorable attitude to the case that” everybody is responsible to protect his/her environment clean.” Thus majority of the respondents had the belief that maintaining environmental sanitation is not as such easy to be solved in separation without cooperation and coordination of the concerned bodies. This shows that the residents have recognized environmental sanitation needs the participation of all citizens. The White Paper on Basic Household Sanitation, RSA, 2001 in line with this described that in fulfillment of its obligation, government must create an enabling environment through which all people can access services and support in obtaining sanitation services, but in the end it is the individuals who are responsible. Individual householders are ultimately responsible, although communities may require a degree of conformity to achieve the healthy environment.

Generally, using the result of question by question analysis majority of the residents had favorable attitude .However there is some inconsistencies on residents' view towards various urban environmental sanitation matters. These variations might be due to lack of knowledge and information about a particular issue. The other factor may be the existence of weak social norms in the value system of the community concerning environmental sanitation.

4.2.3. Analysis of the practice of people's towards urban environmental sanitation

Similar method of analysis is used like that of attitude in analyzing the practice of people towards urban environmental sanitation. Likert scale was used to measure the practice of people's towards urban environmental sanitation. The scale employs on 5 point Likert types of scale from never, rarely, undecided, sometimes and always. In this scale some of items were worded to show positive values whereas others were worded to show negative value. For the positive items value was assigned 5,4,3,2 and 1 for always, sometimes, undecided, rarely and never this value was reversed for negative value items (see appendix C).

There are twelve questions written on a five-point Likert scale. The maximum score is 60 if a resident has scored 5 for all of the twelve questions. The minimum score is 12 if a resident has scored 1 for all of the twelve questions. A score of 36 is in the middle position if a resident score 3 for all of the twelve questions. If the mean score of the residents are below 36, it indicates that residents do not take action to improve environmental sanitation and a score greater than 36 indicates that residents take action to improve environmental sanitation. In this study the mean score of the residents practice to improve their environmental sanitation was calculated and obtained 31.5 which indicated that resident's generally do not take action in improving their environmental sanitation.

In addition, to analysis residents' practice on issues raised in each item the mean value on a five-point Likert scale was taken into consideration. The criterion mean of 3 was derived by adding all the weighted points and divided them by 5. That is 5+4+3+2+1=15/5=3 Thus if the mean on a five-point scale is 3, it is a middle position indicating residents' unclear stand, an average for item greater than 3,is take action ,and an average value less than 3, is considered as do not take action to improve environmental sanitation.

In the case of individual question analysis as shown in Table.4.8 and Figure.4.3, it was only in questions 4 and 6 were residents practiced toward urban environmental sanitation improvement

as the mean on the five point Likert scale greater than 3. In all the remaining questions residents found to be do not take action to improve urban environmental sanitation.

Table.4.8. practice of residents towards urban environmental sanitation based the mean on a five-point scale.

questions	2	3	4	5	6	7	8	9	10	11	12	13
mean	2.7	2.4	2.4	3.1	1.8	3.4	2.7	2.9	2.6	2.1	2.8	2.6

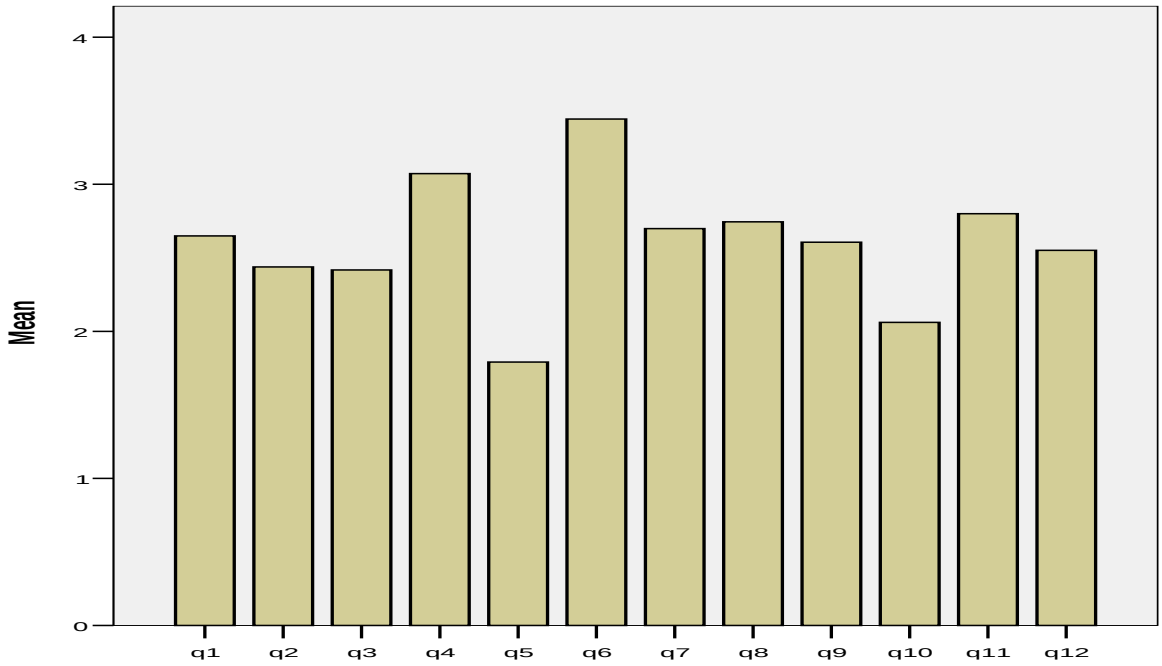

Figure.4.3.practice of people's towards urban environmental sanitation based on the meam value of each individual item

In the following section, each individual practice questions were discussed using the percentage distribution of resident's response for each individual item based on residents' practice that causes environmental sanitation problems, residents' practice to respond in environmental sanitation and to participate in disseminating environmental sanitation information (see appendix D).

4.2.3.1. Practice of residents' that causes environmental sanitation problems (questions 5, 7 and 8)

As to question 5, discouraging result was found, around 77.1% of the respondents dumped their house hold waste in rivers, 13.1% of the respondents found that they had unclear stand and 9.3% of the respondents did not dispose their house hold waste in rivers. The result indicated that the highest percentage of respondents polluted the sources of water like rivers. This also contributed for the transmission of water borne diseases on those people who used polluted water from these rivers. The residents who avoided their waste by this way should consider and change their action for the health of the environment and the society. Rules and regulation regarding environmental sanitation and health should be implemented by the concerned bodies and those people who made such kind of problems on the environment should be punished.

With respect to question 7, around 46.4% of the respondents dumped their house hold waste in an open space, 27.5% of the respondents undecided of the issue and 26.1% of the respondents did not dispose their house hold waste in an open space. The result revealed that majority of the respondents contributed to environmental sanitation problems; this may be due to lack waste disposal facilities in their living area or lack of awareness towards the negative effect of improper waste disposal to environment and the health of the community.

As to question 8, 43.2% of the respondents avoided their household waste in to drains, 28.7% of the respondents had unclear stand on the case and 28.1% of the respondents did not dispose their house hold waste into drains.

4.2.3.2. Practice of residents' in disseminating environmental sanitation information (questions 9, 10, and 11)

In the case of question 9, 52.8% of the respondents did not discuss with their friends and families about the need for action to protect environmental sanitation, 26.4% of the respondents discussed on the issue and 20.9% of the respondents had unclear stand on the matter. The results showed that majority of the respondents were not discusse on the issue that what kind of action should be taken to protect environmental sanitation in their living area. This may be due to lack of experiences to discuss on issues that affect the community or lack of clear awareness to discuss with other people with regard environmental sanitation problems. The other factor may be

absence exemplary person in the area that brought the culture of discussion on different community issues.

As to question 10, 67% of the respondents not interested to teach people when they harm the environmental sanitation in an effort to persuade that person to stop that activity whereas 16.5%% of the respondents had neutral stand and 16.5% of the respondents interested to teach people when they harm the environmental sanitation. The result indicated that large percentage of respondents did not care about to convince other people when they create problem on environmental sanitation however it is every responsibility to stop those people who made disturbance on environmental sanitation in general.

As to question 11, around 43.2% of the respondents did not participate in addressing environmental sanitation information for other people as they consider this is not their responsibility whereas 33.3% of the respondents were participating and 23.5% of the respondents had undecided response on the case. The result revealed that majority of respondents did not participate to transmit information related to environmental sanitation to other people; this might be due lack of understanding on the issue or lack of commitment to contribute their part to protect environmental sanitation.

4.2.3.3. Residents' practice to respond in environmental sanitation problems (questions 1, 2,3,4,6 and 12)

As to question 1, 54.5% of the respondents did not take action to change their ways in order to reduce the amount of waste generated in their house whereas 32.2% of the respondents did take action to reduce the amount of waste generated in their house and 13.3% of the respondents had unclear stand on the case. The results showed that high percentage of respondents did not consider how to reduce the amount waste that they produce .To reduce the amount of waste that the residents generated in their house it is important to reuse some organic wastes for soil fertilizer and produce some vegetables if they have available space in their compounds, this play a major role for the development of urban agriculture as well as for the improvement of urban environmental sanitation.

In the case of question 2, 53.1% of the respondents found that they did not use sanitary latrine to reduce incidents of water borne based diseases whereas 23.8% and 23.1% of the respondents

found unclear and positive stands respectively on the issue. The result indicated that majority of the respondents did not use sanitary latrine, this may be due to lack of awareness about the effect of using sanitary latrine properly for improving environmental sanitation, it may be also emanated from the social values which exist in their living area, in the existing reality open defection may not shame in many residents. The other factor may be majority of residents are poor therefore they could not build their own latrine that is why they were using shared public latrine which are far away from their house but defection sometimes may not give time.

In the case of question 3, to participate in digging waste pits in their surrounding more than half of the respondents (55.6%) found in the category of did not participate whereas 23.8% and 20.6% of the respondents found took action and undecided category respectively. This may be resulted either due to residents being reluctant to participate in community activities or their consideration that this activity is a responsibility of someone else.

With regard to question 4, around half of the respondents (49%) were discouraging the burning of waste but 42.9% of the respondents did not take any action to discourage the case and 8.1% of the respondents had unclear stand on the issue. The result revealed that large percentages of respondents were knowledgeable about the impact of burning of waste to environmental pollution that causes health problems on communities and the depletion of ozone layers. On the other hand around 42.9%of the respondents even did not take action in order to discourage the burning of waste. This may be due to lack of awareness about the bad impact of burning of waste to the environment or it may be due to shortage waste disposal facilities.

In the case of question 6, more than half of the respondents (51.3%) avoided their house hold waste in a public bins while around 28.4% did not avoid their house hold waste in a public bins and 20.3% of the respondents found undecided on the issue. In line with this idea Appleton, Ali and Cotton in 2000, explained that “in developing countries, the householder is responsible to convey their waste to a communal bin or transporter point provided in the locality. The municipalities then collect the waste from these points take it to the final disposal sites. Communal bins are often too far away for easy transfer of waste by householders. As a result waste builds up in local areas of cities.”

With respect to question 12, relatively highest percentages of the respondents (52.8%) did not take into account any environmental sanitation regulation that would restrict their way of life whereas 27.5% of the respondents found that they were take into account the issue and 19.7% of the respondents were unable to decide on this issue. In relation to this The White Paper on Basic Household Sanitation, 2001, described as "the environment must be considered in all development activities, appropriate protection of sanitation of the environment must be applied including if necessary prosecution under the law."

Generally, considering all over the questions the majority of respondents found to be did not take action to improve environmental sanitation in their living area. When taking into account individual question the result was not satisfactory and it lacked uniformity. This might be due to the fact that the respondents were not sacrificing their personal interest for the sake of environmental sanitation. This lack of action might be the weakness of the community and other stakeholders to do different practical activities for instance in cleaning up environment in group. Thus, if the communities become somehow strong in participating in various community activities like environmental sanitation, the residents will have the exposure to appreciate how their role is important and they will become committed for the improvement of urban environmental sanitation.

4.2.4. Chi-square test for people's knowledge, attitude and practice towards urban environmental sanitation based on independent variables

Table.4.9.Analysis of chi-square test showing the influence of gender, age and level of education on the knowledge of people associated with urban environmental sanitation

Variables	Cal.x2	Tab.x2	df	sig
Gender	3.29	3.84	1	0.05
Age	42.93	9.49	4	0.05
Level of education	19.96	7.82	3	0.05

Cal.x2=calculated chi-square value Tab.x2=table chi-square value

df=degree of freedom sig=level of significance

In the case of gender ,table.4.9.verifies that the calculated chi-square value of 3.29 at 1 degree of freedom is less than the table chi-square value of 3.84 at 0.05 level of significance

(cal.x2=3.29< tab.x2 =3.84,p>0.05). This implies that there was not statistically significant difference in the influence of gender on knowledge of people associated with urban environmental sanitation. It is not rational to state gender is related to knowledge.

Table, 4.9.also shows that the influence of age on knowledge of people. It verifies that the calculated chi-square value of 42.93 at 4 degree of freedom is greater than the table chi-square value of 9.49 at 0.05 level of significance (cal.x2=42.93>tab.x2=9.49, p<0.05). This indicates that there was statistically significant difference on the influence of age on knowledge of people in relation to urban environmental sanitation.

As to level of education the above table reveals that the calculated chi-square value of 19.96 at 3 degree of freedom is more than the table value of 7.82 at 0.05 level of significance (cal.x2=19.96>tab.x2=7.82, p<0.05), since the calculated chi-square value is greater than the table chi-square value. This means that level of education had statistically significant influence on the knowledge of people. This finding is not surprising because it is expected that level of education should have influence on the knowledge of people related to urban environmental sanitation.

Generally, table, 4.9. Conclude that there was not statistically significant difference in the influence of gender on knowledge of people associated with urban environmental sanitation, whereas there was statistically significant difference on the influence of age and level of education on knowledge of people associated with urban environmental sanitation.

Table.4.10.Analysis of chi-square test verifying the influence of gender, age and level of education on the attitude of people associated with urban environmental sanitation

Variables	Cal.x2	Tab.x2	df	Sig
Gender	39.24	9.49	4	0.05
Age	72.56	26.30	16	0.05
Level of education	57.61	21.03	12	0.05

Cal.x2=calculated chi-square value Tab.x2=table chi-square value
df= degree of freedom sig=level of significance

As to gender,table,4.10.shows that the calculated chi-square value of 39.24 at 4 degree of freedom is greater than the table chi-square value of 9.49 at 0.05 level of significance (cal.x2=39.24> tab.x2 =9.49,p<0.05). This implies that there was statistically significant

difference in the influence of gender on attitude of people associated with urban environmental sanitation. It is concluded that gender may be a factor for affecting urban environmental sanitation attitude of people.

With regard to age, table.4.10.tells that the calculated chi-square value of 72.56 at 16 degree of freedom is greater than the table value of 26.30 at 0.05 level of significance (cal.x2=72.56>tab.x2=26.30,p<0.05). This confirms that there was statistically significant difference in the influence of age on attitude of people associated with urban environmental sanitation.

In the case of level of education, table.4.10. also notifies that the calculated chi-square value of 57.61 at 12 degree of freedom is greater than the table value of 21.03 at 0.05 level of significance (cal.x2=57.61>tab.x2=21.03,p<0.05).This proves that there was statistically significant difference in the influence of level of education on attitude of people associated with urban environmental sanitation.

Generally, table.4.10. Summarized that there was statistically significant difference in the influence of gender, age and level of education on attitude of people associated with urban environmental sanitation.

Table.4.11. Analysis of chi-square test confirming the influence of gender, age, level of education, income level and family size on the practice of people related with urban environmental sanitation

Variables	Cal.x2	Tab.x2	df	Sig
Gender	41.63	9.49	4	0.05
Age	83.00	26.30	16	0.05
Level of education	62.16	21.03	12	0.05
Income level	78.95	26.30	16	0.05
Family size	53.14	21.03	12	0.05

Cal.x2=calculated chi-square value Tab.x2=table chi-square value

df= degree of freedom sig=level of significance

With respect to gender, table.4.11.States that the calculated chi-square value of 41.63 at 4 degree of freedom is greater than the table chi-square value of 9.49 at 0.05 level of significance (cal.x2=41.63>tab.x2=9.49,p<0.05). This implies that there was statistically significant

difference in the influence of gender on practice of people associated with urban environmental sanitation.

In the case of age, results in the same table confirms that the calculated chi-square value of 83.00 at 16 degree of freedom is more than the table chi-square value of 26.30 at 0.05 level of significance (cal.x2=83.00>tab.x2=26.30,p<0.05). This signifies that there was statistically significant difference in the influence of age on practice of people associated with urban environmental sanitation.

In the case of level of education ,table.4.11.tells that the calculated chi-square value of 62.16 at 12 degree of freedom is greater than the table value of 21.03 at 0.05 level of significance (cal.x2=62.16>tab.x2=21.03,p<0.05. This confirms that there was statistically significant difference in the influence of level of education on practice of people associated with urban environmental sanitation.

As to level of income, table 4.11 verifies that the calculated chi-square value of 78.95 at 16 degree of freedom is greater than the table chi-square value of 26.30 at 0.05 level of significance (cal, x2=78.95>tab.x2=26.30, p<0.05).This implies that there was statistically significant difference in the influence of level of income on practice of people associated with urban environmental sanitation.

With regard to family size, table.4.11. shows that the calculated chi-square value of 53.14 at 12 degree of freedom is greater than the table chi-square value of 21.03 at 0.05 level of significance (cal.x2=53.14>tab.x2=21.03,p<0.05).This implies there was statistically significant difference in the influence of family size on practice of people related to urban environmental sanitation.

Generally, table.4.11.summarized that there was statistically significant difference in the influence of gender, age, level of education, level of income and family size on practice of people associated with urban environmental sanitation.

Chapter five

5. Conclusions and Recommendations of the findings

5.1. Conclusions

Based on the findings of the study the following conclusions were made:-

The study required the sample respondents are above the age of 20 years. The selection was based on the fact that they were matured and would give responsible answers. The study had more female respondents than male respondents. Only 7.8% of the respondents had no formal education. The average age, income level and family size of respondents was 33.4 years, 996 birr and 4.9 individuals respectively.

Based on the findings of the study, it was concluded that the majority of respondents were knowledgeable about urban environmental sanitation, however it was not adequate as environmental sanitation is one of the basic element of the health living of human being, and most of the residents were expected to acquire high level of knowledge. This lack of knowledge might be due to lack of residents' motivation and initiation on urban environmental sanitation matters.

Greater part of the respondents had favorable attitude to urban environmental sanitation, but there was some inconsistencies on residents' attitude towards various urban environmental sanitation issues. These variations might be due to lack of knowledge and information, or existence of weak social norms in the value system of the community concerning urban environmental sanitation.

Majority of the residents of *Wereda* nine administration did not take actions to improve environmental sanitation in their living area. This indicated that they were not as such sacrificing their personal interest for the sake of environmental sanitation. This lack of action might be the weakness of the communities and other stakeholders to do different practical activities in group in order to maintain urban environmental sanitation.

Generally, from the findings of the study, it can be conclude that several respondents had inconsistent knowledge, attitude and practice towards urban environmental sanitation. This might

possibly be lack of knowledge and information on particular issue or lack of motivation and initiation of the residents on urban environmental sanitation matters. The other factor might be in the process of data collection some respondents were hesitant to provide the necessary and appropriate information, this may affect its consistency to some extent.

Depending on the findings of the study, it is also possible to conclude that there was not statistically significant relationship between gender and knowledge of people to urban environmental sanitation while there was statistically significant relationship between age and level of education on knowledge of people associated with urban environmental sanitation.

Based on the finding of the study, there was statistically significant difference in the influence of gender, age and level of education on attitude of people associated with urban environmental sanitation.

Based on the findings of the research it is possible to say that there was statistically significant difference in the influence of gender, age, level of education ,level of income and family size on practice of people towards urban environmental sanitation.

5.2. Recommendations

Based on the finding of the study the following recommendations were provided:-

1. Knowledge of residents' on environmental sanitation should be promoted. Those with lower level of education should be the focus group. This can be achieved through organizing workshops, seminars and conferences on environmental sanitation by environmental sanitation authorities and public health educators.

2. Health education and hygiene awareness should be promoted to influence the resident's attitude that target personal, household and community hygiene and sanitation.

3. Special attention should be given on practical engagement of the residents in the community through developing urban garden, urban beautification and urban agriculture.

4. Government and non-governmental organizations should undertake community based project on knowledge, attitude and practice associated with urban environmental sanitation. This will help to create awareness as well as alter the negative attitude and practice related to urban environmental sanitation.

5. The residents in the study area should be motivated to participate in different community activities; this will help them to have the exposure to appreciate how their role is important and become committed for the improvement of urban environmental sanitation.

6. Active community participation in environmental sanitation should be coordinated and promoted by both the *wereda* health office and sanitation and beautification office.

7. The community also should actively be involved in environmental sanitation rather than expecting everything with regard to environmental sanitation from the government.

8. Good governance should be exercised to motivate environmental sanitation through the involvement of different stakeholders (government, NGOs and communities) in decision making.
9. Deep rooted experiences of indigenous knowledge and practice in addressing environmental sanitation needed to be researched and integrated in different environmental sanitation options.
10. Many sources of urban environmental sanitation information should be provided to the public through different mass media.

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Appendix-A

Addis Ababa University

College of social science

Department of geography and environmental studies

Questionnaires on-Knowledge, attitude and practice of people towards urban environmental sanitation study in *Wereda* nine administration of *Gullele* sub-city of Addis Ababa.

This study intends to assess knowledge, attitude and practice of people towards urban environmental sanitation in *Wereda* nine administration of *Gullele* sub-city of Addis Ababa. Your response to the study items highly contributes to the success of this study. Therefore, you are kindly requested to give genuine response to each of the items presented in this questionnaire. The responses you give are to be used for this study purpose only and I assure that your anonymity is always protected. Please do not write your name in any part of this questionnaire.

1. Demographic information of the respondents

Sex: 1. Male 2. Female

Age: (choose and circle one category)

1. 20-29years 2. 30-39 years 3. 40-49 years 4. 50-59 years 5. 60-69 years

Level of education: (choose and circle one category)

1. No formal education 2.primary education 3.secondary education 4.teritary education

Monthly income :(choose and circle one category) 1. less than 500 birr 2. 501-1000 birr 3. 1001-1500 birr 4. 1501-2000 birr 5. above 2000 birr

Family size: 1.1-3 individuals 2. 4-6 individuals 3.7-9 individuals 4.above 10 individuals

Appendix-B

2. I would like to ask you about your personal knowledge on urban environmental sanitation in your living area. Please mark one choice in each row of the following statements.

Please note that: yes=1 no=2

no	statements	1	2
1	Sanitation is a group of method to collect human excreta, urine and community waste in a hygienic way.		
2	Environmental sanitation is the control of environmental factors that form links in disease		

	transmission.		
3	Environmental sanitation is keeping our environment clean.		
4	Environmental sanitation is avoiding waste in an open space.		
5	Burying of household wastes can bring to environmental sanitation.		
6	Burning of household solid wastes can bring to environmental sanitation.		
7	Improper waste management attracts the multiplication of micro-organisms like fungi, viruses, bacteria which affect human health.		
8	Improper management of waste pollutes the sources of water and cause typhoid fever.		
9	Dirty environment breeds flies which precipitates the occurrence of diarrhea.		
10	Inaccessibility of adequate sanitation facilities strengthen the cycle of diseases.		
11	The provision of a safe water sources is a key entry point to improve sanitation and hygiene.		
12	All sections of the societies are proportionally affected by urban environmental sanitation problems.		
13	Environmental sanitation is achieved through engaging the services of waste collectors.		
14	Waste disposal method is a problem in your neighborhood?		
15	Are you aware that it is an offence to leave waste around your house or the immediate surrounding?		
16	The best solution to improve urban environmental sanitation conditions in your living area is environmental sanitation education.		

Adopted and modified from Dunlap and Vanlier (1997) and Jatua (2013)

Appendix-C

3. I would like to ask about your personal attitude towards urban environmental sanitation in your living area. Please indicate how much you strongly disagree, disagree, undecided, agree or strongly agree with each of the following statements. Please mark in the column of your choice in each row.

please note that: strongly agree=5 ,agree=4 ,undecided=3 ,disagree=2 ,strongly disagree=1

no	statements	1	2	3	4	5
1	In my view, the underlying cause of urban environmental sanitation problems is poverty.					
2	In my view, the impact of inappropriate dumping of wastes in open fields and around road sides causes the area loses its natural beauty, bad odor to the community, health problems on the society and pollution of surface and ground water.					
3	In my view, the residents of *wereda* nine are severely creating environmental sanitation problems.					
4	In my view, one should not blame the residents of *wereda* nine who dump wastes on the road sides and rivers because that is the only choice they have to dispose waste.					
5	In my view, open burning of wastes has no impact on the health of human being.					
6	In my view, educated people are more concerned on environmental sanitation than non- educated people.					
7	In my view, it is the responsibility of the government to keep the environment					

	clean.					
8	In my view, the most serious environmental sanitation problems in my living area are disposal of solid and liquid wastes.					
9	In my view, sanitation services in my living area including networks and systems are bad and need maintenances, development and replacement.					
10	In my view, environmental sanitation problem is a temporary problem so there is no need to worry about it.					
11	In my view, The present and future generations in my living area can be benefitted if the environment is protected and healthy.					
12	In my view, the current environmental sanitation problems in my *wereda* make the future of life bleak and hopeless.					
13	In my view, a sanitation condition in my neighborhood is good and I am satisfied with it.					
14	In my view, maintaining economic growth is more important than protecting the environment.					
15	In my view, the main environmental sanitation problems affecting health in my living area is diarrhea and typhoid fever.					
16	In my view, sanitation improvement is gradual and it may take a long time to notice the impact.					
17	In my view, the existing environmental sanitation problems in my living area can be solved through civilized way of life.					
18	In my view, I can do a lot to protect the environmental sanitation in my community.					
19	In my view, everybody is responsible to protect his/her environment clean.					
20	In my view, from the level of services provided, I can feel that environmental sanitation service is the priority of the *wereda* authority?					

Adopted and modified from Dunlap and Vanlier (1997), Jatua (2013) and Florence et al (2013)

Appendix-D

4.1 How often do you practice the following in your living area? In responding to the items presented in the table below, please note that: always=5, sometimes =4, undecided =3, rarely =2, never =1, Please mark one choice in each row.

no	statements	1	2	3	4	5
1	I change my ways in order to reduce the amount of waste generated in my house.					
2	I use a sanitary latrine to reduce incidence of water born based diseases.					
3	I participate in digging waste pits in my surrounding.					
4	I discourage the burning of solid waste.					
5	I dump my household waste in rivers.					
6	I dispose my household solid waste in a public bins.					
7	I dump my household waste in an open space.					
8	I dispose my household waste into drains.					

9	I discuss with my friends and family about the need for action to protect environmental sanitation.						
10	I teach people when they harm the environmental sanitation in an effort to persuade that person to stop that activity.						
11	I participate in addressing environmental sanitation information for other people, because it is my responsibly.						
12	I oppose any environmental sanitation regulation that would restrict my way of life.						

Adopted and modified from Jatua (2013) ,Engdasew (2010) and Florence et al (2013)

Amharic version of the questionnaire

አፒንዲክስ-ሀ

አዲስ አበባ ዩኒቨርሲቲ

የጂኦግራፊና አካባቢ ጥናት ትምህርት ክፍል

ይህ መጠይቅ የ ሚያተኩረው በአዲስ አበባ ከተማ ፣ በጉለሌ ክ/ከተማ አስተዳደር ፣ ወረዳ 9 (ዘ ጠኝ) አስተዳደር ዉስጥ የሚኖሩ ነዋሪዎች በከተማ የአካባቢ ንጽህና ላይ በአላቸው እዉቀት አመለካከትና ትግበራ ላይ ነው፡፡

የዚህ ጥናት ዋና አላማ በአዲስ አበባ ከተማ፣ በጉለሌ ክ/ከተማ ፣ወረዳ 9 (ዘጠኝ) አስተዳደር ውስጥ ላይ በሚኖሩ ነዋሪዎች ዙሪያ በከተማ የአካባቢ ንጽህና አጠባበቅ ላይ ስላላቸው እዉቀት አመለካከትና ትግበራ ላይ ጥናት ማድረግ ነው፡፡ በመሆኑም የጥናቱ ተሳታፊዎች ለጥያቄዎቹ የሚሰጡት ትክክለኛ መልስ ለዚህ ጥናት ስኬት ከፍተኛ አስተዋጥኦ አለው፡፡ ስለዚህ እርስዎ በዚህ መጠይቅ ለተዘረዘሩት ጥያቄዎች ትክክለኛውን መልስ በመስጠት የበኩልዎን አስተዋጽኦ እንዲያደርጉ በትህትና እጠይቃለሁ፡፡ የሚሰጡት መልስ ለዚህ ጥናት ብቻ የሚያገለግል ሲሆን የእርስዎ ማንነት በሚስጥር የተጠበቀ ነው፡፡

እባክዎን በመጠይቁ ላይ ስምዎትን አይጻፉ፡፡

ነ.ነ የመጠይቁ ተሳታፊዎች የግል መረጃ

ጸታ- 1. ወንድ 2. ሴት

እድሜ (መልስዎን አንዱን ምርጫ በመምረጥ ይክበቡ)

1.20 እስከ 29 አመት 3.40 እስከ 49 አመት 5.60 እስከ 69 አመት

2.30 እስከ 39 አመት 4.50 እስከ 59 አመት

የትምህርት ደረጃ(መልስዎን አንዱን ምርጫ በመምረጥ ይክበቡ)

ነ. መደበኛ ትምህርት ያልተማረ 3.የሁለተኛ ደረጃ ትምህርት የተማረ

2.የመጀመሪያ ደረጃ ትምህርት የተማረ 4.የከፍተኛ ተቋም ትምህርት የተማረ

ወርሀዊ ገቢ (መልስዎን አንዱን ምርጫ በመምረጥ ይክበቡ)

ı. ከ 500 ብር በታች 3. ከ1001 እስከ 1500 ብር 5. ከ 2000 ብር በላይ

2. ከ501 እስከ 1000 ብር 4. ከ1501 እስከ 2000 ብር

የቤተሰብ ብዛት(መልስዎን አንዱን ምርጫ በመምረጥ ይክበቡ)

1.1 እስከ 3 ግለሰቦች 3.7 እስከ 9 ግለሰቦች

2.4 እስከ 6 ግለሰቦች 4.ከ10 ግለሰቦች በላይ

አፒንዲክስ-ለ

2.1 የሚከተለው መጠይቅ የሚያተኩረው እርስዎ በሚኖሩበት ወረዳ በከተማ የአካባቢ ንጽህና አጠባበቅ ዙሪያ ስላለዎት የግል እዉቀት ነዉ፡፡ እባክዎ መልስዎ አዎ ከሆነ (1) አይደለም (2) በማለት በእያንዳንዱ ጥያቄ ፊት ለፊት ቁጥሩን ያስቀምጡ፡፡

ተ.ቁ.	ጥያቄዎች	አዎ	አይደለም
1.	ንጽህና ማለት የግለሰብንና የማህበረሰብን ቆሻሻ በተገቢው መንገድ በጋራ የማስወገጃ ዘዴ ነዉ፡፡		
2.	የአካበቢ ንፅጎና ማለት ከበሽታ መተላለፍ ጋር ተያያዥነት ያላቸዉን አካባቢያዊ ሁኔታዎች መቆጣጠር ማለት ነዉ፡፡		
3.	የአካበቢ ንፅጎና ማለት አካባቢን ንፁህ ማድረግ ነዉ፡፡		
4.	የአካበቢ ንፅጎና ማለት ቆሻሻን በየቦታዉ ማስወገድ ማለት ነዉ፡፡		
5.	የቤት ዉስጥ ቆሻሻን በመቅብር የአካባቢን ንጽጎና መጠበቅ ይቻላል፡፡		
6.	የቤት ዉስጥ ቆሻሻን በማቃጠል የአካባቢን ንጽጎና መጠበቅ ይቻላል፡፡		
7.	ቆሻሻን በተገቢዉ ቦታ አለማስወገድ ለበሽታ አምጪ ተህዋስያን ለምሳሌ ለፈንገስ ለባክቴሪያና ለቫይረስ መራቢያ ምቹ ስለሚሆን በሰዎች ጤና ላይ ችግር ይፈጥራል፡፡		
8.	ቆሻሻን በተገቢዉ ቦታ አለማስወገድ የዉሀ አካላትን ስለሚበክል የታይፎይድ በሽታ እንዲከሰት ያደርጋል፡፡		
9.	ቆሻሻ አካባቢ ለዝንቦች መራቢያ ምቹ ሁኔታን ስለሚፈጥር ለተቅማጥ በሽታ መከሰት መንሰኤ ነዉ፡፡		
10.	በቂ የሆነ የቆሻሻ ማስወገጃ ስፍራ አለማግኘት የበሽታን በተደጋጋሚ መከሰትን ያጠናክራል፡፡		
11.	ንጽህናው የተጠበቀ ዉሀ በበቂ ሁኔታ ማግኘት ንጽህናን ለመጠበቅ ቁልፍ መሳሪያ ነዉ፡፡		
12.	ሁሉም የማህበረሰብ ክፍል በአካባቢ ንጽህና ችግር በእኩል ሁኔታ ተጎጂ ነዉ፡፡		
13.	የአካባቢ ንጽህናን ቆሻሻን በሚሰበስቡ አካላት ማሳካት ይቻላል፡፡		
14.	በጎረቤትዎ የቆሻሻ አወጋገድ ችግር አለ፡፡		
15.	ቆሻሻን በተገቢዉ ቦታ አለማስወገድ በህግ ያስጠይቃል፡፡		
16.	በሚኖሩበት አካባቢ ያለዉን የአካባቢ ንጽህና ለማሻሻል ዋናዉ መፍትሄ የአካባቢ ንጽህና አጠባበቅ ትምህርት ነዉ፡፡		

አፒንዲክስ-ሐ

3.1. የ ሚከተለው መጠይቅ የሚያተኩረው እርስዎ በሚኖሩበት ወረዳ በከተማ የአካባቢ ንጽህና አጠባበቅ ዙሪያ ስላለዎት የግል አመለካከት ነዉ፡፡ በመሆኑም መጠይቁን ሲሞሉ በጣም እስማማለሁ ፣ እስማማለሁ ፣ መወሰን አልችልም አልስማማም እና በጣም አልስማማም በማለት በእያንዳንዱ ጥያቄ ፊት ለፊት ቁጥሩን ያስቀምጡ፡፡

በጣም እስማማለሁ = 5 እስማማለሁ =4 መወሰን አልችልም =3 አልስማማም =2 በጣም አልስማማም =1

ተ.ቁ	ጥያቄዎች	1	2	3	4	5
1.	በእኔ አመለካከት ለአካባቢ ንጽህና ችግር ዋናዉ ምክንያት ድህነት ነዉ፡፡					
2.	በእኔ አመለካከት ቆሻሻን ተገቢ ባልሆነ ሁኔታ ማለትም በአገኙት ቦታና በመንገድ ዳር ማስወገድ የአካባቢንና የተፈጥሮ ዉበት ይቀንሳል፣ ለነዋሪዎች መጥፎ ሽታ ያመጣል ፣ለማህበረሰቡ የጤና ችግር ይፈጥራል እንዲሁም የከርሰ ምድርና የገፀ ምድር ዉሀን ይበክላል፡፡					
3.	በእኔ አመለካከት የወረዳ ዘጠኝ ነዋሪዎች ከፍተኛ የሆነ የአካባቢ ንጽህና ችግር እየፈጠሩ ነዉ፡፡					
4.	በእኔ አመለካከት ማንም ሰዉ የወረዳ ዘጠኝ ነዋሪዎች ቆሻሻን በመንገድ ዳርና በወንዞች ዉስጥ ይደፋሉ ብሎ መዉቀስ አይችልም ምክንያቱም ቆሻሻን ለማስወገድ ብቸኛ አማራጫቸዉ ይህ ብቻ በመሆኑ ነዉ፡፡					
5.	በእኔ አመለካከት ቆሻሻን ማቃጠል በሰዎች ጤና ላይ ምንም አይነት ተጽዕኖ አያመጣም፡፡					
6.	በእኔ አመለካከት የተማሩ ሰዎች ካልተማሩ ሰዎች በተሻለ ለአካባቢ ንጽህና ትኩረት ይሰጣሉ፡፡					
7.	በእኔ አመለካከት የአካባቢ ንጽህናን መጠበቅ የመንግስት ኃላፊነት ነዉ፡፡					
8.	በእኔ አመለካከት በምኖርበት አካባቢ ያለዉ ከፍተኛ የአካባቢ ንጽህና ችግር የደረቅና ፍሳሽ ቆሻሻ አወጋገድ ነዉ፡፡					
9.	በእኔ አመለካከት በምኖርበት አካባቢ ያለዉ የንጽህና አጠባበቅ አገልግሎት አዉታር እና ዘዴ ችግር ያለበት ስለሆነ መቀየር እና ማደግ አለበት፡፡					
10.	በእኔ አመለካከት የአካባቢ ንጽህና ችግር ጊዜአዊ ስለሆነ መጨነቅ አያስፈልግም፡፡					
11.	በእኔ አመለካከት አካባቢ ከተጠበቀና ጤናማ ከሆነ የአሁኑና የወደፊቱ ትዉልድ ተጠቃሚ ይሆናል፡፡					
12.	በእኔ አመለካከት በምኖርበት ወረዳ አሁን ያለዉ የአካባ ንጽህና ችግር የነዋሪዎችን የወደፊት ህይወት ከባድና ተስፋቢስ ያደርገዋል፡፡					
14.	በእኔ አመለካከት አካባቢን ከመጠበቅ ይልቅ የኢኮኖሚ እድገት ማምጣት የተሸለ ነዉ፡፡					
15.	በእኔ አመለካከት በምኖርበት አካባቢ የማህበረሰቡን ጤና እየጎዳ ያለዉ የአካባቢ ንጽህና ችግር ተቅማጥና ታይፎይድ ነው፡፡					
16.	በእኔ አመለካከት ንጽህና በሂደት የሚሻሻል በመሆኑ ዉጤቱን ለማየት እረጅም ጊዜ ይወስዳል፡፡					
17.	በእኔ አመለካከት ዘመናዊ የአኗኗር ዘዴን በመከተል ብምኖርበት አካባቢ ያለዉን የንጽህና ችግር መፍታት ይቻላል፡፡					
18.	በእኔ አመለካከት የማህበረሰቡን የአካባቢ ንጽህና ለመጠበቅ ከፍተኛ አስተዋጽኦ ማድረግ እችላለሁ፡፡					
19.	በእኔ አመለካከት የአካባቢን ንጽህና መጠበቅ የሁሉም ኃለፊነት ነዉ፡፡					
20	በእኔ አመለካከት ከሚሰጠው አገልግሎት ደረጃ አንጻር የወረዳው ባለስልጣናት ለአካባቢው ንጽህና አገልግሎት ቅድሚያ ይሰጣሉ፡፡					

አፒንዲክስ-መ

4.ነ. እርስዎ በሚኖሩበት አካባቢ የሚከተሉትን ተግባራት ምን ያህል ጊዜ ያከናዉናሉ? በሚከተለዉ ሠንጠረዥ የቀረቡትን ጥያቄዎች ለመመለስ እባክዎ፡- ሁልጊዜ፣ ብዙ ጊዜ፣ መወሰን አልችልም አልፎ አልፎ እና በፍፁም በማለት በጥያቄዉ ፊትለፊት መልስዎን ያስፍሩ፡ ሁልጊዜ =5 ብዙ ጊዜ = 4 መወሰን አልችልም =3 አልፎ አልፎ =2 በፍፁም =1

ተ.ቁ.	ጥያቄዎች	1	2	3	4	5
1.	የአኗኗር ዘይቤዬን በመቀየሬ በቤቴ ዉስጥ የማመነጨውን የቆሻሻ መጠን መቀነስ ችያለሁ፡፡					

2.	ንጽህናዉ በተጠበቀ መጸዳጃ ቤት በመጠቀሜ ዉኃ ወለድ በሽታዎችን መቀነስ ችያለሁ፡፡					
3.	በአካባቢዬ የቆሻሻ ማጠራቀሚያ ጉድጏድ በመቆፈር እሳተፋለሁ፡፡					
4.	ደረቅ ቆሻሻ ማቃጠልን አልደግፍም፡፡					
5.	የቤቴን ቆሻሻ በወንዝ ዉስጥ እደፋለሁ፡፡					
6.	የቤቴን ደረቅ ቆሻሻ በቆሻሻ ማጠራቀሚያ ገንዳ ዉስጥ እደፋለሁ፡፡					
7.	የቤቴን ቆሻሻ በየቦታዉ አስወግዳለሁ፡፡					
8.	የቤቴን ቀሻሻ ትቦዎች ዉስጥ እደፋለሁ፡፡					
9.	የአካባቢን ንጽህና ለመጠበቅ መወሰድ ስላለበት እርምጃ ከቤተሰቦቼና ከጏደኞቼ ጋር ዉይይት አደርጋለሁ፡፡					
10.	በአካባቢ ንጽህና አጠባበቅ ላይ ችግር የሚፈጥሩ ሰዎችን ከዚህ ተግባራቸው እነዲታቀቡ የማሳመን ስራ እሰራለሁ፡፡					
11.	የአካባቢ ንጽህና አጠባበቅ መረጃ ለሌሎች እንዲደርስ ተሳትፎ በማድረግ ኃላፊነቴን እወጣለሁ፡፡					
12.	የአኗኗር ዘይቤዬን የሚገድብ ማንኛዉንም የአካባቢ ንጽህና አጠባበቅ ደንብ ተግባራዊ አላደርግም፡፡					