



WOLKITE UNIVERSITY

COLLEGE OF SOCIAL SCIENCE AND HUMANITIES

DEPARTMENT OF GEOGRAPHY AND ENVIRONMENTAL STUDIES

**ASSESSING IMPACTS OF WASTE MANAGEMENT: THE CASE OF
ANGECHA TOWN, KAMBATA ZONE, CENTRAL ETHIOPIA**

**A SENIOR RESEARCH ESSAY SUBMITTED TO THE DEPARTMENT OF
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AND ENVIRONMENTAL STUDIES.**

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WOLKITE, ETHIOPIA

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TOWN KEMBATA ZONE, CENTRAL ETHIOPIA**

**Submitted to Department of Geography and Environmental Studies in partial
fulfilment of the requirement for BA degree in geography and environmental studies**

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ACRONYMS AND ABBREVIATIONS

HH: House Hold

MW : Municipal Waste

MWM : Municipal Waste Management

NGOs: Non government organisation

SBPDD: Sanitation, Beautification and Parks Development Department

UNCHS : United Nation Centre of Human Settlement

UNEP: United Nation Environmental Program

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ABSTRACT

Waste management is a critical issue globally, especially in developing countries like Ethiopia. Angecha town faces significant challenges in household waste management, impacting public health and the environment. A study was conducted to assess the current situation and raise awareness within the community. The research aimed to evaluate the existing municipal waste management services in Angecha town, Analyze the composition of household waste, Assess the spatial coverage of waste management services and Examine institutional arrangements and capacities. Primary data was collected through questionnaires, interviews, and field observations, supplemented by secondary sources. Both qualitative and quantitative methods were employed for analysis. Findings indicate that Angecha town's waste management heavily relies on the municipality, yet services lag behind waste generation. Biodegradable waste from households dominates the waste stream. Key challenges include Poor institutional structure and capacity within the sanitation department, Limited stakeholder participation, including communities, NGOs, and the private sector, Inadequate household waste management practices, such as improper storage, low separation, and illegal disposal. To address these challenges, recommendations include implementing sustainable waste management practices through awareness campaigns and training, enhancing institutional capacity, and adopting an integrated approach involving all stakeholders.

KEY WORDS: Waste management, House Holds, Disposal waste

CHAPTER ONE

1. INTRODUCTION

1.1. Background of the study

Waste management is a critical issue all over the world. However, good waste management is not yet more practiced all over the world due to various factors. The problem is more serious in developing countries especially fast growing towns (Michal, 2001).

Waste can create serious problems for humans and the environment, if they are not treated, stored, transported and managed safely (Pèriou, C (2012)). Wastes are an unavoidable part of human activity. They either come from man's production activities or as a by-product of the materials consumed by man. A rising quality of life and high rates of resource consumption patterns have had an unintended and negative impact on the urban environment generation of wastes far beyond the handling capacities of urban governments and agencies. Waste - according to the UK environmental protection act (1990), "it is any substance which constitutes scrap materials, an effluent or other unwanted surplus arising from application of any substances or particles which requires to be disposed of which has broken, worn out, contaminated or otherwise spoiled. Waste management is a major challenge of these days for the administrator, engineers, and planners. Huge volumes of waste are generated and needed to be transported speedily and sufficiently without excessive cost or damage into the environment. Unfortunately in many developing countries therefore managing wastes primitively (Pierre, 2003).

Waste management system is a planned system efficiently controlling the production, storage, collection, transportation, and processing and disposal of waste in a sanitary, acceptable and economic manner. It includes all administrative, financial, legal, and planning functions as well as the physical aspect of waste handling (Encyclopaedic dictionary of waste, 2007). Waste management practices use several techniques to manage and dispose of specific components. Waste management techniques include avoidance, reduction, reuse, recycling, recovery, and disposal. Classification of these activities into different stages and techniques helps to identify and understand the problems associated with the waste management system and provides a proper response to improve facilities and services (Anjaneyulu, 2009). In addition, it also helps to identify sources and types of waste that influence them. Thus, to avoid, minimize or sort waste materials as at their source requires active participation from the waste-generating household, commercial and industrial companies and their employees (Harris and Kiel, 2006).

In developing country's it is common to find large heaps of garbage festering allayer the city. The problem get feather complicated due to large population and the absolute techniques employed of waste management (Khan *et.a.,l* 2003).

Municipal waste management construes one of the most crucial health and environmental problems facing government of Africa cities. The uncollected or illegal dumped waste constitute a disaster for human health and the environmental degradation. Not only their quantity increase but their varieties also increasing by in urbanization income and changing consumption habits fully by globalization. This scenario places the already desperate urban authorities in difficult situation especially as they have to develop new shortages to deal with increasing volume as well as strong varieties of waste poor waste management practice particularly wide spread dumping of waste in water bodies and uncontrolled. Dumpsites aggregate the problem of sanitation level across the African continent (UNEP,2001).Most the time in Ethiopia the increasing population density in urban areas are one of the most factor waste generating and decreasing the population of land available for its management (Newton. David E. 2020). In Ethiopia one of the major public health problem occurs due to in appropriate disposal of waste particularly human waste .The sanitation coverage is very low and constriction facilities in Ethiopia would be one of the major sanitation and health problem of the country (Geber Emanuel, 2000). Increasing population growth accompanied by rapid urbanization and industrialization has resulted in dramatic increase in the volume of waste generated by modern societies. Increased electricity and food consumption by humans and changing life style generate a massive volume of domestic waste which creates critical problem in developing countries (Palmer, 2010).

Waste management in Ethiopia is important because only a small percentage of the country's inhabitants have access to safe drinking water: 21% in rural areas, 84% in urban areas, and 30% country-wide. Additionally, only 7% of populations in rural areas, 68% in urban areas, and 15% of people country-wide have adequate access to latrines or other improved human waste disposal options (Kumie, 2005). Access to latrines is a critical aspect of waste management, especially since the practice of open defecation is prevalent in the country, which can contaminate groundwater and lead to disease (WHO, 2008; PLAN, 2007).

The alarming of resources depletion and waste generation, associated with population growth and increasing urbanization is posing a great problem across the globe (palmer, 2010).In particular waste discharges already beginning to change the way the biosphere function and depletion of the ozone layer and climatic change are beginning to reduce the productivity of

global ecosystem at a time when millions of people are looking livelihood sustenance to be provided by the environment (Simmons,2008). While each of these problems generally required general attention, the issue of waste management disposal and recycling seems to be the most urgent especially in developing world where domestic management technology is still limited (Un- habitat, 2007).

Waste management is one of the most important services provided by municipal authorities. The way of handling collection and disposal of waste can pose risks to the environment as well as the public health. The scope and complexity of waste management continue expanding and consume considerable proportion of the city budgets. The waste management sectors, therefore, deserves careful attention for sticking a balance between quality of service and cost effectiveness. In a modern city or town, huge volume of wastes is generated every day that need regular collection, transportation and disposal. The operations have to be carried out speedily and efficiently without incurring excessive cost or damage to the environment. In many developing countries the system for managing waste in primitive and cannot cope with the volume of waste being generated (Ahmed, 2009).

Ethiopia waste management is a serious problem and low awareness about the impact of waste and not think about the future generation. Ethiopian waste management, the service of municipality waste passive with in the management of waste (Tekele Tadesse, 2004). The main significance of this study was to becoming sustainable environment condition with in the town, to reject the waste, and control illegal dumping around the open area and to manage the unwanted materials.

1.2 Statement of the problem

Wastes a potential of serious problem on environmental and human health, unless properly managed .It leads to surface and ground water contamination, land pollution and air quality deterioration (Kahn and Ashen, 2003).

In developing countries the practice of waste management is low ,resource are in adequate and uncontrolled dumping is wind to spread poor waste collection and disposal system have significant environmental and health impact as well as limited regulation of private sector and illegal dumping of domestic and industrial waste is common practice (Takil.T, 2004).

Household waste management in Ethiopia is being a major public health and environmental concern in urban areas of the countries. In Ethiopia the average waste generation rate is about

0.221kg per person per day and it is also estimated that only 2% of the population received waste collection on service (Zebenay, 2010).

Angecha town is characterized by rapid population growth caused by natural increase and migration. Due to rapid increase in population together with rapid development of the town has produced increasing the volume of waste. In addition to this there are no public waste storage containers and road said dust bens.

This shows that the operational condition of HWM service and efforts made to change the situation are low. Before a time many researchers was participated by this issue. The main objective of the previous researchers was to be coming good environmental condition with in Angecha town. But the researcher was not generating sufficient solution, because the town was not far away from any waste and problems. But we belief to that our research was solve these problems and become good environmental condition on the town. Because, our idea was first to assess the current municipal household waste management and to create awareness within the societies about the impacts of waste in the settlers. So our research was the best one to becoming the solution in the waste management of the town. These situation show that house hold waste management in Angecha town has not been carried out in a sufficient and proper manner. The environmental and sanitary condition of the town has become more serious from time to time, and people are suffering from living in such condition. So that the urgent need of efficient household waste management on one hand and growth of waste problem on the other hand are still the main feature of the Town. Therefore this study examines the existing condition of municipal waste management in Angecha town.

1.3 Objective of the study

1.3.1 General objective

The main objective of the study is to assessing waste management in Angecha town.

1.3.2 Specific objectives

Having the above general objectives the study geared to attain the following specific objectives.

- ✓ To investigate the physical composition of household waste in the town.
- ✓ To examine the existing status and spatial coverage of municipal household waste management service in the town.

- ✓ To examine present institutional arrangement and capacity of municipal waste management of the town.

1.4 Research questions

So as to achieve the intended objectives stated above the following research are formulated.

1. What are physical compositions of household waste in the town?
2. What is the current status and special coverage of municipal household waste management of the town?
3. What is the existing institution arrangement and capacity of municipal waste management of Angecha town.

1.5 Significance of the study

This study may have two main significances. First it may give some guide line information to policy maker, waste management and environmental protection agency about existing situation on municipal waste management of Angecha town. The study may also important in putting base line information to the next other studies how would like to conduct detailed and comprehensive studies either in Angecha or other study area.

1.6 Scope of the study

This study was confined to Kembata Zone, Angecha town. This is mainly because there is severe problem of household waste management and no surveys conducted so far regarding the town waste management. On the other hand, the problem that the researcher studies is delimited to overview of the current condition municipal and household waste management and institutional arrangement and capacity of stakeholders for delivering of proper household waste management practice in the town.

1.7 Limitation of the study

While doing the research some constraints was faced such as, lack of enough money, in accessibility of the study and lack of enough documented data about the study area. it was not have enough time and some people was not willing to offer necessary information and most of the people was not willing to make interview with the researcher.

1.8 Organization of the study

This paper is organized in to five chapters. The first chapter is an introductory part of the paper that includes background of the study, statement of the problem, objective of the study,

research questions, and significance of the studies, scope of the study, limitation of the study and organization of the paper. The second chapter deals with review of related literature obtained from various published and unpublished reference materials. The third is research methodology. The fourth result and discussion present analysis and interpretation of data about the existing status and special coverage of municipal solid waste management practice, and institutional arrangement and capacity of municipal waste management of town. The last part of this study is chapter five which presents the conclusion and recommendation of the study. Appendices are also attached at the end of the paper.

CHAPTER TWO

2. REVIEW OF LITERATURE

2.1 Definition of terms and concepts

2.1.1 Waste

According to UK environmental protection act(2009) “waste is any substance which constitutes scrap materials, an effluent or other un wanted surplus arising from application of any substance or article which requires to be disposed of which has broken, worn out, contaminated or other with spoiled.”

waste can be defined as “any garvages, refuse, sludge, and other discarded materials resulting from industrial, commercial agricultural operations, and community activities but does not include dissolve materials”(Samuel,2011).

2.1.2 Waste management

Means the collection transportation, storage, recycling or disposal of waste or the subsequent use of disposal site that is no longer operational. (Federal Negarit Gazeta of Ethiopia, proclamation number 513/2007).

Waste management is a term that used to refer to the process of collecting and treating wastes. It also offers solution for recycling items that do not belong to garbage or trash. As long as people have been living in statements and residential areas, garbage or waste has been an issue. Waste management is all about how waste can be changed and used as a valuable resource. waste management should be embraced by each and every household including the business owners across the world. Industrialization has brought a lot of good things and bad things as well. One of the negative effect of industrialization is the creation of waste Pierre, A (2003).

2.2 waste management system

Planned system of efficiency controlling the production storage collection, transpiration processing and disposal solid in sanitary aesthetical and conceptual manner.waste management is the practice of using several techniques to manage disposal of specific component waste. waste management techniques include avoidance ,reduction ,reuse recycling ,recovery and disposal ,classifying this activity in to different stages and techniques would be help to identify and understand the problems associated with waste management system and proper response improve the facility and service (RamChandra, 2006).

2.3 Source of waste

2.3.1 Domestic wastes: wastes generated from household activities such as food preparation, cleaning fuel burning, old clothes, furniture, absolute utensils and equipment, packaging, news print and garden wastes. In developing countries, food waste and ashes dominate household wastes (Wondie, T., 2009).

2.3.2 Commercial wastes: wastes from shops, offices, hotels, restaurants, etc. and typically consisting packaging materials, office supplies and food wastes in low income countries food markets contribute the largest portion of commercial waste (Dereje, 2009).

2.3.3 Institutional wastes: waste from school, hospitals, clinics, government offices, military bases, etc. and comprise hospital and clinical wastes including potentially infectious and hazardous materials (Rousta et al., 2015).

2.3.4 Industrial wastes: compositions of industrial wastes depend on the kind of industrial involved. It consists food waste from kitchens and contains, packaging materials, plastic and metal items Kumar (2006).

2.3.5 Street sweeping: dust soil, paper, etc. in developing countries street sweeping also include fruit and vegetable residues household waste dump along road drain cleaning animal manure and plant remains (Hailu, Girma, 2000).

2.3.6 Construction and Demolition wastes: its composition depend on type of construction materials used but it typically includes soil, brick, stone, concrete, ceramic materials, wood, packaging materials and the like (Dereje, 2011).

2.4 Collection of Households wastes in municipal waste management

Collection involves the process of pecking up of wastes from collection ponds , lauding them into vehicle and transporting it to processing facilities ,transfer stations or disposable sites ,in most municipal solid waste management system. Cost of collection accounts a significance portion of total cost for instance ,industrialized countries collection accounts about 60-70% of total cost and from 70=90% in developing and transition countries (UNEP,2010).Collection is structural similar in developing countries transition and industrialized countries .However, in developing countries collection often involves a face to face truncation bin generator and collectors .The level of services is low and generators often have to bring their waste along

distance and place it in containers .As result many collection activities in developing countries are carried out by informal sectors (UNPE, 2009).

2.5 Disposal of Waste Management

This is finally functional element in waste management system. Disposal activities are associated with finally dump of wastes directly to a land fill site. Today disposal of wastes by land filling or land spreading is the ultimate fate of all wastes whether this are residential wastes ,or residual materials from materials recovers facilities; ”However in most developed countries this methods official banned a longing only sanitary land fill for finally disposal .Because sanitary land fill is not a dump it is an engineered facilities used for disposing of wastes on land without creating nuisances or hazards to public health and environment (techobanningless,2011).Though it is the most common technology around the world, conventional and environmental un friendly methods such as open –burning, open dumping and non-sanitary land fill can still be used as disposal method (UNPE, 2009).

2.6 Constraints of Municipal Households Waste Management

As it is noted alertly atypical sold waste management system in developing countries displays an array of problem including low collection coverage and irregularly collection series and crude open dumping and burning without air and water control .this problem are caused by various factories which constraint development of effective municipal waste management system. The can be categorized in to technical, financial, institutional, social constraints and awareness and attitude (Rousta et al., 2015).

2.6.1 Human and Technical constraints

In most developing countries there is lack of human resources and technical experts both at national and local level .Many officers in charge of waste management, particularly at local level, have little technical back ground or training in management (ogawa, 2013). This is the many resound for lock of compressive waste management planning in developing countries, Furthermore, collection and analyses of waste data are generally not give sufficient attention.

2.6.2 Financial constraints

Municipal waste management is given priority in developing countries as a result very limited funds are allocated to the sector by government. This problem is acute at the local government level where local revenue collection system is indigently developed and financial base for public services including municipal waste management is weak. In addition to limited funds many local government in developing countries lack good financial

management and planning. For instance, in a developing countries town over 90% of annual budget provided for waste management is used up with in first six months. Lack of financial management particularly cost accounting deplete to limited resource available for the sector even more quickly and causes waste management service to halt for some (Gebrie, 2009).

2.6.3 Awareness and attitude towards waste

Public awareness and attitude to waste can affect the whole municipal waste management system. All steps in municipal waste management starting from household waste storage, collection frequency, to waste segregation recycling, willingness to pay for waste management services and opposition to siting of waste treatment and disposal facilities depends on public awareness and school education about the importance of proper waste management for health and wellbeing of people severely restrict use of community based approaches in developing countries and also crucial for failure of a municipal waste management service in developing countries (Zubugg, 2011).

2.6 Relationship between institutional capacity and provision of municipal waste management.

First of all institutional capacity means; the ability institutions to perform functions, solve problem and set the achieve objectives in sustainable manner (Abeje, 2009).

According to Abeje; capacity of an institution to deliver municipal waste management (MSWM) is mainly depend on three factors.

These including,

- A) Capacity of individual to perform their job or tasks
- B) Consideration of structure and culture characteristics of organization and its leadership
- C) Institutional context of public sectors and expansion of the task network.

2.6.4 Lacks of legislation and enforcement

Lacks of legislation on waste management has also been cited as being partially responsible for the undefined role of agencies in the waste sector as well as the lacks of coordination among them.

Legislation related to waste management in developing country is usually fragmented and several acts (such as public health) local government and environmental protection cause related to waste management.

Rule and regulation therefore to be enforced by different agencies with duplication of responsibility and gaps in the regulatory provision which constrain the development of effective waste management system (Ibid).

2.7 Municipal waste management system in developing countries

The rapid extent and nature of urbanization in developing countries made MWM is a major issue of concern in those countries. “In the next 35 years, the urban population of world is expected to be double to more than five billion people, and from this 90% of growth is taking place in developing countries”. As a result of this, the existing MWM of developing countries fail to catch up with the rapid increase of waste production in these countries. To show this situation “one third to one half of waste generated with in most cities in low and middle income countries are not collected, rather it ends up as illegal dumps on streets, open space, and sewerage systems, and contribute to spread of disease.” Furthermore, MWM Schemes generally serve only part of the urban population. For instance; Kenya- Nairobi municipal waste collection service is mainly concerned in central business district and more affluent communities. As a result, in poor suburban zone indiscriminate disposal of waste at river side’s, roadsides, and other open space are common (Gebrie, 2009).

Transport of waste from households, commercial areas, institution and other generation sites is also a growing problem in developing countries. The transport waste becomes longer and more time consuming, and hence, more expensive and less efficient. In developing countries many sources of waste might only be reached by roads or alleys which may be inaccessible to certain method of transport because of their width, slope congestion, and surface. This is especially critical in unplanned settlement such as slums or low income area. In addition to this vehicles that serve for waste transports are also out dated, poorly maintained and frequently out of action (Zerbock,20011).

The operational in efficiency of MWM in developing countries is also further reflected in resource recovery. Although the material recovery from the west stream has a great potential in economic as well as environmental point of view, municipality and formal privet sector contribution in this activities is minimum. Beside this, west disposal is also neglected area in many low income countries and cases for environmental health hazards. Most of municipal waste in developing countries are dumped on land in more or less uncontrolled manner.

These dumps make very an economical use of the available space, allow free access to waste pickers, animal and fly and often produce unpleasant and hazardous smoke from slow burning fire (Zurbrugg, 2009).

2.8 Disposal waste

This is finally functional element in waste management system. Disposal activities are associated with finally dump of waste directly to land fill site .Today disposal of wastes by land filling or land spreading is the ultimate fate of all wastes whether this are residential waste or residual material from materials recovery facilities ;"However, in most developing countries this methods official banned a longing only sanitary land fill for final disposal .Because sanitary land fill is not a dump it is an engineered facilities used for disposing of wastes on land without creating nuisances or hazards to public health and environment (Techobannigless, 2011).

Through ,it is the most common technology around the world ,conventional and environmental unfriendly methods such as open burning ,open dumpling and non-sanitary land fill can still be used as disposal method (UNPE, 2009)

2.8.1 Disposal methods

Recycling:-is refers to separation of collected waste and transformation manufacture waste into usable or marketable. This implies that the cycling program insures to enable countries to prevent waste from ending up in landfills and in clinerarators. Furthermore it support low income household to buy or purchase the recycle solid waste at lower cost (Techobannigless, 2011).

Land filling the fact that source reduction, recycling and composting taken the protection waste management system, some solid remain to be placed in landfills. Land fill of waste is the most important widely used in waste management methods, however; land fill practices most low and middle income countries are open dumpling and burning with very little control (Helin,etal 2008).

Combustion: for many developing countries burning of waste material in the open land fill disposal site has been a common method of reducing the volume of waste .Combustion refers to the confined and controlled burning which help to decrease the volume of waste deposited an open landfills. Further in industrialized countries the waste burning process recover energy which used to produce steam and electricity (Horn WERA, etal, 2008).

CHAPTER THREE

3. METHODOLOGY

3.1. STUDY AREA DESCRIPTION

3.1.1. Geographical Location

Angacha Town is in the central region of Ethiopia, in the Kambata Zone, located at a distance of 250km from Addis Ababa. and its relative location is bordered on the south by Kacha Bira woreda, on the west by Doyogena town, on the north by the Hadiya Zone, on the east by Damboya Woreda, and on the southeast by Kedida Gamela Woreda. The astronomical location of Angacha Town is 7°19'–7°35'N and 37°49'–38°59'E latitude and longitude, respectively (ANTM, 2024).

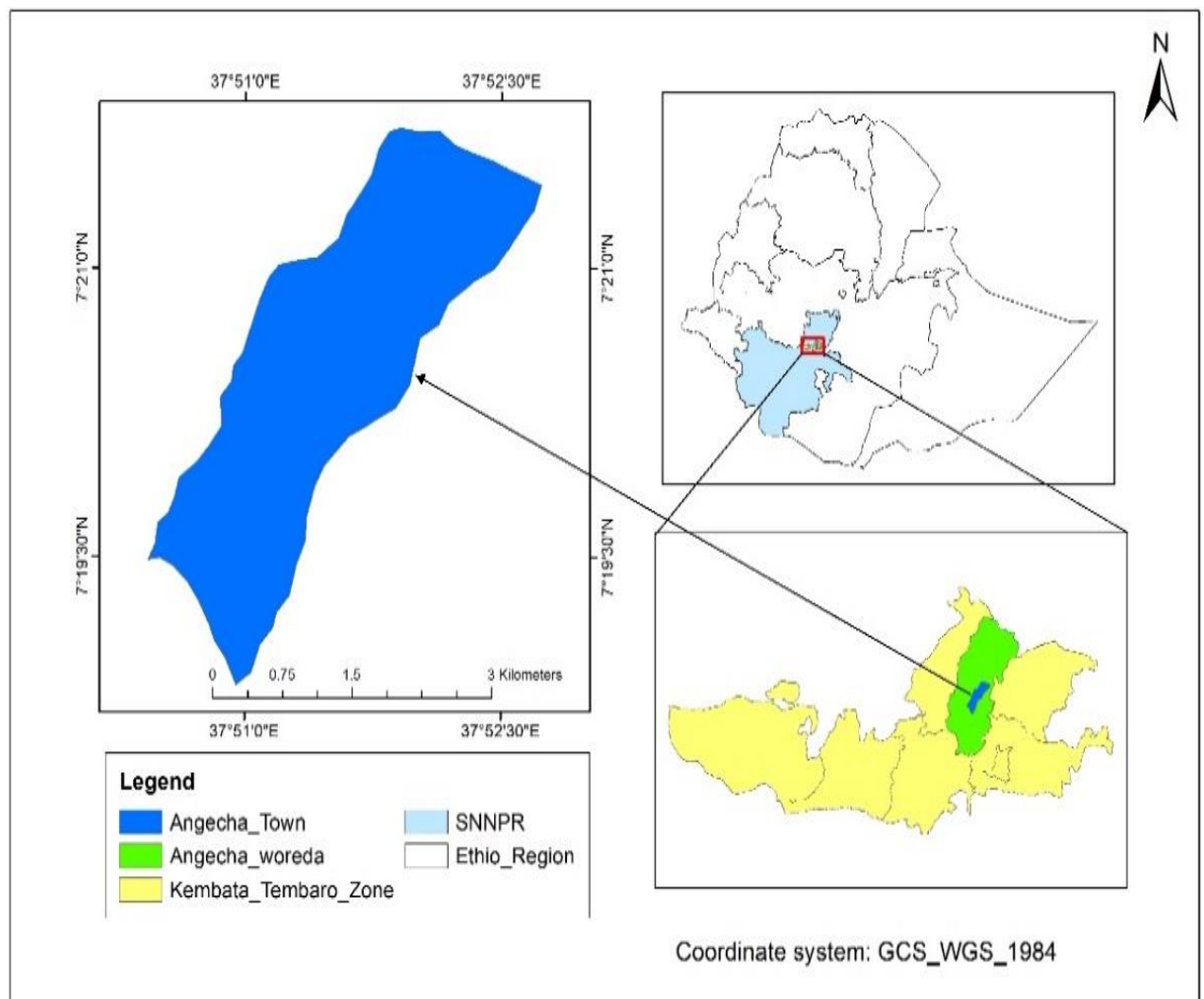


Figure 1 Map of Study Area

Source: (Ethio Gis; 2024).

3.1.2. Climate

Angecha town is one of the cool town, which is found at dega agro climatic zone of Ethiopia. Such climate zone was revealed by annual and monthly temperature of the town computed with an average maximum temperature of 20.1°C and minimum temperature of 6.5°C the town has get annual mean temperature of 22.29°C and annual rain fall of 964mm , has moderate annual rainfall during the summer season (Angecha municipal office 2023)

3.1.3 Topography

The topography of Angecha town is a lowland and plain area. Its elevation ranges between 1700 and 3028 metres above sea level (m.s.a.l). Out of the total area of the town, flat land covers 82%, while 16% is plateau, and the remaining 2% is mountainous (Angecha town administration office magazine, 2023).

3.1.4 Demography

Based on the 2007 national census conducted by the central statistical agency of Ethiopia (CSA), Angecha town has a total population of 6680 out of this 3,493 were male and 3,326 women.

3.1.5 Economic activity

Currently, Angecha town has exhibiting promising improvements in all most all area of development activities in general and local economic development in particular. Owing to its strategic location on the main north –south transportation root, Angecha town is an important trade and transport centre for the north eastern part of the country. As a result, the town's economy is largely characterized by diversified trade activities particularly involves collection and distribution of agricultural and industrial commodities and provision of catering services and also civil servant included (Angecha town administration office magazine, 2013).

3.2 Research design and Method of study

3.2.1. Research design

This research was employed descriptive research design. Descriptive design refers to a set of methods and procedures that can be descriptive research variables in which the research has under discursiveness researches in order to answer the questions (Creswell, J.2011). Because it is the situations and the shortages of time in this reasons our research to use discursive and interprets the impacts of waste managements.

3.2.2. Research Approach

The researcher mainly focuses on both qualitative and quantitative research design method. The main reason is that qualitatively approach was used to find data, information and qualitative design was use to show the amount of waste generate from the town by percentage

3.2.3. Data sources

Both primary and secondary data source was used in the investigation. Primary source of data is the researcher was used as 70 respondents in a form of questionnaire, field observation and interview with to sanitation beautification parks development department (SBPDD) heads. Secondary source were as both published and unpublished documents.

3.2.4. Data collection instruments

The researcher was conducted the study by using primary and secondary source of data. Primary information can be collected by using interview, questionnaire (having both open and close ended questions), and field observations were used. The interview was semi structured interview which intended to be interviewed to municipal workers of sanitation beautification parks and development department (MWSBDD). Whereas the questionnaire was presented to the selected households. The questionnaires were first prepared in English.

3.2.4.1 Questionnaires

Questionnaires was contain both open and close ended questions to collect primary data from the House Holds administration and waste collectors to get general information on waste management in Angecha town.

3.2.4.2. Interview

In primary data collection method, interview was undertaken a face to face situation to collect information for further investigation on the bases of the information gain from respondents. Interview was taken in order to become free to arrange the form, order and timing of questions. Researchers were conducted interview to get relevant information for his study.

3.2.4.3 Filed observations

The researcher was used observation great input to supplement primary data and to cross check the response of the sample Households by directly observing and collecting relevant information.

3.2.5. Target population, sampling technique and sample size

3.2.5.1. Sampling technique

To conduct this study, researchers were employed simple random sampling technique. The use of this simple random sampling technique is that it provides equal chance of being included in sample to each population. In general, this sampling technique was preferred from other sampling systems in order to avoid bias, to take good sample from representative of the whole population and to save time and money.

3.2.5.2 Sample size

Based on the 2007 national census conducted by the (Central Statistical Agency of Ethiopia (CSA), the total population of angecha town was 6680 from these total population house hold were 1520. From these household, the researcher was selected 70 sample sizes in order to distribute the questionnaire by using (Quater, 2004).

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

Where, n=Sample size

N=Total number household

e=level of confidence (95%)

p=proportional standard (0.05)

z=standard confidence (1.96)

$$q = 1 - 0.05$$

$$n = \frac{1.96^2 (0.05)(1-0.05)(1520)}{0.05^2 (1520-1) + 1.96^2 (0.05)(1-0.05)}$$

$$n = 277.36352 \approx 3.979976$$

$$n = 70$$

3.3 Data Analysis

The collected data from the questionnaires and interviews was quantitatively and qualitatively. In quantitative analysis the percentage will be used. Interview and open ended questions from questionnaires were organized finally, the results obtained from each instrument are presented by comparing and contrasting to reach a conclusion and possible solution.

CHAPTER FOUR

4. PRESENTATION AND ANALYSIS OF DATA

4.1 Introduction

This chapter deals with the presentation of the data obtained from the through questionnaires, interviews and field observations. HWM as a necessary and vital urban service in Angecha town. Like road and electric city. This is because absence of qualified and efficient municipal waste management service exposed the town resident from various health, aesthetic and environmental impacts. For this reason, this chapter briefly discusses and evaluates the existing condition of MWM service in general and household waste management practice in particular.

4.2. Demographic characteristics of the sample household

Table 1 Demographic characteristics of respondents by sex

Sex	Number of household	Percent
Female	50	71%
Male	20	29%
Total	70	100%

Source: (Field survey, 2024)

Because waste generation and its handling shows a great variation related with difference in background characteristics of house hold, in this study the researcher tried to constitute different sample house hold with a different demographic characteristics. In this study the questionnaire survey was conducted among 70 households. Among this sample respondents more than half of them where female. This was due to the fact that most of the time females stay and work inside them home rather their working outside. Since women have batter knowledge than men about their resident waste property and its handling. This is because most of such kind of activates are routinely done by women and children.

4.2.1 Age distribution of Respondents

In this part of age distribution of house hold, the researcher would be analyse age distribution of house hold who give detail information for this study.

Table 2 age distribution of respondents

As the below the table 2 shows that, majority of respondents were lay between age 21-30 and accounts about 47.1% both male and female. This age group is well known by its “productivity” and more powerful to perform any activiies

Age	Numbers of respondents	Percentage (%)
10-20	10	14.3%
21-30	33	47.1%
31-40	15	21.4%
41 -50	11	15.7%
51 and above	1	1.4%
Total	70	100%

Source: (Field survey, 2024)

4.2.2 Marital status of respondents

Table 3 marital status of respondents

Marital status	Numbers of respondents	Percentage (%)
Single	32	45.7%
Married	28	40%
Divorced	12	15.6%
Widowed	-----	-----
Total	70	100%

Source: (Field survey, 2024)

Marital status is another demographic factor of respondent which influence degree of waste generation, management, and participation on different activities. Most of the time, a divorced individuals generate less waste when we compare with the married one.

From table 3, 45.7% of the respondents are widowed while (45.7%) of the respondents are single and the remaining (15.6%) are divorce. From this table we had concluded that the majority of the respondents were single.

4.2.3 Educational status of respondents

Educational level has its own contribution .The following table 4.4 describes it. Education is the formal processes by which society deliberately transmit its accumulated knowledge skills customs and beliefs from one generation to another. Education status is another factor which influences proper management of waste as well as other natural resources. As a country has greater educated people, it plays a great role for its resource conservation, putting alternative to the existed problem as well as rehabilitation the degraded resource. On the other hand, country has high illiteracy rate their contribution for such activity is relatively less.

Table 4 educational status of respondents

Educational level	Frequency	Percentage (%)
Illiterate	2	2.6%
Grade 1-4	3	4%
Grade 5-8	5	6.5%

Grade 9-10	7	9%
Diploma	10	13%
Grade 10-12	16	25.7%
Degree and above	27	40%

Source: (Field survey, 2024)

Based on the data from the field survey conducted in 2024 regarding the educational levels of respondents, the distribution is as follows:- Illiterate: 2 respondents (2.6%), Grade 1-4: 3 respondents (4%), Grade 5-8: 5 respondents (6.5%), Grade 9-10: 7 respondents (9%) ,Diploma: 10 respondents (13%), Grade 10-12: 18 respondents (25.7%) , Degree and above: 27 respondents (40%). This data provides insight into the educational background of the surveyed population, showing a diverse range of educational levels.

The majority of respondents have attained a degree or higher education, indicating a relatively educated sample group. In the case of educational status it one of major contribution of the collection of waste .So, the higher educational level was more awareness than the lower one.

4.2.4 Occupational status of respondents

Table 5 occupational status of respondents

Occupational status	frequency	percentage
Farmer	2	2.5%
Merchant	25	32.5%
civil servant	21	27.2%
daily Labour	10	12.9%
Other	9	11.6%

Source: (Field survey, 2024)

Based on the data from the field survey conducted in 2024, the distribution of occupational status among the respondents is as follows farmer: 2 respondents (2.5%), Merchant: 25 respondents (32.5%), Civil Servant: 21 respondents (27.2%), Daily Labour: 10 respondents (12.9%), other: 9 respondents (11.6%). This data provides insights into the occupational status of the surveyed population, with merchants being the most common occupational category, followed by civil servants and students.

4.2.5 Religious group

The different religion groups in the study area.

Table 6 religious group

Religion	Frequency	Percentage
Protestant	53	75.7%
Orthodox	10	13%
Catholic	5	6.5%
Muslim	2	2.6%
Total	70	100%

Source; Field survey, 2024

In the study area majority of the respondents were protestant (75.7), remaining orthodox, catholic and Muslim are 13%, 6.5% and, 2.6% respectively. The total row provides the sum of all respondents across all religious groups, which in this case is 70 respondents. The percentages add up to 100%, indicating that all respondents have been accounted for in the religious group distribution. Among these Religion group protestant followers occupy majority group and followers Muslim occupy the least.

4.3 composition of household waste

The first and the most pre requested step for provision of efficient MWM is began by identification of major sources, and determination of generation rate and composition of municipal waste. But Angecha town sanitation, beautification, and park development department (SBPDD) gave less attention. For instance, regarding the town residential waste composition and generation rate, there has been lack of frequent and ongoing surveys.

This situation was investigated as the researcher of this paper conducted interview with the SBPDD of the town. As the researcher observed in the field, the dominant type of biodegradable waste are food leftovers, vegetable peeling ,onion and garden waste, animal waste ash, dust leaves, scarp of chat, market place wastes(vegetable and fruit wastes), papers, wood scraps, bones, straw, dead animals, cardboard cartons and paper packaging materials etc. Whereas non-biodegradable wastes of the town includes different type of plastics (like plastic or festal broken pieces of plastic materials plastic packaging material), cables and use less electronic material, pieces of ceramic, glass, cans, pieces of metals, textile scrapes,

discarded old shoes, packaging materials, etc. of biodegradable and non-biodegradable waste generated.

Table 7 composition of house holds

Bio degradable	63	90%
Non-biodegradable	7	10%
Total	70	100%

Source: (Field survey, 2024)

As table 4.7 shown the most dominantly generated wastes emitted to their surrounding were bio degradable 63 (90%) whereas 7(10%) where non bio degradable . from this finding researcher concluded that in Angecha town the dominant household waste are bio degradable. In addition to respondent reply the researcher observed the waste at household compounds and deposal site.

4.4 waste storage facility and its handling in Angecha town

MSWM encompasses an action of storing waste in a certain kind of materials or equipment as soon as the waste generated and safe control of it. Accordingly, studying waste storage facilities and their handling has significant impact for betterment of municipal waste management activity. This is from the point of identification of type and quantity of storage material to be used, appropriate location (sitting) of it, deciding the collection method to be used and avoidance of health, environment and aesthetics impact of storage material (G/tsadikan, 2006). As a result of this, the researcher collection the information about waste storage and handling practice of in Angecha town and briefly in two categories. The first category constitutes primary or temporary storage facility of household, while the second category comprises secondary or communal storage facility of a town which include public waste container and dustbins. The detail examination of both of these storage facilities is described below.

4.4.1 Extant of cleaning house and compound

Table 8 extent of cleaning of house and compounds

Item	Respondents	Percent
every day	55	78.6%
With two days interval	8	11.4%
with three days interval	5	7.1%
One week's interval	2	2.9%
If any	-----	-----
Total	70	100%

Source: (Field survey, 2024)

Based on the data from Table 8 on the extent of cleaning of house and compound from the field survey conducted in 2024, the distribution of respondents based on their cleaning frequency is as follows: Every day: 55 respondents (78.6%) With two days interval: 8 respondents (11.4%) With three days interval: 5 respondents (7.1%) One week's interval: 2 respondents (2.9%).

This data indicates that the majority of respondents clean their house and compound every day, with a smaller percentage opting for less frequent cleaning intervals. It highlights the importance placed on cleanliness and maintenance among the surveyed population.

4.4.2 What types of storage materials that households have.

Table 9 storage material that house hold have

Alternative	Number of respondent	Percent
Traditional bin	60	85.7%
Modern bin	10	14.2%
Total	70	100%

Source; field survey, 2024

The result shown at table 4.9 that 85.7% have traditional bin storage material, while the remaining 14.2% have modern bin storage materials. But, on the type of storage material used by household there is a high variation. This is mainly because the nature of storage materials of house hold is depend on characteristics of waste (rate of generation, physical and chemical composition , moisture content of waste etc), collection frequency and type of collection equipment, space available for placement of the storage materials, and economic power of waste generation.

4.4.3 Type of primary waste storage materials of house holds

Table 10 types of primary waste management materials of household

Primary storage	Number of respondent	Percent
Sacks	23	32.9%
Plastic bag	16	22.9%
Basket	14	20%
Privet pit	7	10%
Cardboard	6	8.8%
Metallic container	4	5.7%

Total	70	100%
-------	----	------

Source; field survey, 2024

As it is clearly observed in table 4.10, the majority of household 23(32.9%) stock up their solid waste sack this is highly related with the least cost of sack, easily availability in the market, its suitability for holding large volume of waste, and low frequency and spatial coverage of door to door waste collection service of the town. Next to sack, about (22.9%) of households use plastic bag followed by basket (20%) because of their frequent but low generation of waste and economic power to utilize replicable storage materialise such as plastic bag following this there are households that use private pit (10%) and cased bored(8.8%) as storage materials of solid waste in their home. But the least used storage materials is metallic container (5.7%). This is essentially because of its difficulty for transportation high cost and low access in market. However different from preparation and usage of storage materials most of the resident do not have well established handling practices and gives low attention for it.

4.4.4 Secondary waste storage facilities and their handling

Secondary storage facilities refers to different types of waste containers which involve keeping waste generated from different households at a common or central point from where collection vehicles can pick it and transport to final disposal site. These facilities are provided by municipalities which is responsible for management of the town of solid waste. According to interview made with SBPDD head, there are no any secondary storage facilities.

But the households should wait until the collectors come to take to disposal site and load on carts by using sacks.

4.5 waste collection and transportation system in Angecha town

Collection and transportation of waste involves the process of picking up of waste from place of generation, taking nearby public waste container or transfer stations, and finally dumping it to disposal site. This functional element is very decisive and mandatory component of municipal waste management because productivity and efficiency of this service is highly determined it.

Currently, in Angecha town there is one method of waste collection that is door to door service. This method is largely implemented for collection of waste from residential.

4.6 waste disposal practices in Angecha town

As it is described earlier, door to door waste collection of the town is very in significant both in spatial coverage and efficiency. As a result, the only option of majority house hold is restricted to two choices. The first one is simply burning, or dumping of waste in their compounds. While the secondary option is throwing of waste at roads sides open fields near by rivers, bridges and gullies. Hence in orders assess routine method of waste, the researcher asked the sample respondents about their common disposal system. The survey result looks like the following.

Table 11 household waste disposal practice

Household solid waste disposal practice	Number of respondent	Percent
Dispose at the road side and open fields	15	21.4%
Dumping in the nearby riverside, bridge	10	14.3%
Dumpling in the gullies	5	7.1%
Burning in my compound	41	58.9%
Total	70	100%

Source: (Field survey, 2024)

As vividly seen on the above table 15 respondent (21.4%) dump in the roads and open fields and dumpling in the nearly river side's bridges and gullies, 10(14.3%) respondent 41(58.9%) burning in their compound, 15 respondent (19.5%) dispose at the road sides and open fields As it is observed in table 4.5, quit large numbers of households 44 respondent (55%) preferred improper and unauthorized waste practices. This confirmed that the destination of the majority of uncollected waste of households is in road, sewers, riverbank, valleys, gullies, bridges, and area.

4.7 waste separations to quarrel and exchange with liwach

Table 12 waste separation to quarrel and exchange with liwach

Separation and exchange waste	Yes	27	38.9%
No separation	No	50	61%

Source: (Field survey, 2024)

As shown table 12, 61% Of respondent said they do not separate waste that produced in their house but 38.9% of respondent separate and exchange it to liwach. This situation confirmed that the resident in the town have not the waste separation practices. If they were done these, other craftsmen and waste collectors can use it for reuse and recycling.

4.8 awareness of households on waste management

Table 13 awareness of households on waste management

Alternatives	Number of respondent	Percent
Have awareness	28	40%
Have not awareness	42	60%

Source: (Field survey, 2024)

As vividly seen in table 13 most of the households (60%) are lack of clear and adequate awareness about proper waste management system. But (40%) have awareness on the management. The reason for this lack of awareness is they did not get good households wastes handling an interview with the town SBPDD head. I.e. the was no good and enough trainings.

4.9 existing situation and management of waste disposal sits

Waste collection and transportation is not an end to waste management. Proper waste management also requires proper disposal of waste in a proper place. In spite of this Angecha town waste disposal site and its management is in adequate and below the standard. The site called broken river is located as the edge of Angecha town in the Hogtie sub city. Under such condition the site has been functioning for the last 12 years. Some of the major problem associated with this unsanitary open landfill includes

Odour is a problem at the disposal site which affects the quality of air in the surrounding area and cause residents be affected by different respiratory disease

There is high leaching generation from the site which has high potential for soil and ground water as well as water contamination. For example, the site is bounded by broken river. As result waste are directly eroded and join into it. In addition, dumped waste of the site also goes to this river by water and wind erosion, as result of this, health of the surrounding residents and inhabitants is highly affected. Especially those households who living at the lower part of the river at subjected to different health problems since the use the river for washing purpose.

Table 14 satisfaction of the community with the MWM services of the town

Item	Respondent	Percent
Very satisfactory	-----	---
Satisfactory	-----	---
Fair	64	92.5%

Unsatisfactory	6	7.5%
Total	70	100%

Source: (Field survey, 2024)

As we seen in table 14 the community satisfaction regarding with the MWM services of the town 64(92.5%) of respondent are fair satisfied were as 6(7.5%) respondent are unsatisfied by the town MWM services. In addition to the respondent of the community the town SBPD head said that the MWM services are not satisfactory up on the community.

Table 15 supervision and control on illegal dumping of waste on streets and open areas

Item	Respondent	Percent
Yes	3	7.75%
No	67	92.25%
Total	70	100

Source: (Field survey, 2024)

As vividly seen in the table 15 the researcher found 67 respondent (96.25%) said that they have not seen any supervision on illegal dumping of waste on street and open area but only 3(7.75%) respondents said they have seen the control action of the sanitation agents. As the researcher asked the sanitation agents on illegal dumping through interview the rarely visit the waste disposal system.

4.11 Does waste management services in your area is burning issue

Table 16 does waste management services in your areas burning issue

Items	Respondent	Percent
Yes	70	100%
No		---
Total	70	100%

Source: (Field survey, 2024)

As the collected responses through the questionnaire form sample household all 70(100%) said the waste management service is A very burning issue as other service like road and water supply.

Table 17 status of door to door waste collection services

Items	Respondents	Percent
Yes	-----	-----
No	70	100%
Total	70	100%

Source: (Field survey, 2024)

As a table 4.17 indicated all respondents replied there have not an access to door to door waste collection services that delivered form municipality. The researcher also gathered information from the town municipality through interview they accepted that the absence of any door to door waste collection services.

4.10 Effect of sanitation, beautification and parks development department to participate different stock holder on MWM

The following findings are based on the interview conducted with the Angecha town SBDDP head on the above issue stated under 4.10. For many services that are delivered in many urban areas of the world stockholder participation is regarded as a back bone because delivery of one big service by one actor makes the service very difficult and complex. However, the involvement of various stockholders with their specialization can make the service provision easy, satisfactory and efficient. Similar to this for proper management of HSW of a given town and to keep its sustainable functioning, participation of stakeholder also plays determinant and irreplaceable role.

Those stockholders of HWM comprise community and community based organization, nongovernmental organisation (NGOs), and formal and informal privet sectors. Although there 10 well functional and socially organized local area associations with others. There for, the governmental organization should recognized their defect and give great emphasis to initiate stock holders participation.

CHAPTER FIVE

5. CONCLUSION AND RECOMMENDETION

5.1. Conclusion

This paper has attempted to assess the status and coverage of municipal waste management service of Angecha town in general. In particular, the study explored households waste management practices, institutional structure and capacity of sanitation, beautification and parks development department (SBPDD) of the town. These investigations were addressed by employing questionnaires, field observation, semi structured and UN structured interview with head and workers of sanitation beautification parks and development department (SBPDD). Finally, on the bases of qualitative and quantitative analysis of data, the finding of this study is concluding as follows.

The principal source of municipal waste in Angecha town is residences, streets sweeping. However, the considerable amount of waste of the town is generated from residential areas. According to this study 83.75% of residential areas waste is composed of biodegradable wastes such as ash, dust and food waste. These facts are investigated by the researcher using questionnaires, field observation at households home and disposal site.

The study also indicated that two main factors which are the main case for existing poor status of municipal waste management service of Angecha town. These are:-

Angecha town municipal waste management service is very week in terms of status, special coverage and waste management facility. Presently, in the town there are no public waste storage containers and road side dust bins. Like there is not a waste transport truck to transport the household wastes to the disposal site. It is being transported by using cart which is pulled by equine (horses and mule). The cart also serves as other mode of transport for income generation by transporting goods and furniture. This also one constraint to waste collectors so as to transport on time. There is not regular control of waste collection and management mechanism in each house hold; there is low effort awareness creation on HWM on the communities; there is note an authorized disposal site for wastes it only dumped at the bank of a river called bursa river wit out environmental, economic and social impact considerations. Door to door waste collection system is implemented by one youth Association. But the status and special coverage of this service is very unsatisfactory.

Moreover; the municipal sanitation beautification and parks development department (SBPDD) did not agitate stake holder in household waste management (HWM) service. Like CBOs, NGOs and other privet sector.

The first weakness of household is poor handling of temporal storage of materials of their house. Such as, the dropout wastes around it. They also exposed it to rain and light, did not well covered, and placed near to residence. According to the standard for minimum distance of the placement of primary storage materials. It should be at least 10 meter away from the house, and preferable at the back of house there should be at list 30 meter distance from water wells. Second, the greater part of the town house holds didn't separately store waste. They didn't also in cleaning campaign voluntary. They mainly engaged by afraid of charge.

5.2. RECOMMENDECTIONS

Based on the finding of this study, the following measure are very important to overcome MWM problem of Angecha town.

1 .Awareness Related Measures

Implement comprehensive awareness programs targeting Angecha town residents to educate them about waste management issues and sustainable practices. Special focus should be given to women as influential change agents.

2. Sanitation, beautification and parks development department capacity related measures

Prioritize infrastructure development including reinstating public waste containers, introducing dustbins under close supervision, procuring transport trucks, and ensuring regular waste collection. Implement efficient monitoring systems to deter illegal waste disposal. Enhance waste collection through permanent programs and field worker supervision. Establish and enforce specific regulations addressing local challenges in municipal waste management, with a focus on stakeholder involvement and sustainability. Foster partnerships with NGOs and donor agencies for financial and technical support in purchasing waste management facilities and building community and departmental capacities.

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APPENDIX 1

WOLKITE UNIVERSTY
COLLEGE OF SOCIAL SCIENCE AND HUMANITY
DEPARTMENT OF GEOGRAPHY AND ENVIRONMENTAL STUDIES

Questionnaire Prepared For Sample House Holds In Angecha Town

This questionnaire is prepared for an academic purpose for the fulfilment of BA degree in geography and environmental studies. Specifically the objective of the study is to assess the current practice, infrastructural and institutional capacity of municipal waste management service in Angecha town. Therefore, your response is very important for the success of the study because all information that you provide determines the analysis and conclusion of the research. Hence you are kindly requested to give your response by selecting (circling) your answer from the given alternative choice or describing your opinion. Please be informed that your response is kept in confidential and you are not required to write your name. We would like to thank you for your cooperation.

Part one: background information about the respondents

Instruction: in order to answer the following questions, put a right sign in the boxes that located in front of your choice.

1. Sex A. Male B. Female
2. Age A, 10 -20 B, 21 -30 C, 31-40 D, Above 40
3. Marital status A, Single B, Married C, Divorced D, widowed
4. Educational back ground A, illiterate B, elementary 9-10grade D diploma
E, 10 -12 grade F, degree and above
5. Occupational status A, Agriculture B, Civil servant C, Labour
D, Other specify
6. Religion A, Orthodox B, Catholic C, Muslim
D protestant

Part two: questionnaire prepared for investigating households waste management awareness, and practice together with their attitude regarding municipal waste management of the town.

1. How often do you clean you house

A. every day B. With two day interv a C. with three day interval D. With one week interval E. If others please specify it-----

2. How many waste storage material do you use to store waste produced in your dwelling?
.....

3. What type of waste storage material do you use in your house to store waste produced from your dwelling?

A. sack B. basket C. Metal container D. Plastic container (festal)
E. Private pit F. I don't use G. If others please specify it-----

4. Do you separately store wastes that are produced in your house and saleable to "Quale's" and exchange with "liwach"?

A. yes B. No

5. If your answer for question no-4 is 'yes', which of the following items do you separate for selling it to "Quale's" and exchange to "liwach" (possible to select more than one)?

A. metals B. Plastics C. Glass, bottles, can etc D. Organic wastes
E. Electronic wastes F. Textile and old shoes If other please specifies it----

6. Do you separate other wastes produced in your dwelling apart from wastes which are saleable to "quale's" and "Liwach"?

A. yes B. No

7. If your answer for question number 6 is 'yes', state the type of those wastes?

8. Do you have access to door to door waste collection service delivered from the municipality waste collection vehicle?

A. yes B. No

9. If your answer for question no-8 is 'yes', in how many day interval you get this service?

A. 1-3 days B. 4-7 days C. 8-15 days D. 16-30 days

E. Above 30 days F. As available

10. What are the most dominant composition of waste do you generate?

- A. food left over E. Plastic bag "festal"
B. vegetable peelings F. Packaging material
C. kitchens and garden wastes G. Textile scraps
D. ash and dust H. Glass and cans

11. Where do you frequently use to dispose the waste of your house holds?

- A. at the road sides and open fields D. Dumping in river side's and gullies
B. dumping in bridges E. Burn in compounds
C. burry inside my compound F. Simply dispose in my compound

12. Does waste management services in your area is a burning issue as it compared with other services like road service, water supply etc.

- A. yes B. no C. If others please specify it-----

13. Do you have storage materials in your compound?

- A. yes B. No

14. If your answer is yes for question 13, how many storage materials do you have?

- A. One B. Two C. More than two

15. Do you know the rules and regulations of waste management of the town?

- A. yes B. No

16. Have you ever seen the sanitation agent making supervision and control on illegal dumping of wastes on the street, open areas, river side's and other areas?

- A. yes B. No

17. In general, are you satisfied with the municipal waste management services of the town which is delivered by sanitation, beautification and park development of Angecha under the jurisdiction of municipality?

- A. very satisfactory B. Satisfactory C. Fair D. Unsatisfactory
E. very unsatisfactory

APENDEX- 2

Interview questions prepared to beautification and park department of Angecha town

Dear respondent this interview is conducted for an academic purpose for the fulfilment of BA degree in geography and environmental studies. Specifically the objective is to assess the current practice, infrastructural and institutional capacity of municipal waste management service in Angecha town. There for, your response is very important for the success of the study because all information that you provide determines analysis and conclusion of the research.

Hence, you are kindly requested to give your response. Please be informed that your responses is kept in confidential. We would like to thank you for your cooperation.

Part one: background information about the respondents

1. Job title in your department -----.
2. Employment condition A, permanent B, contract
3. Educational level A, 1-4 grade completed C, certificate
B, 5-8 grade completed D, 9-12 , diploma
F, first degree, G, second degree and above
4. Work experience-----.

Part two: Interview questions prepared for head of sanitation, beautification and park development of Angecha town

1. What type of waste collection methods does your department adopt?
-----.
2. Mention the type and total number of equipment that your department used for collection, transportation and disposal of municipal waste of the town?

-----.
3. Explain the major reasons of why your department didn't place public waste container and streets bins at the major road of Angecha town?

.....
4. Does your department collect charge from the residence of the town for its municipal waste management service delivery?

.....
5 Does your department invited different stock holders of management to participate both in planning and implementation process of municipal waste management?

.....
6. Did your department give training to the community about waste management and prepared clean up campaigns? If you did, how many times and describe your method of delivery?

.....
7. List challenges of your department?

.....
8. Do you think resident of Dessie town have clear and adequate awareness about waste management system?

.....
9. What do you think should be done to improve the situation of MWM of the town in general? If you have any additional comment, suggestion, and would like to elaborate on any of your previous, please include it here, or attach a separate sheet.