THE CONTRIBUTION OF ZOOMLION TOWARD MANAGEMENT OF SOLID WASTE AND AS A MEANS OF CREATING EMPLOYMENT FOR THE YOUTH.
A CASE STUDY IN SUNYANI MUNICIPALITY, GHANA

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Signature……………………….. Date… …………………………………

Dedication

This work is dedicated to my parents, Stephen Kwame Ankamah and Madam Janet Fofie for their support during my entire education.

For my brothers Ankamah Bernard, Frank Owusu, my late sister Ankamaah Clara and my cousin Owusu Daniel for their contribution toward my education carrier.

Finally, to my one and only friend Prince Bright and my daughter Christabel Ankamah.

You are all special to me and may God bless.

Acknowledgement

Abstract

The study examined the contribution of Zoomlion towards management of solid waste and as means of creating employment in the Sunyani municipality in the Brong Ahafo region, in the southern part of Ghana. A total of one hundred respondents were interviewed by the used of questionnaire in order to obtain information regarding the waste management system in Sunyani by Zoomlion. In addition, an interview guide was designed for the assemblymen in the community and the regional manager of Zoomlion. Other stakeholders were also interviewed for example the district health officer and regional youth employment coordinator. The outcome of the research was in two categories, that is viability of the company and employment creation.

In the first place, the company has positively contributed to the management of solid waste in the Sunyani municipality. But the company has still got a lot of tasks to perform before achieving its stipulated target by 2015 such as the establishment of a waste management training institution and spreading its branches all over the world. The research shows that, solid waste management in the community is improving in a very gradual process. Workers are ready to deliver if their working conditions are improved and necessary equipment is provided.

In the second place, the findings showed that the company has generated a lot of employment opportunities for the people especially the youth in the community. This has reduced the unemployment rate in the community. Workers of the company can now meet their daily bread requirement and improve their livelihoods as a result of the establishment of Zoomlion in the community.

Other actors with vested interest in the study were Ministry of Youth and Employment, Sunyani municipal assembly and Ministry of Environment. With regard to Zoomlion much concentration was given to the workers who work in various households to pick solid waste and other public places such as markets and streets. Private company involvement in solid waste collection was found from the study to be very limited in the Sunyani municipality but commonly found in Accra and Kumasi.

Table of contents

Page

List of Abbreviation and Acronyms

1. C.E.O: Chief Executive Officer

2. EEA: European Environment Agency

3. EPA : Environmental Protection Agency

4. ICT: Information and Communication Technology

5. IFAS: Germany Based Company

6. J.H.S: Junior High School

7. NDMW : National Daily Minimum Wages

8. NYEP : National Youth Employment Programme

9. RDN : Regional District Nanaimo

10. S.H.S: Senior High School

11. SMA: Sunyani Municipal District Assembly

12. UNCHS : United Nations Centre for Human Settlements

13. UNDP: United Nations Development Programme

14. UNEP: United Nations Environmental Programme

15. USEPA: United States Environmental Protection Agency

16. UNEP-IETC: International Source Book on Environmentally Sound Technologies for Municipal Solid Waste Management

17. UNSD: United Nations Statistics Division

<div align="center">**CHAPTER 1**</div>

<div align="center">**INTRODUCTION**</div>

1.1 Background

The general aims of municipal solid waste management are to ensure quality of environment, secure environmental health, provide the needed support for the efficiency and productivity of the economy and create employment (Schubeler, 1996).

Solid waste management has become a major issue as part and parcel of development and modernization but much impact is usually felt mostly by developing countries. This irony is based on the distance between the ways of growth and modernization in the less developed countries in the world. That is their ability to pay for, plan for and implement sound management is usually incorporated in national policy (see Thomas –hope 1998, p.1).

Solid waste result from human domestic activities, social and industrial activities for the purpose of improving in the standard of living, increase in population and development of technology (Dickerson 1999; UNEP, 1999; Suess 1985). In addition, research conducted by Research Market in Dublin and Ireland pointed out that the global sum of municipal solid waste generation is about 1.84 billion tones and a partial increase of 7% over the 2003 figures (see www.jij.com/msw/index.html. The reports further states that between the years of 2004 and 2008 a tremendous rise in global municipal waste at about 31.1% was expected.

 Issues concerning environment has reached the awareness of all people especially management of solid waste in various communities in the world. This has therefore become a global issue in which Sunyani Municipality cannot be neglected. In some countries waste generation has been going up as a result of corresponding increase in population and economic growth. Meanwhile more developed countries are endowed with facilities that enable them to deal with numerous generated solid waste but financial difficulties aggravate this problem in less developed countries (Deshmukh et al, 2002).

Most often urban area waste is usually lost, contributes towards pollution or is used as landfill which means there is no industrial products or nutrients to the production, this usually causes problems such as soil mining and pollution (Drechsel et al, 2001).

Zoomlion is a term that is used to describe a waste management institution in Ghana that aims to operate in an efficient and cost effective manner. The groups of youth who are employed for the purpose of improving sanitation level of the community are identified by the term Zoomlion. Zoomlion is also used as a tool of poverty reduction through job creation for the unemployed in collaboration with the Ministry of Youth and Employment. Zoomlion was established in Ghana in the year 2006. The company has got a lot of branches across the nation. The company was first initiated in the national capital Accra, Ghana. During the African cup of nations "Angola 2010" Zoomlion were responsible for the treatment of wastes made by all the participants in the game.

1.2 PROBLEM STATEMENT

Management of waste in Ghanaian community is a very difficult task for the government and private bodies in which the Sunyani municipality cannot be overlooked. This has come about as a result of increase in the population and the continuous rural- urban drift of citizens which cause increasing volume of waste without equivalent rise in logistics for its disposal and intensive pressure on the few existing facilities. This has led to outbreak of diseases such as cholera, malaria and typhoid fever. It has also contributed to pollution and unfriendly environment. In the light of this situation, I wish to focus on the significance of the existence of Zoomlion in the Sunyani municipality. The thesis will also look at the problem from a different perspective that is as a means which the government of Ghana is using as an employment mechanism for the youth in the country. In Ghana, especially in the Accra a large number of people consider flooding as a major cause of improper management of solid waste. It's established that during the raining season most gutter in the city is full of solid waste that actually prevents the normal flow of water hence causing flooding. In dealing with solid waste both health and social effects are significant as well as the environmental impact.

1.3 OBJECTIVES AND RESEARCH QUESTIONS

The study has two main objectives which have been further classified into research questions.

1. To explore the viability of waste management by Zoomlion.

RESEARCH QUESTIONS

a. What are the basic functions of Zoomlion?

b. What are the various kinds of solid waste they manage within the environment?

c. Are the communities satisfied with the performance of the company?

d. Do they perform any other function apart from waste management?

f. Do they have enough technology to be able to recycle the waste from the households?

2. To analyze how Zoomlion has contributed toward youth employment in Ghana

RESEARCH QUESTIONS

a. Which groups of people are employed into the company?

b. Are the workers satisfied with their working conditions?

c. Are there any frictions in the relation between workers and management?

d. Are there any requirements one must meet before being employed as a worker?

e. Does the company have sufficient incomes to secure the workers timely and adequate payment?

1.4 DESCRIPTION OF STUDY AREA

Sunyani is one of the regional capitals of Ghana and at the same time a district capital. The region is popularly known as the Brong Ahafo Region. Sunyani is located at the southern part of the country. The entire population according to the population census organized in the year 2000 was 70,869 with the growth rate of about 4.0%. The major occupation in the region is farming with the presence of some civil servants and government officials.

1.5 SIGNIFICANCE OF THE STUDY

Urbanization and subsequent solid waste disposal system has had impact in environmental standard in the city of Sunyani municipality.

Evidence clearly shows that when waste is not properly managed it may contain toxic or poisonous substances which can cause dangers to the human health and at the same time pollute the environment and it may also call for high environmental cost to be incurred by the local government. The study will give room for future researchers to employ some of the ideas employed in the work and also enable me to compare the differences and similarities of other recognized studies in the area of solid waste management. With regard to the bad impact associated with solid wastes I wish to address the essence of solid waste management in the country particularly the Sunyani municipality in order for the people to enjoy safe environment and improve the living standard of the people in the community as whole.

1.6 **ORGANIZATION OF THE STUDY**

This work will be divided into 5 chapters. The first chapter will be the overall introduction toward the work. Within this chapter there will be statement of problem, background and objectives of the study. The second chapter will emphasize on the theoretical framework and literature review. The third chapter will also talk about methodology into detail and emphasize will be placed on the study area, questionnaire and data processing method. The fourth chapter will involve results and discussion. The final chapter will work on conclusions and recommendations of the study.

1.7 ETHICAL ISSUES

With regard to the research ethics two basic issues will be highlighted. The first issue is informed consent which implies that, the researcher is responsible to discuss the purpose of the research with all participants and participation must be voluntary. For that matter, a participant may choose not to answer questions they may not be comfortable with. The second issue is the confidentiality of the information participants will deliver. Participants will be given the assurance that any information they provide may not be disclosed. Such information should be kept as secret as possible and should only be used for the research and nothing else.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Introduction

During the primitive era human and animals waste did not pose threat to the communities in terms of management because the population was too small and there was convenient ground available for deposition of solid waste. But currently the situation is changed where population is growing at a very high rate more especially in less developed countries and for that matter communities are finding it very difficult to get conducive place for the deposition of solid wastes (Sathis and Chanakya 1995). This chapter will further discusses the following: definition of concepts, world- wide overview of solid waste management, integrated waste management, management of solid waste in Ghana and how the issue is prevailing in the Sunyani municipality.

2.2. Definition of basic concepts

2.2.1Solid waste

Sathis and Chanakya (1995) defined solid waste as "any solid material in the natural flow pattern that is rejected by society is called solid wastes".

The United States Environmental Protection Agency (USEPA, 1999) also defined solid wastes as "solid wastes composed of garbage and rubbish, which normally originates in a private home or apartment house…..may contain a significant amount of toxic or hazardous waste".

The European Environment Agency (2005) also defined household solid waste as "solid waste composed of garbage and rubbish, which normally originate from household".

2.2.2 Waste management

According to Bilitewsti et al (1994) the concept of "waste management", had been there from the period of 9.000 to 8.000 B.C where people learnt how to dispose their own waste outside their own home settlement in order to avoid odours, wild animals and nuisances of vermin.

"Management of solid waste may be defined as that discipline associated with the control of generation, storage, collection, transfer and transport, processing, and disposal of solid wastes in a manner that is in accord with the best principles of public health, economics, engineering, conservation, aesthetics, and other environmental considerations. In its scope, solid waste management includes administrative, financial, legal, planning, and engineering functions involved in the whole spectrum of solutions to problems of solid waste thrust upon the community by its inhabitants", (Tchobanaglous et al, 1997).

In general, household waste contains reusable and valuable materials for instance glass, metals, paper, plastic and food waste with great nutrient content but also increasing amount of hazardous waste for example mercury from batteries and cadmium from fluorescent tubes (Kharbanda and Stallworthy, 1990).

2.3 World- wide overview of solid waste management

According to agenda 21 (UNSD, 1992b) and authors such as Kreith (1994) and Bilitewski et al (1994) it is possible to stipulate that waste management consists of the following issues.

- "Minimization of waste in quantity and of contaminant concentration".

- "Increased sound waste reuse and recycle".

- "Ensure environmentally friendly treatment and disposal of no recoverable wastes".

- "The composition of the waste; this aspect is very crucial especially to define ways of safe disposal, potential for recycling and appropriate waste collection method.

Consumption patterns, life style and the season of the year will manipulate the waste composition".

The United Nations Development Programme survey among 181 Mayors during the International Colloquium, in the 1997 found an insufficient solid waste collection and disposal among the 5 most threatening problems among cities in the United States (UNDP, 1997). United Nation Centre for Human Settlements (UNCHS) stated that if waste is not properly managed it becomes a major source of contamination and promotes disease. Therefore proper waste management skill is needed to reduce health problems, water pollution risks and other associated environmental risks and negative aesthetic impacts to promote human health.

Zavodska (2000) pointed out that population growth and industrialization caused excessive accumulation of waste. This will cause disease if not properly treated. Pichtel (2005) pointed out that more than 1000 communities in the United States are in their initial stage of designing new incinerators for solid waste treatment.

Louis (2004) also found out that there are gradual shifting from burying or burning a community waste to recycling and using the waste as a medium of energy and materials for the community. Many people have also adapted the technology of recycling the waste and using it as a source of energy as a result of good legislation by governments.

More illustration can be learnt from the introduction of Environmental Impact Assessment in the United States and Canada to develop efficient management and planning system. (Hostovsky, 2003). This has actually made management of solid waste an important planning issue globally. The recovery rate of Municipal Solid Waste in the United States is explained in Table 1.

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years	1960	1970	1980	1990	1997
Generation (thousand tones)	88,120	121,060,	151,640	205,210	216,970
Recycling (thousand tones)	5,610	8,020	14,520	29,040	48,630
Composting (thousand tones)	----	----	---	4,200	12,070
Rate of recovery (%)	6.6	6.9	9.6	16.2	28.0

Source USEPA, 1999.

Table 1 Significance of municipal solid waste in the United States

Table 1 explains how the trend of solid waste management has changed by moving from one decade to another. The amounts of waste generated, recycled and composted go up with respective increase in the ratio of recovery in the United States.

Gorddard (1995:211) pointed out that "……the (waste management) problems is not a primarily one requiring only technical or engineering approaches such as landfill and incineration, but that are fundamentally it is economic in nature".

Smith (1990) also shared his view by saying that in terms of waste treatment it's very rational to employ different methods that ensures proper end use and good disposal of waste.

2.3.1 Integrated waste management

This refers to a system that gives managers opportunity to design a systematic approach in dealing with municipal solid waste. This practice is suitable for both developing and developed

nations and has gone above mere combination of different methods of waste management. (Seadon, 2006, Dai and Dai, 2004).

The United Nations Environmental Programme (UNEP, 1996) has defined integrated waste management as a "a framework of reference for designing and implementing new waste management systems and analyzing and optimizing existing systems".

Seadon (2006) further pointed out that the concepts of integrated waste management can be classified into four aspects; the integration of

- "Multi-options of treatment for waste into a single medium" (atmospheric, aqueous and solid waste).

- "Treatment for waste in multi-media".

- "Multiple tools" and

- "Multiple agents".

The multi-option focus on sound combination of waste management methods ensures effective waste reduction, reuse, recycling, resource recovery and disposal (Smith, 1990). The multi-media called for concurrent consideration of gaseous aqueous, solid waste and its effect on atmospheric, aquatic and terrestrial environments. For instance, issue like effects on both surface and underground water due to landfills activities, and pollution in the atmosphere due to the application of modern incinerators will be taken into consideration. The third aspect discusses the regulatory, voluntary and financial related mechanism that is needed to put into action. The final aspect involves various actors who have vested interest in solid waste management such as waste pickers, waste buyers, non-governmental organizations and other communities' organization responsible for waste collection.

Management of solid waste is endowed with the components of source of reduction, recycle, reuse and incineration which ensure efficient application of integrated waste approach. The efficient method of handling of waste never relies on only one technique but employs as many methods as possible and relevant, (EPA, 1989).
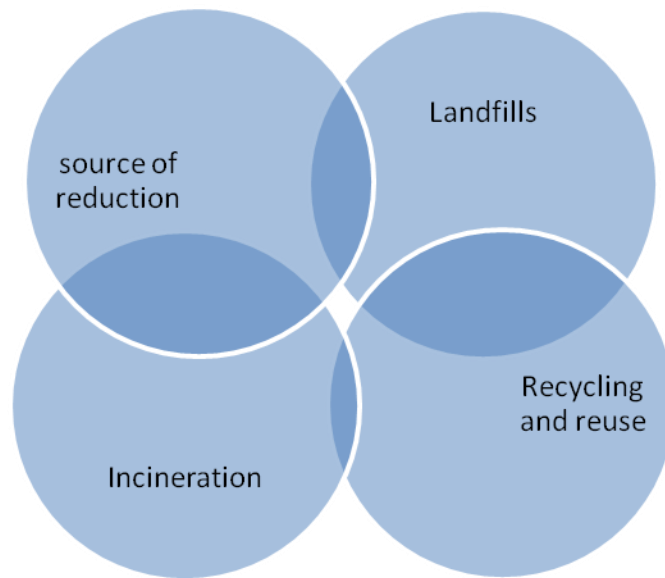
Figure 1 Interaction among methods of waste management.

Source (UNCHS, 1994)

This simply implies that managers are charged with the task of selecting the technique that suits the solid waste materials available. The United Nations Centre for Human Settlements (UNCHS, 1994) emphasizes the following 4 basic programme areas as means of ensuring environmentally sound management system of solid waste.

- "Minimizing waste production".

- "Maximizing environmentally sound reuse and recycling".

- "Promoting environmentally sound waste disposal and treatment".

- "Extending waste service coverage".

The organization further established that to be able to accomplish this task the following management strategies should be put in place:

- Increasing the waste planning and management information that involves education and technical campaigns.

- Raising proper planning by waste handlers, local communities and states

- Government, private sectors and corporate citizens should be involved in the recycling processes.

- Declining the risk from municipal solid waste combustion in order to promote and protect human health.

Figure 1 illustrates various interactions among actors with the purpose of improving urban environment and as a means of creating employment for the people in the community (UNDP, 1996).

Ownership

Government
(policy makers)

Resources

Solid Waste and Urban
Agriculture

Government

**Solid waste
management**

NGOs

**Sustainable resource
management**

Waste recycling

Waste collection

Urban Agriculture

Waste user

Vegetable farmers

Poultry

Pig farmers,

Source: UNDP (1996)

Consumers
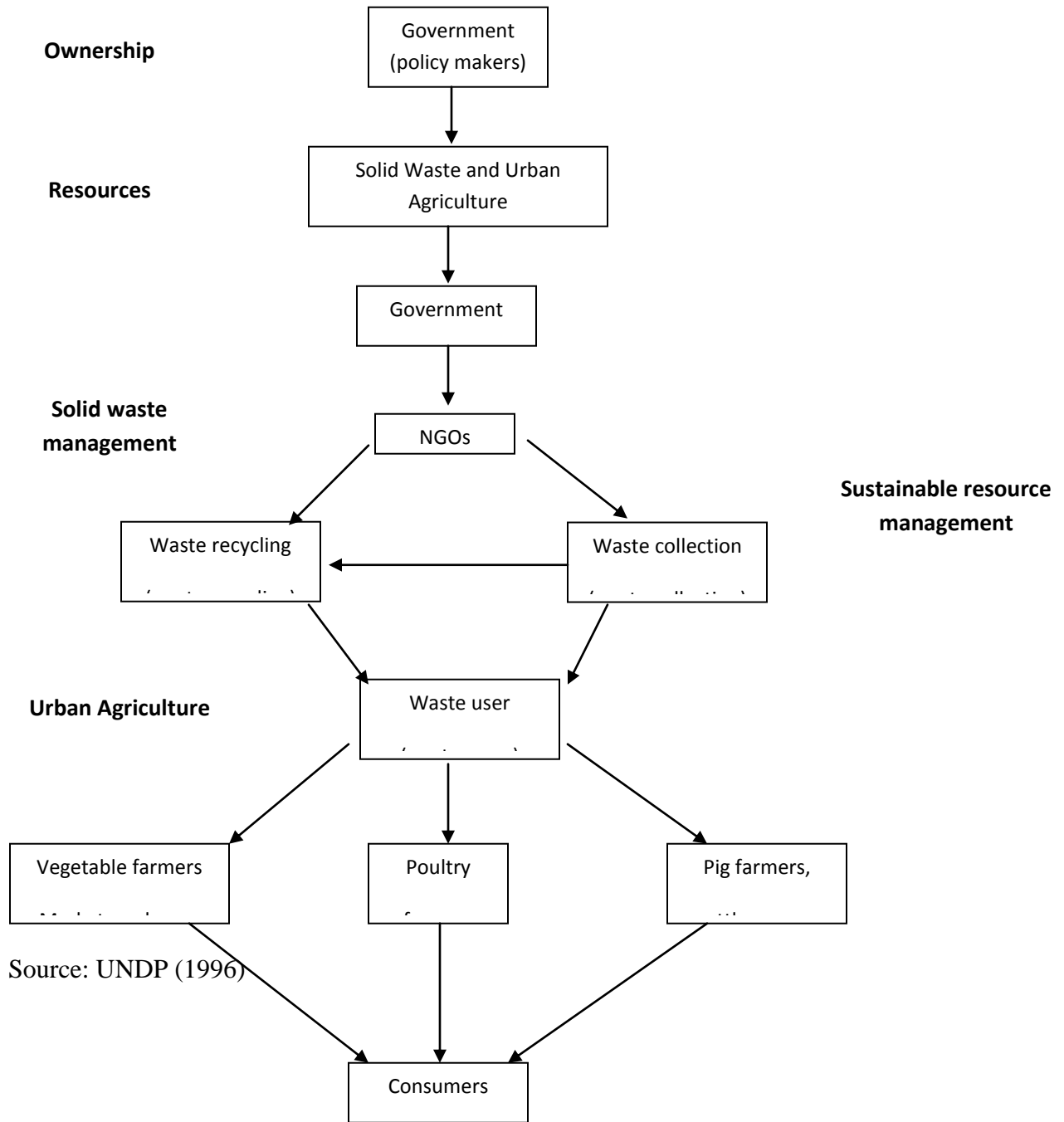
Figure 2 Conceptual model for solid waste management and interaction between actors.

2.4 Solid waste management in Africa

In Africa the solid waste generation rate can be seen within the range of 0.3-1.4 kg per capita per day while the developed world is rated around 1.22 kg per capita per day (Beukering and Sehker, 1999:9). Table 2 presents detailed information concerning per capita solid waste and households with garbage collection in some selected African cities. African cities are listed with their population estimated in millions (2000).

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Country	City name	Per capita SW generation Kg/day	Households with garbage collection (%)	Population>0.5 million
Benin	Porto Novo	0.5	25	0.6
Burkina Faso	Ouagadougou	0.7	40	1.6
Burundi	Bujumbura	1.4	41	-
Cameroon	Yaoundé	0.8	44	1.0
Congo. DR	Kinshasa	1.2	0	6.3
Congo Rep.	Brazzaville	0.6	72	0.9
Egypt	Cairo	0.5	65	14.5
Ghana	**Accra**	**0.4**	**60**	**1.7**
Guinea	Conakry	0.7	50	1.3
Nigeria	Lagos	0.3	8	8.0
Senegal	Dakar	0.7	36	2.3
Tanzania	Dar es Salaam	1.0	25	2.3
Uganda	Kampala	0.6	20	0.8

Table 2 Relationship between waste generation in some African cities and population growth.

Source: Beukering and Sehker, (1999)

Table 2 shows that factors like population size has a great influence in municipal solid waste management. In addition, there is a positive correlation between cities population and the percentage of waste moved and the amount of waste generated from different households.

UNEP-IETC (1996) argued that people offering waste management service to various households had reached in negotiation with households regarding payment. It further stated that such system existed in Asia and Latin America as well as Africa. According to Medina (2000) such system is regarded to be the oldest system in terms of management of solid waste.

Mc Michael (2000) and Mwanthi and Nyabola (1997) established that high prevalence of parasites, tetanus, malaria, hookworm, cholera and diarrhea in many African countries can be attributed to unsanitary conditions by solid waste being easily thrown around. Experiences shown by Kironde (1999) suggested that improper management in places like Dar es Salaam in Tanzania and other African nations cannot be attributed to inadequate resources but key factors like corruption, improper coordination between general public and politicians, high dependency ratio on government and command-and-control approach should be taken in consideration.

Reports from UNEP-IETC (1996) also show that incinerators are not the best technique in dealing with waste problems in Africa, this was demonstrated by the introduction of incinerator system in Tanzania and Nigeria, which was a total failure.

2.5 General overview of solid waste management in Ghana

In Ghana there were no specific laws and regulations that were documented for the management of waste. However there is some written document policy associated with National Environmental Sanitation Policy (Ministry of Local Government and Rural Development 1999) in order to ensure clean, safe and pleasant environment which is conducive for human settlements.

The role of the Environmental Protection Agency in Ghana (EPA) cannot be overlooked since it has provided well-defined guidelines for safe disposal of waste in the country. The EPA has set the following objectives which they work towards. (EPA, 1996).

1. "To reduce, prevent and if possible to eliminate pollution and nuisances".

2. "Protection of humans, animals and plants from any bad environmental effects".

3. "Designing sound management practice of environmental and natural resources".

4. "Maintenance of ecological and ecosystem processes for the purpose of ensuring efficient functioning of the biosphere". Figure 4 gives a picture of how the EPA coordinates its activities with other parties in the country.

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│ National Development    │───────▶│ Ministry   Of    │◀───────│ National                 │
│ planning Commission     │        │ Environment      │        │ Committee for the        │
│                         │        │                  │        │ implementation of        │
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              │ Environmental    Protection Agency (EPA)               │
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                                    │        District Assemblies            │
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┌─────────────────────────────┐
│ 1. Research Institutions    │   ┌──────────────┐ ┌──────────────┐ ┌──────────────┐
│                             │   │ District     │ │ Community    │ │ Regional     │
│ 2. Department of            │   │ Environmental│ │ Environmental│ │ Environmental│
│ Epidemiology and  Hygiene   │   │ Management   │ │ Committee    │ │ Office       │
│                             │   │ Committee    │ │              │ │              │
│ 3. Ghana Standard Board     │   └──────────────┘ └──────────────┘ └──────────────┘
│                             │
│ 4. Geological Service       │
│ Department                  │
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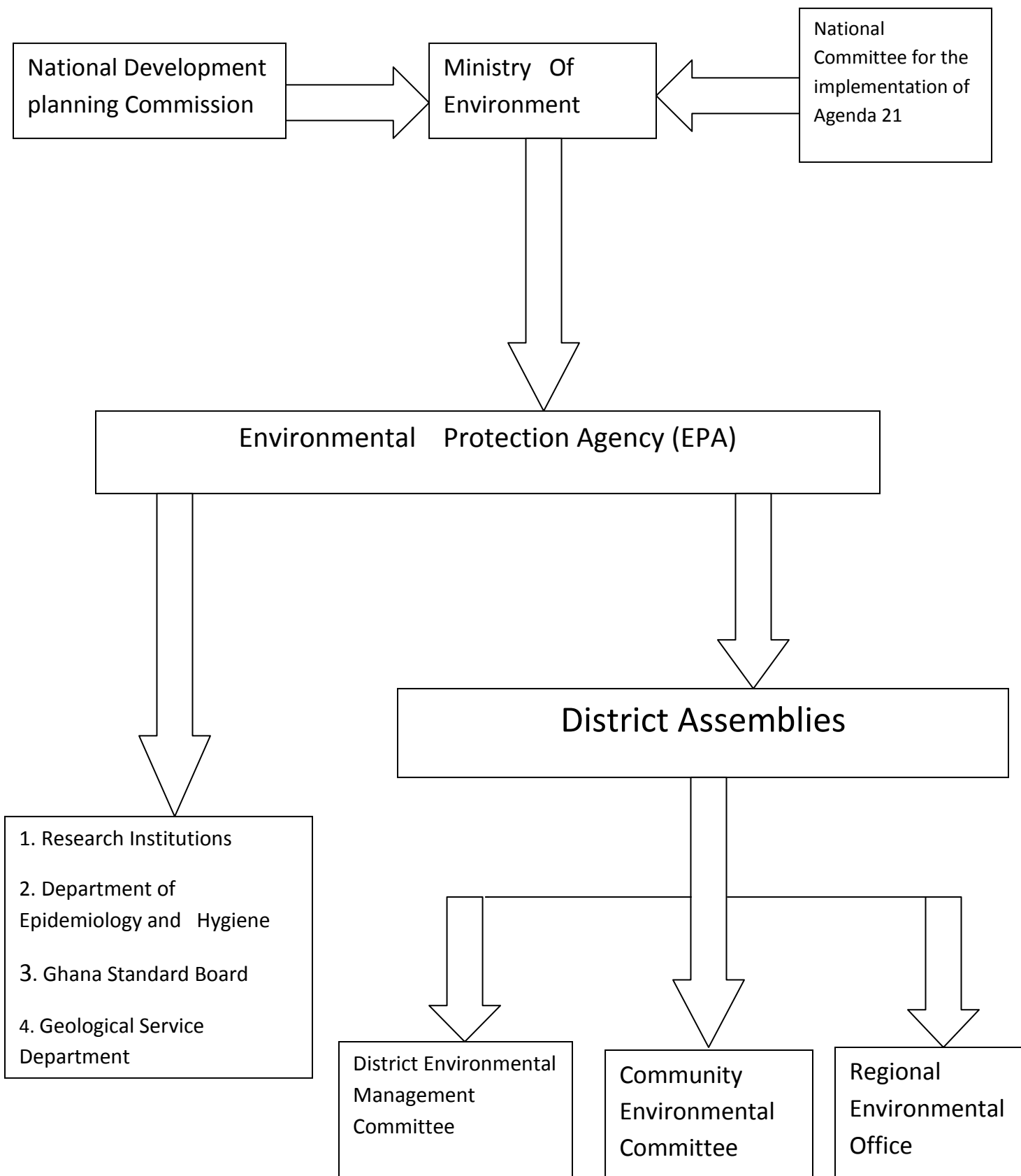
Figure 4 Environmental Protection Agency activities.

Source: EPA (1996)

Aside the EPA there are also bye-laws designed by the district assembly regarding waste disposal. The district assemblies often make container available for the general public to deposit their waste into. These containers are usually found at various vantage points of the town. Another way in which the district assembly is employed is the appointment of Sanitary Inspector who is given special training regarding waste management to visit households to ensure proper deposition of waste more especially in the villages of Ghana. Offenders are often charged with fines prescribed by the district assembly and verbal warning is also used for the first time offenders.

According to Wilson (2007) developed nations often take into consideration the environmental impact in terms of waste management by making good use of landfills, energy provisions from waste, waste treatment and material recovery. According to UNEP (2005) the major obstacle facing developing countries for efficient management of waste is the managerial skill rather than the technical know-how. It continued to illustrate that a good system of management of solid waste is to involve the people at the grassroots in the management processes. Steblein and Standford (2008) mentioned that better political frameworks open stability and put to end the unnecessary government intervention in the waste management process. They added that senior members and other staffs in the cities are not excluded from the payment of employees of waste management.

Collection of waste has prevailed in the city of Accra since 1995 under government management. After 1995 it was handed over to the private sector. Reports shows that 60% of waste generated in Accra is under control while the remaining 40% are managed in irregular basis or not managed at all (Awal, 1999). Policy reform from the public sector to private sector can be attributed to many workers in the sector with few supervisors which caused poor performance from the workers. Other factors include low incentive for satisfactory performance and inadequate source of finance to pay and employ the workers timely.

According to Amuzu (1997) waste generated in Accra is estimated to be about 0.250 kg/person/day and 80% of waste generated in Accra is collected by the district assembly while in Kumasi only 35% of waste generated is treated by the district assembly. Laryea (1997) mentioned that the application of incineration for treatment of solid waste is very expensive therefore it must only be used for the treatment of solid wastes generated by hospitals.

The case study of Hens L and Boon E. K (1998) indicates that most industries in Ghana deposit their waste into the water bodies showing that many of the industries are in their early stage of sustainable waste management. For example, rivers Ankobrah and Pra serve as sources of deposition of industrial waste in the Accra municipality.

CHAPTER THREE

DESCRIPTION OF STUDY AREA AND METHODOLOGY

3.1 Introduction

This chapter discusses various methodologies employed in the study and gives detailed description of the area in which the study was organized. This involves description of the target population, sampling and sample procedure, instruments used, administration of instrument, and problems encountered with respect to the questionnaire and interview guide.

3.2 Description of study area

The study is done in Ghana which is located in the West Africa. Sunyani which is one of the biggest regions in Ghana is the actual location in which the study took place. Sunyani is located in the southern part of the country and shares boundary with surrounding cities like Kumasi and Tamale located in south and north respectively. Sunyani is located around latitude 7.34 degree North and longitude 2.35 degree West. (World gazetteers, 2010). The population of the community according to the 2000 population census was 70,869 with annual growth rate of about 4.0%. The majority of the people in community are subsistence farmers while few personalities are drivers and local traders. The currently population census organized by the government of Ghana pointed an increase in the population to about 86,604. (Ghana Government population census 2000 and 2010). Since it is a regional capital government official are also present. The region is endowed with a very significant river called Tano. The river has contributed to an increase in the production level in the agricultural sector and enhancing some commercial activities such as clay waving and manufacturing of pots for commercial reasons. It also serves as a source of drinking water for the nearby villages such Tanoso, Koforidua and Abesim. Sunyani is regarded to be the neatness city throughout the country.

Figure 4 Map of Ghana

Source: www.worldmapnow.com/category/africa/ghana-map.(retrieved on 12/12/2010)

Figure 5: Map of Sunyani

 source: http://maps.google.no/maps retrieved on 10/12/2010.

Sunyani is a nodal city link with so many roads as illustrated in figure 5.

3.3 Solid waste management system in Sunyani Municipality

In year 2003 the Ministry of Local Government and Rural Development selected three Ghanaian experts in the field of waste management in order to provide technical assistance to a four members committee appointed by District Assembly to design efficient waste management systems in the various places under the municipality. After the appointment a seminar was organized for the four members. Below are the various items highlighted during the workshops. (SMA and RDN, 2006).

a. "Inter-sectoral collaboration in planning, implementation and monitoring of environmental sanitation service".

b. "Strengthening the environmental health and management department" and

c. "Designing financial management and cost control systems for environmental service".

The quantity of waste created in the Sunyani municipality according to Sunyani Municipal District Assembly (SMA) is not precisely known in terms of disposal, generation and collection in the region. But according to UNEP (1996) the average amount of waste generated in Africa per person can be estimated to 0.5kg/per/day. The Sunyani Municipal District Assembly (SMA) and Regional District Nanaimo (RDN) made a rough estimation concerning waste generation in the Sunyani town by using population size, growth rate, and waste generation per capita. Table 3 below gives detailed account of waste generation in Sunyani.

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Year	2006	2007	2008	2009	2010
Growth rate	3.4	3.4	3.4	3.4	3.4
Total population	75,763	78,339	81,002	83,757	86,604
Solid waste generation					
Per capita	0.38	0.38	0.38	0.38	0.38
Total generation(t/d)	29	30	31	32	33
Total generation(t/y)	10,508	10,866	11,235	11,617	12,012

Table 3: **Relationship between waste generation and population growth rate in the Sunyani municipality**

Source SMA and RDN (2006).

There is clear indication from table 3 that as population goes up waste generated also rises. The SMA and RDN reported the various composition of the waste generated in the municipality which are expressed in percentages in table 4.

Types of waste generated	Percentage (%)
Organics	69
Metals	10
Paper and cardboard	6
Plastics and rubbers	6
Inerts or Residues	3
Textiles	2
Glass	2
miscellaneous	2

Table 4: **Composition of solid waste in Sunyani**

Source SMA and RDA (2006).

Table 4 shows that, the major composition of solid wastes in Sunyani Municipality is from organic substance followed by metal, papers and plastic. The smallest contribution to the waste is from miscellaneous and glass.

3.4 Prevailing waste management situation in Sunyani

There are special designed metal containers of 10 cubic meters which are offered for the entire community to drop –off their waste, residents are granted permission from SMA. The SMA has scheduled time in which they carry the containers from the vantage point for final deposition to the landfills site when they are full. The dump site is close to the Sunyani Polytechnic and new containers are provided. The SMA emphasized that there is no proper supervision in the landfills site.

The experts knowing the situation on ground also came out with suggestions to be incorporated in the various communities through the representatives from each district. The technical experts employed by the SMA identified the following as the components of solid waste collection system.

1. Continue to service low income and/or non-accessible communities through expanded and improved communal containers collection system.

2. The introduction of door to door collection in some residential areas.

3. The introduction of door to door collection to industrial/commercial/ institutional establishments.

The experts concluded that if the above plans are well put into action it will enhance waste collection in the municipality from 40% standard to 90%. They again suggested that the containers provided at the vantage points should be increased in numbers and sizes.

They also mentioned that the tricycle made by the Zoomlion Company should be adapted into the system of collection of waste especially to door- to-door collection in some residential areas in the town. For example a project done in Tema estimated that, the introduction tricycle in communities has being successful by enlarging collection zone from 500m to 1000m thereby improving collection efficiency to about 70%.

According to the Ghana web on the date of 25th April 2008 the regional minister Ignatitus Baffour Awuah officially launched the pilot project of waste collection in the entire region by Zoomlion Company. The regional minister mentioned that various logistics will be made

available for assembly members to engage in active public education towards good sanitation. He further mentioned that the pilot project will focus on door-to-door collection. The regional minister expressed that residents are expected to give the company the needed assistance in order to deliver up to the expectation of the people and promote good health as well. (GhanaWeb, 2008)

The Zoomlion is working in collaboration with some government institutions and agencies. The chief executive of the company (Nana Yaw Sarkodie) confirmed this by saying that, the company is working hand in hand with municipal district assemblies toward sustainable development in the region. The company is providing the town with servicing, repairs and maintenance of machines and provision of education to the general public to ensure clean environment and eradicate out-break of diseases. The company again takes part in intensive cleaning in the Sunyani market and distilling of cloaked   gutters all over the town. They engaged in weeding activities at bushy parts of the town (Modern Ghana, 2009).

3.5 Methodology of the study.

According to Winchester (2000), research methodology refers to the investigation technique that is used to obtain answers to issues that are put forward for research. He further illustrated that the type of method to employ depends on the scope, type, purpose and focus of the research topic combined with actual context in which such research is undertaken. Winchester pointed out that, the world and the means of knowing the world could be linked with the type of method used in the study.

In the words of Ofo (1999) research methods can be classified into; "descriptive, expo-facto, correlative and historical". He further mentioned that descriptive is in the sense that people's attitudes, beliefs, views and practices are necessary conditions to examine municipal solid waste management. According to the same author most descriptive researchers employ survey techniques such as questionnaires and interviews. Most arguable debate is surrounding the use of mixed methods for data collection that is qualitative and quantitative for data collection and analyze. Qualitative research looks at the world in a wider perspective while quantitative research looks at the world in narrow perspective. (Brannen 1992a cited in Winchester 2000).

28

Data was gathered from secondary and primary sources. The primary source was obtained through personal interviews of management of Zoomlion, district coordinators and workers. Secondary data is compiled by individuals, agencies, government and non-governmental organization from existing data. Secondary data for this research will be obtained from Ministry of Health, Ministry of Youth and Employment and the Ministry of Environment.

3.5.1 Sample and sampling size

The target population for the study covered all the workers of Zoomlion. This area was selected because of it active participation in solid waste management. The entire population of the study area is estimated to be about 80,653.

"Random sampling is a method of selecting units from a population in such a way as to enable us to estimate the values of the population and making valid inferences about it" (Folarin, 1999). Purposive sampling employs judgment and deliberate effort to pick individuals who meet a specific standard. Purposive sampling tends to seek out theoretically important cases, what Patton, (1990) termed as "Information rich cases". Guba and Lincoln (1989) have also suggested purposive sampling of "homogenous cases, extreme cases or even politically important cases may be legitimate objectives as well as depending on the nature of the research"

Simple random sampling was used to identify the people who were involved in the study. A total of 100 workers of Zoomlion took part in the study irrespective of their background. On the other hand a purposive sampling technique was also employed to solicit information from the management members.

3.5.2 Instruments

Both quantitative and qualitative data were gathered. The study employed direct observation, self completion questionnaire, and interview guide. Various diagrams such as pie chart and bar graph were also used to display information. This was used in order to reduce the abstract nature of the work and make it more concrete.

3.5.3 Questionnaires

The study adopted the use of closed ended questionnaire to illicit information from Zoomlion workers about their views regarding the topic under study. Respondents were given an overall orientation about how to go by the questionnaire in order to obtain the right information. A sum of 100 questionnaires was distributed. The questions were divided into three sections. The first part gathered information about the viability of the company. The second part obtained information about the way in which Zoomlion has contributed toward employment among the youth in the Sunyani Municipality. The final section asked for information concerning the socio-economic status of the worker where issues about gender and age were also taken into consideration. The purpose of the study was also made known to the respondents before the administration of the questionnaire began.

3.5.4 Observation

Kearns 2000 pointed out that field observation is very important throughout the study. This process requires informal observation of waste management phenomena as well as "participant-as-observer activities".

A direct observation was made in a working area of Zoomlion to find out how they organized their daily activities. A personal visit was also made to the management offices to discuss how the presence of the company had ensured effective management of solid waste in the entire region and its role in the reduction of unemployment rate in the community. A personal visit was also made to see how workers interacted with households and also how management related to workers. Some of the primary data were gathered during researcher conversation with workers and management members. The researcher wrote important answers on note pad during conversation. A visit was also made to the site where final deposition of the solid waste takes place to see what actually happen there.

3.5.5 Interview guide

Interview guides were prepared purposely for management of the company to gather information about the progress and the short-coming of the company. Issues regarding the long term plan of the company and other essential information concerning the company were demanded. Four interview guides were sent to the various branches of the company within the municipality. Copies were also sent to the assemblymen who represent the interest of the individual households in the region. The questions were in an opened ended form which offered respondents much room to express their view.

3.5.6 Data analysis

Both qualitative and quantitative techniques were employed to analyze data. Qualitative data obtained from the questionnaire were compiled and expressed in percentages, averages and range through Microsoft excel. Cross tabulation and percentage system were used to identify relations between variables.

3.5.7 Limitations of the study

The limitations of the study will be portrayed in terms of representativeness, validity and reliability.
To obtain information from some management members was very difficult, due to the fact that management usually attends conferences, workshops and organizes meetings among themselves. At certain point in time the company coordinators complained they had just been transferred from one area to another and were not aware about what is actually pertaining in the region. It was also the desire of the researcher to look at the impact of solid waste management with respect to the living standard of the people but since management could not provide adequate information, it could not materialize.
Since a large number of workers were not interviewed only 100 workers were selected it could not give a through reflection of the study and does not make the work more representative since the sample size was too small.

There are various branches of the company throughout the country. The selection of only one municipality could not give the clear picture of the solid waste management in the whole country. It will be very essential to link management of solid waste with issues like pollution and global warming.

The issue of reliability can be questioned since funds, time and researcher effort was too limited to accomplish an effective task.

Finally, the issue of validity could be seen in term of workers inability to provide right information to questions due to the fear of being dismissed or punished by management members. Other respondents also demanded money before answering the questionnaires. When this condition is attached to the answering of the questionnaires it usually affects the entire result in the long run.

CHAPTER FOUR

4.0 PRESENTATION, ANALYSIS AND DISCUSSION OF RESULTS.

4.1 Introduction

This chapter presents the finding of the study on solid waste management and the employment trend in the Sunyani municipality, Ghana. Issues such as background information of the respondents, relationship between workers and management members, technology against disposal type will also be expressed in graphical form, relationship between working hours of waste workers and time spent at working place will also be looked at, the kinds of solid waste they usually work on, households ways to express opinions on workers performance and workers reaction towards expectation will also be expressed, workers incentives will also be expressed in percentage and all other important variables which are in line with the objectives of the studies will be dealt with.

4.2 Socio economic nature of the study area

The state of smell and dust coupled with high temperature in the study area often make the work of the waste workers very difficult more especially at final deposition areas which are sometimes affected by heavy rainfall. The environment becomes not conducive for human stay. The low levels of education among the waste workers often make it more dangerous regarding how they handle hazardous materials. The inability of the company to provide regular medical checkup and protective clothing for the workers often threatens their health conditions. In addition, waste workers' significance is often not realized because of the poor socio economic status they find themselves. They faced problems like poor salaries, absence of leave days and lack of life insurance.

The introduction of Value Added Tax (VAT) is also worsening the whole situation and payment of transportation to their working destination also ends up chopping off all the little allowance they receive.

4.3 Overview of the company.

The regional manager of Zoomlion in the Sunyani municipality Mr. Kofi Boateng, February 2011 highlighted issues the company is working on. According to him the company is responsible for managing two kinds of solid waste that is organic and inorganic. He mentioned that the company is spreading it branches internationally and is currently working in countries such as Ivory Coast, Angola, Togo and China. He continued to mention that, the long term plan of the company is to establish waste management training institutions in the country and also build a composite plant in the various regions in the country to ensure efficiency.

Regarding the management aspect of the company he stated that the Chief Executive Officer (C.E.O), board members and management team work hand in hands to make decision about the company. They received assistance from Regional Directors, District Officers and Field Officers. According to one of the field officers Mr. Prince the major difficulty they faced is the situation where some of the people in the community sometimes disposed human waste into the bins that are purposely designed for solid waste. He further mentioned that children are often sent by parents to dispose household waste into the community provided bins in which they find it very difficult to do the disposal correctly, thereby giving the caretakers of the bins an extra works without any extra payment. Mr. Boateng further mentioned that other private organizations for solid waste management exist in the country and cited examples such as Stanley Owusu Company, Waste Group and Sackem Waste Management Company but explained that municipal assembly is the major source of solid waste management throughout the country. He mentioned that about 8000 Ghana Cedis (GHS) is often spent on monthly basis on machinery and equipment for waste collection and for every 3 months workshops are organized among the workers. He further gave various categories of workers in the company which includes aforestation department, Malaria control department, street sweeper department and core staff with their respective number of workers including 5470, 440, 2440 and 210 at the regional level

respectively. The total number of workers employed by the company is 8560. Mr. Boateng was not specific about amount of money set aside by company for wear and tear of equipment but emphasized that, there are policies which exist in terms of depreciation of equipments.

Finally regarding the motivation of workers he mentioned that one month salary of the workers are often added to the salaries of the core staff at the end of every years as bonus, loan facilities are also made available and free training of workers. Foodstuff such as rice and oil are often given to street sweepers at the end of every year. Beverages such as milo, milk, sugar and tea are sometimes provided for workers. (Mr. Boateng Kofi Sekyere, zoomlion Regional manager, 08/02/2011).

4.4 Overview of employment programme

According to Nana Opoku Gyan, 2011 regional coordinator of National Youth Employment Programe (NYEP) the programe is designed by the government of Ghana to offer employment for the youth in the country who did not perform well in their Senior High School Certificate Examination. This system of internship was provided to the youth in order to help them to get small allowance and better their grade after the 2 years service. Sometimes, some workers are employed permanently into the various sectors. There are various modes of employment which include the following.

- Health extension workers. These types of workers are given 6 months training. The workers are often posted to rural areas to provide medical service to the remote communities.

- Community Teaching Assistance. These youth are often sent to deprived areas where there are inadequate teaching personnel.

- Youth in security. Some of these youth are also recruited into the Ghana Police Service and they are given 3 months training. They control the traffic system in the major cities in the country and provide other services as well.

- Youth in agriculture. Some of the youth who are interested in agricultural activities are given large portions of land to about 50 people in group to grow foodstuff such as

beans, sorghum, onion and maize. The government buys their produce where there are inadequate market services.

- Youth in dress making. After 3 years of training the government assists them with some amount of capital to set up their own private business.

- Partnership with zoomlion. Under this model the youth are sent to Zoomlion Company to offer them employment in the area of waste management.

- Road repair and maintenance. This sector is concentrated in the urban centres where a group of youths are trained with skills of ensuring motorable road system throughout the year and filling of pot holes along roads in the country.

- The latest model setup by the government is youth in information and communication technology (I.C.T). This sector is responsible for repairing and assembling mobile phones. These groups of youth are trained for a longer period about how to repair mobile phones. After the training period, the government provides them with an amount of money to set up their own private business. (Nana Opoku Gyan Katekyie, Regional Co-ordinator of NYEP, 31/01/2011).

4.5 The environmental condition in the municipality.

From the words of Mr. Opoku, municipal health environmental officer, the municipality has set a target to ensure efficiency of waste collection from current level of 45% to 65% by 2015 more specifically by collecting more industrial and health care waste. He explained that the municipal is fighting all around in order to turn their waste created in the district into wealth. He added that the municipality assembly is on track working in negotiation with a German Company called (IFAS) for the purpose of providing support to turn waste into energy and fertilizer. The municipal assembly has won the cleanest city in Ghana prize in 1998 and 2008 and such good work could be attributed to the contribution from workers and active participation from the community at large. The municipality also receives support from sister country Canada operated through the company called NANANOM for the purpose of capacity building. The officer

36

highlighted the following as the major obstacles the municipal is facing; high dependency on district assembly common funds, inadequate logistics, financial constrains, low level of knowledge among people in the community regarding waste creation and lack of sanitation principles. He further explained the link between waste management and diseases. Diseases such as malaria, typhoid, intestine complications and improper conduct from food vendors can result in unhealthy condition in the municipality. As a result of the pertaining risk the municipal assembly has set up 4 teams responsible for directing the municipality waste control. These teams include waste team, food and meat hygiene team, premises inspection team and health promotion team (Simon Opoku, District Health Environmental Officer, 09/02/2011).

4.6. Respondents' socio-economic background

This aspect of the analysis will focus on socio-economic details of respondents. Variables such as age, gender, educational level and annual income will be taken into consideration.

4.6.1 Age of respondents.

The average age of the respondent was 36 implying that the majority of the workers were above 30. Figure 6 depicts a clear picture of respondents' age range. Out of the 100 respondents those with age range from 20-30 constitute 29% while majority fall within the category of 31-40 which represents 46%. The range of age from 41-50 represents 23% while 50 and above constitutes the least percentage representing 2%.
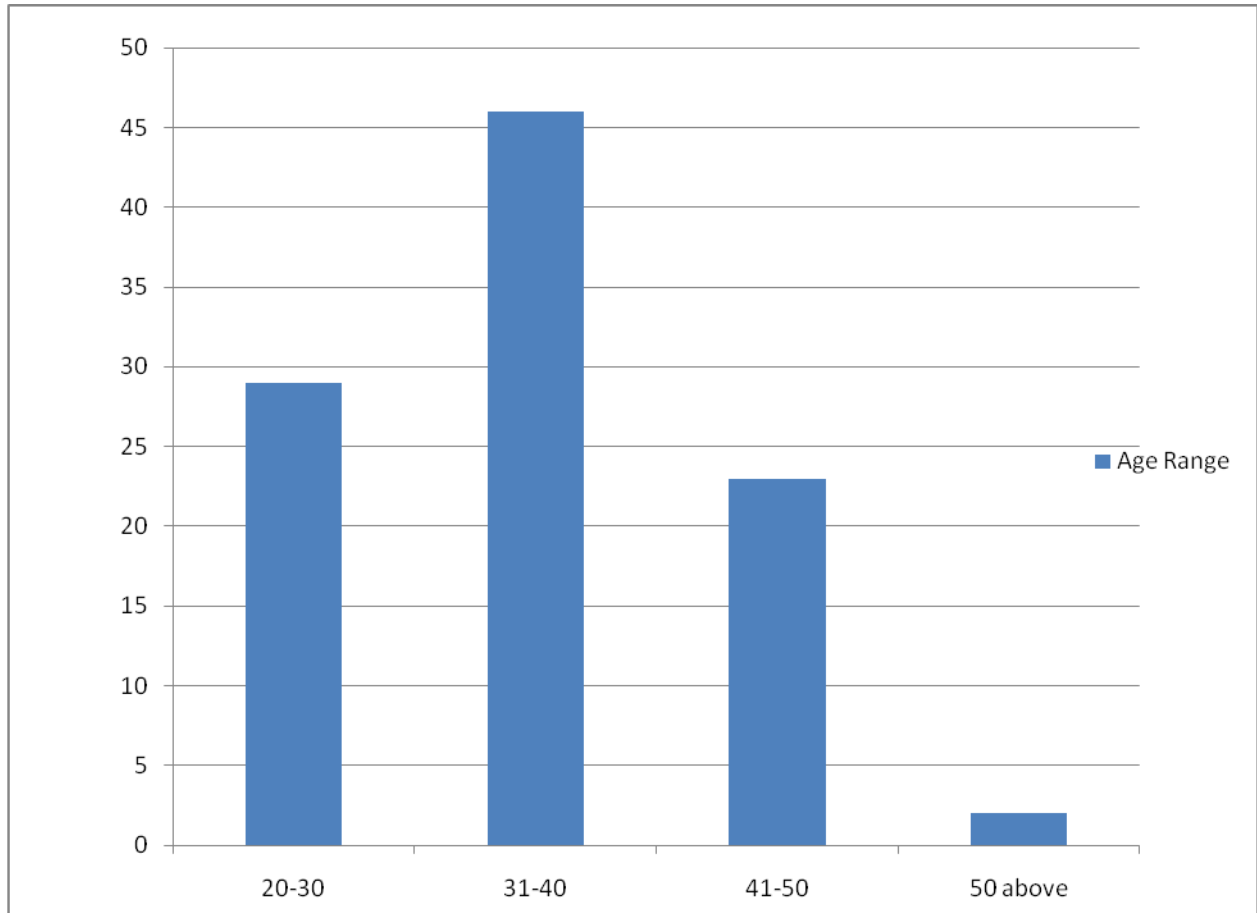
Figure 6. Age distribution of respondents.

4.6.2 Gender of respondents

This section will presents on the number of males and females who took part in the research. Out of the 100 respondents 25% representing 25 respondents were male while the remaining 75% representing 75 respondents were female. During my interview with the Regional manager Mr. Boateng I asked him why majority of the workers were women. He claimed that most of the men complained that the amount of money the company pays to them on monthly basis were not enough to take care of themselves as well as their family. So majority of the workers are females who take active part in the company, they do that in order to earn some amount of money to support their husband in taking family responsibilities. Most of these women who were interviewed by the researcher suggested that they are doing extra job apart from the Zoomlion work. Others pointed out that, they engaged in selling food stuff after they have finished working for Zoomlion. Some also joined their relatives at various shopping centres to offer them

assistance in selling various items. Figure 7 indicates the various percentages of men and woman who took part in the study.
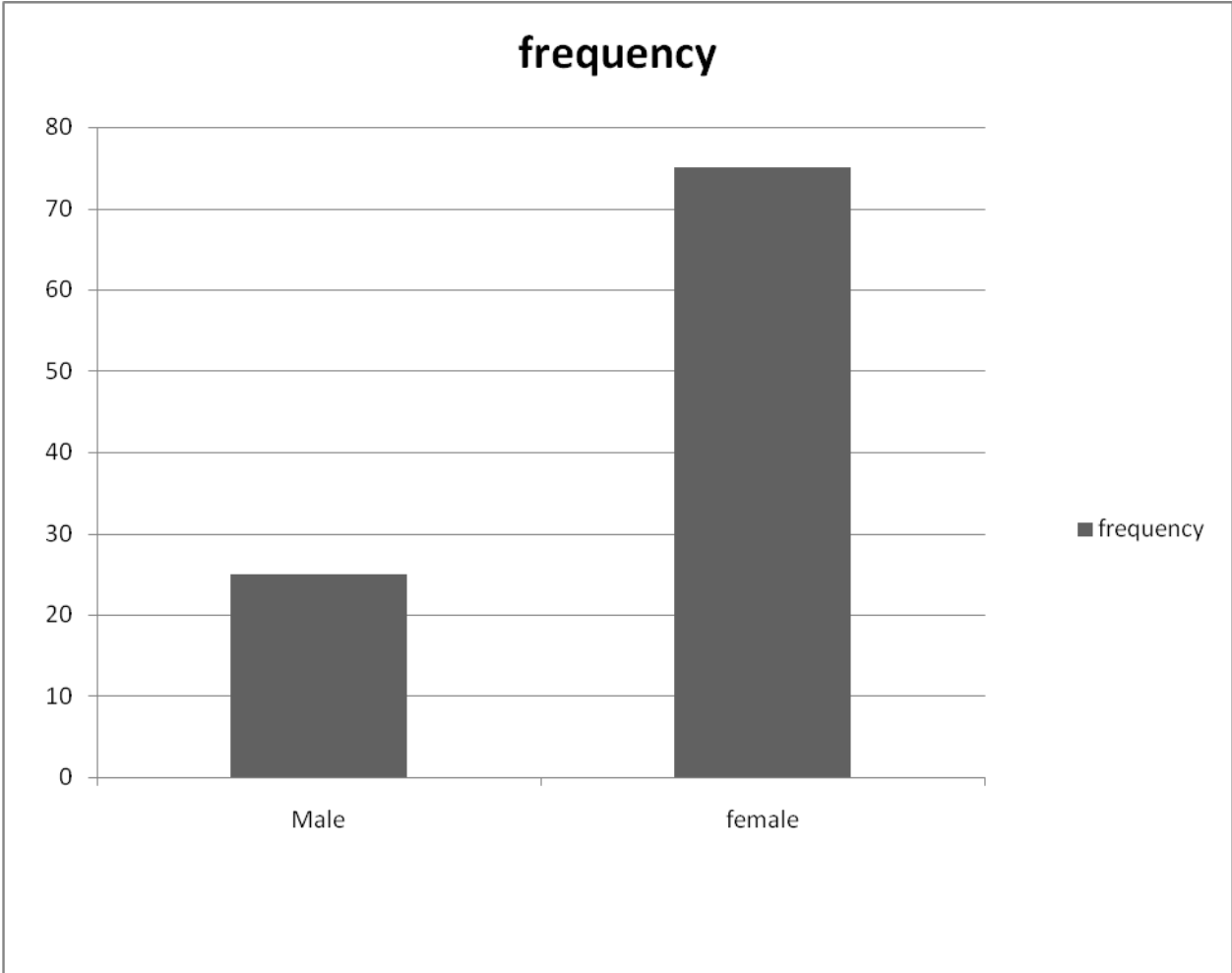
Figure 7. Gender distribution of the respondents

Issues such as any gender preference during recruitment of workers into the company and which gender stands the chance of being employed were raised. 88% of the respondent claimed that females are the most potential candidates to be recruited into the company and 10% went for male while 2% gave no response. Most of them supported this statement above, mainly because unemployment rate is higher among women than men in the municipality. Therefore they were

desperately ready to work under any unhealthy condition that would help them to survival. Picture 1 shows some of the women interviewed.

Picture 1. A group of respondents

4.6.3 Educational level of respondents

The last but one socio economic factor that will be discussed is the educational level of the respondents who took part in the study. The study pointed out that 46% of the respondents had completed Junior High School (JHS), followed by no education representing 37%, followed by 12% representing those who had primary education and remaining 3% and 2% represent Senior High School (SHS) and technical education respectively. This information is shown in figure 8. In addition, before workers are recruited into the company the municipal assembly has designed a policy demanding that all of them are supposed to undergo medical screening to find out the health status of the entire workers. Some of the workers confirmed that such requirement was effective and it is still ongoing.
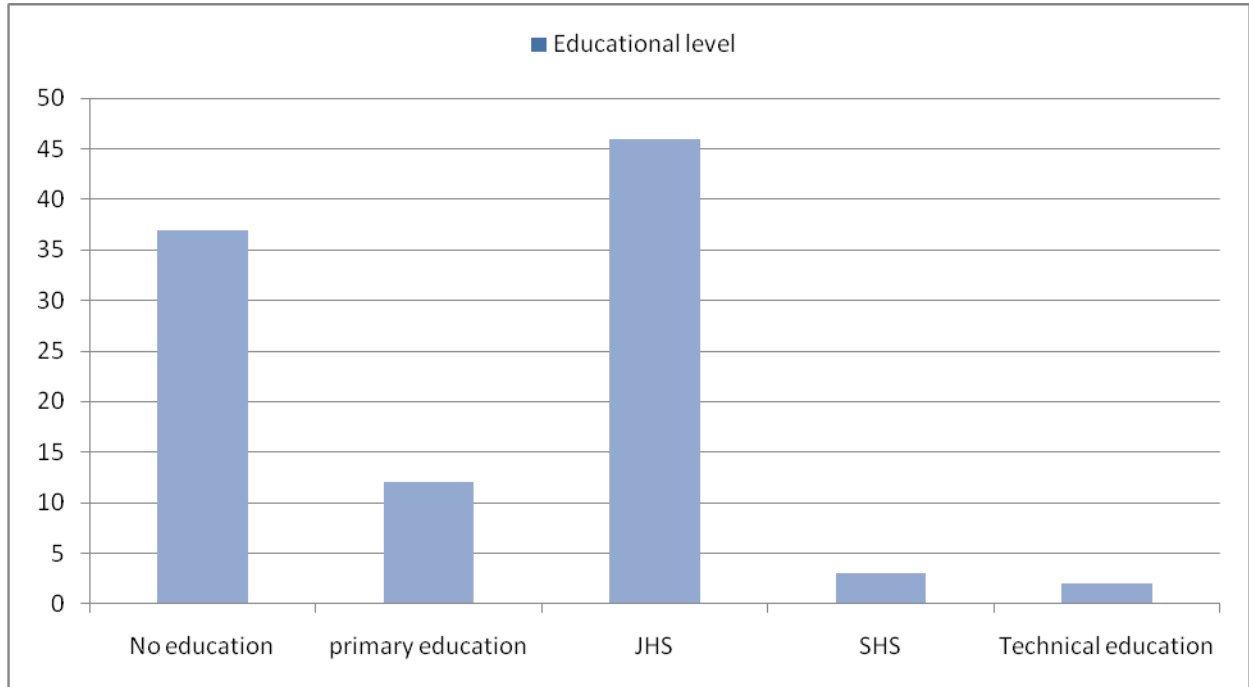
Figure 8. Educational level of respondents.

Picture 2 .A child throwing garbage into the public bin.

4.7 Income level of the respondents.

The last background information emphasizes on the annual income workers received. Direct interview with the majority of the workers show that they received 50 Ghana Cedis (GHS) which is equivalent to about 34.48USD United States dollars monthly. Out of the 50GHS given to them 3GHS is deducted as bank charges which leaves 47GHS as their take home paid. Majority of the workers interviewed insisted badly that the money pay to them as their monthly salary is not sufficient for their daily bread. They therefore requested that government and other private agencies should come to their aid to rescue them from their salaries situation. Records from the National Daily Minimum Wages implies that such salary paid to the workers are below the minimum wages that employers are supposed to pay to employees which was designed by the government of Ghana under the Ministry of Employment. The current daily minimum wages among workers is 3.73GHS. This was made known to the general public after a session among the representatives of the labour forces, government and employers officials in Accra. (Ghanaian Times newspaper, 2010).

4.8 Relationship between workers and management members.

The first focus on the objective will be based on the workers relationships with the management members. Figure 9 shows a clear picture of such condition. Majority of respondents declared that the state of relation between workers and management members is somehow good representing 90% while none of them selected neither bad nor somehow bad. 4% and 6% of the respondents also selected very bad and neither good nor bad respectively. The researcher asked one of the management members called Mr. Prince regarding why the workers actually like him so much. Prince mentioned that, he usually treats them like brothers and sisters without assaulting and insulting them. He is always ready to listen to them about their personal problems and provide them with the necessary help.
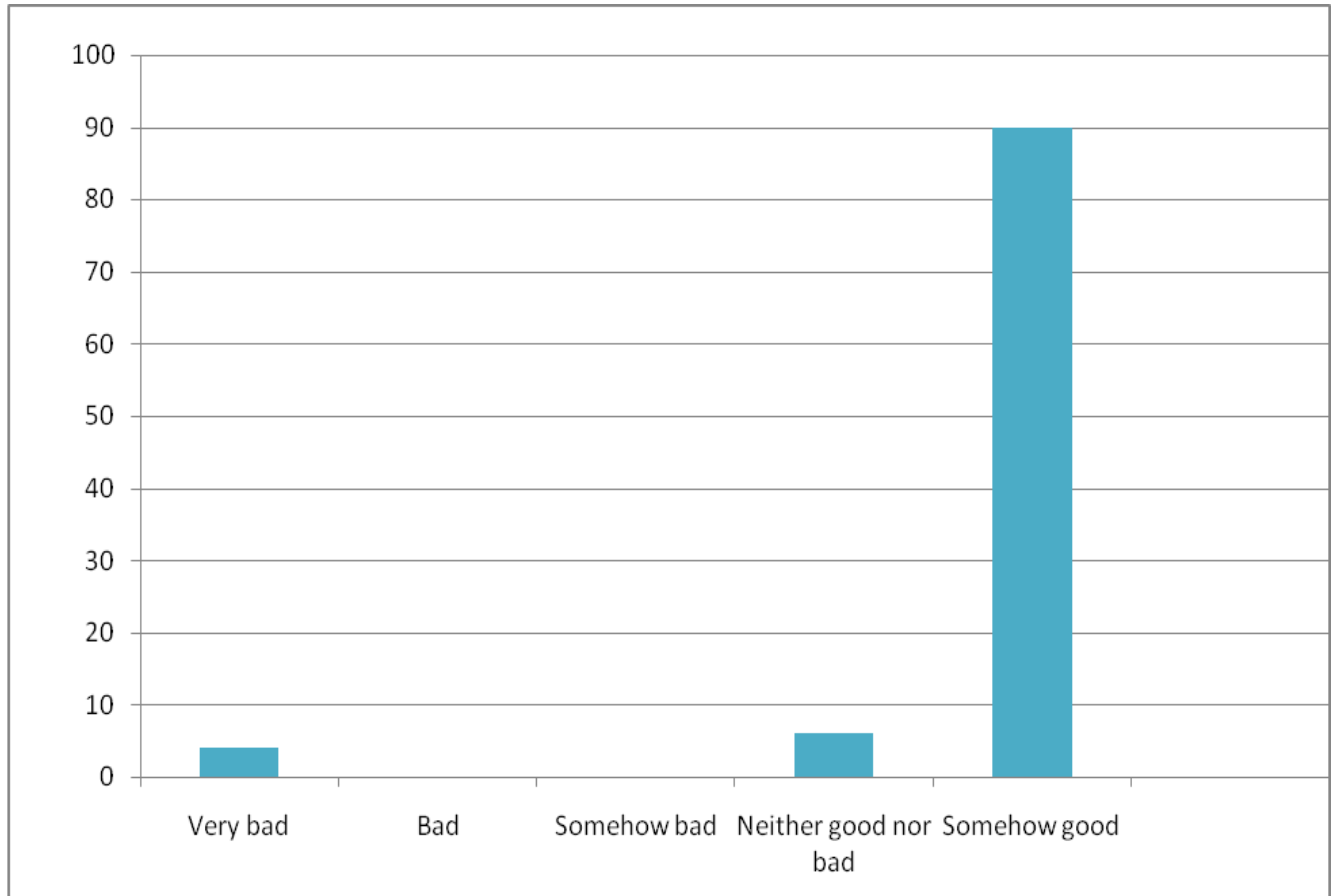
Figure 9. Relationship between workers and management members.

4.9 Kinds of solid waste

There are various kinds of solid waste that workers pick from households. According to Kharpanda and Stallworthy, 1990 household waste comprises of both valuable and usable items such as glass, papers, plastic and food waste. The research conducted also came out with similar findings like Kharpanda and Stallworthy. Figure 10 gives detailed account of solid waste

zoomlion workers worked on at various households in the municipality which are expressed in percentage.
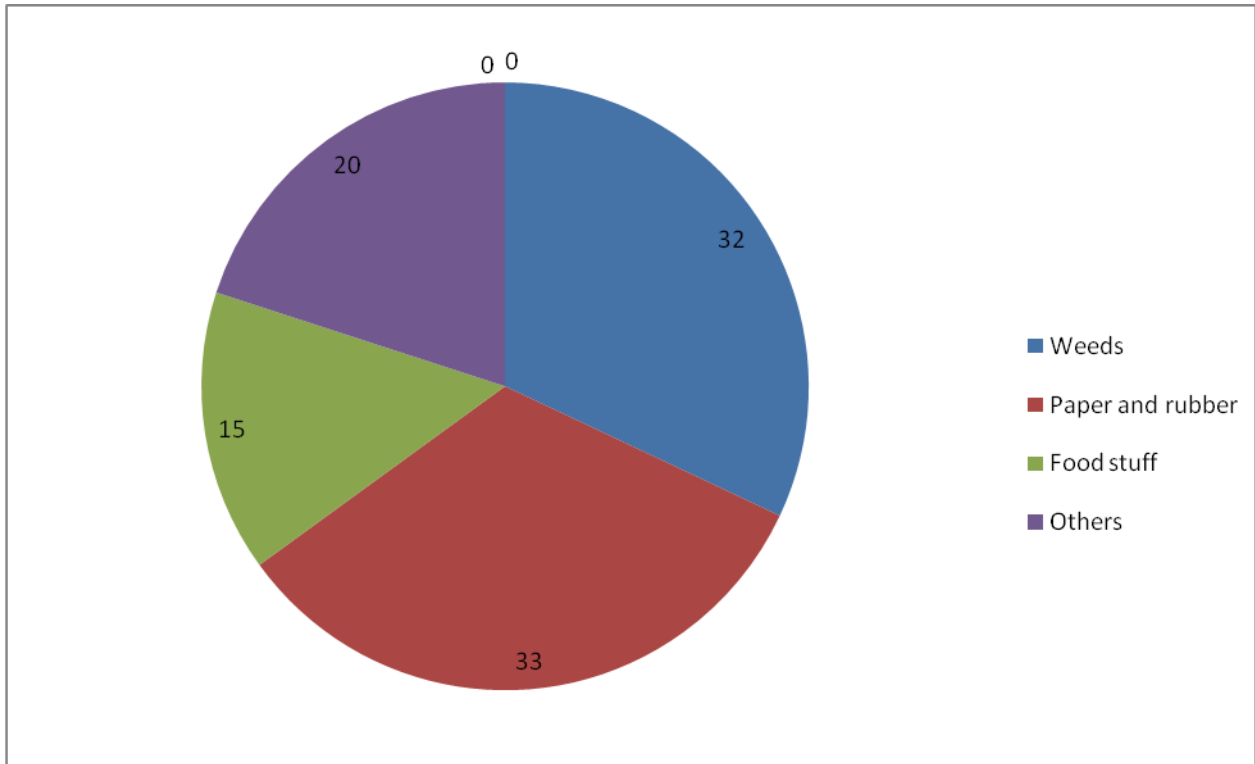
Figure 10 Kinds of waste handled by Zoomlion.

On average the respondents interviewed stated that 33% of their regular collection from household and other public places such as market and street were papers and rubbers followed by weeds which constitute 32%. The remaining is food stuff representing 15% and finally others matching 20%. Others comprise plastic, glass and metals.

4.10 Incentives and type of incentives designed for workers.

Majority of the respondents stated that only rice and oil are often given to them at the end of every year**.** Incentives play a very crucial role in any organization or company and in the case of Zoomlion the incentives seem to be weak. In most developing countries the social conditions of waste workers are very poor. These groups of workers are often surviving without any basic social and economic security arrangement for their entire life. These facilities should be put in

place with the aim of improving their working condition and providing essential facilities such as health care, life insurance and increasing their ability of gaining more salary. Also various skills must be impacted onto them so that they will become experts to collect, recycle and reuse waste collected from household and other places. When these factors are put into place it will uplift the bad image of waste workers to erase marginalization and fragmentation of the waste workers. (Schubeler, P 1996).

4.11 Relationship between workers and households.

The next discussion will be on household behavior and attitude when workers delivered up to their expectation versus the situation where workers failed to deliver up to households' expectation. Greater portion gave the opinion that households become pleased when they delivered up to their expectation and they begin to give waste workers all kinds of words of encouragement which represents 93% on the bar graph and motivate them to keep their good work going. But the researcher's argument is that when waste workers work perfectly households failed to report that to management while as soon as they perform below standard they automatically report them to the management. The researcher expects that as households are able to praise them after a good work much the same way they should advice them when they experience poor performance without report them to the management members. Legal action can also be used as one of the tools to discipline waste workers when they fail to deliver because some of them intentionally put up a very bad performance when they are performing their duties. Figure 11 gives detailed descriptions about behavior of households after a bad and good performance from workers. The first section talks about bad performance starting from words of encouragement to others while the next section starts from words of encouragement to others.
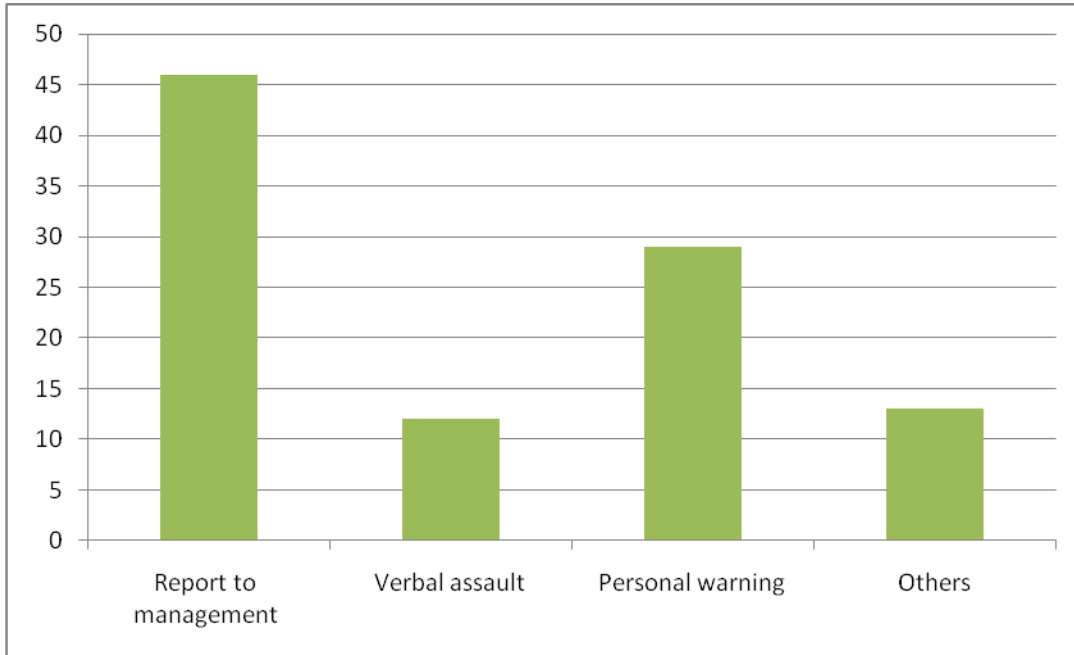
Bad performance.
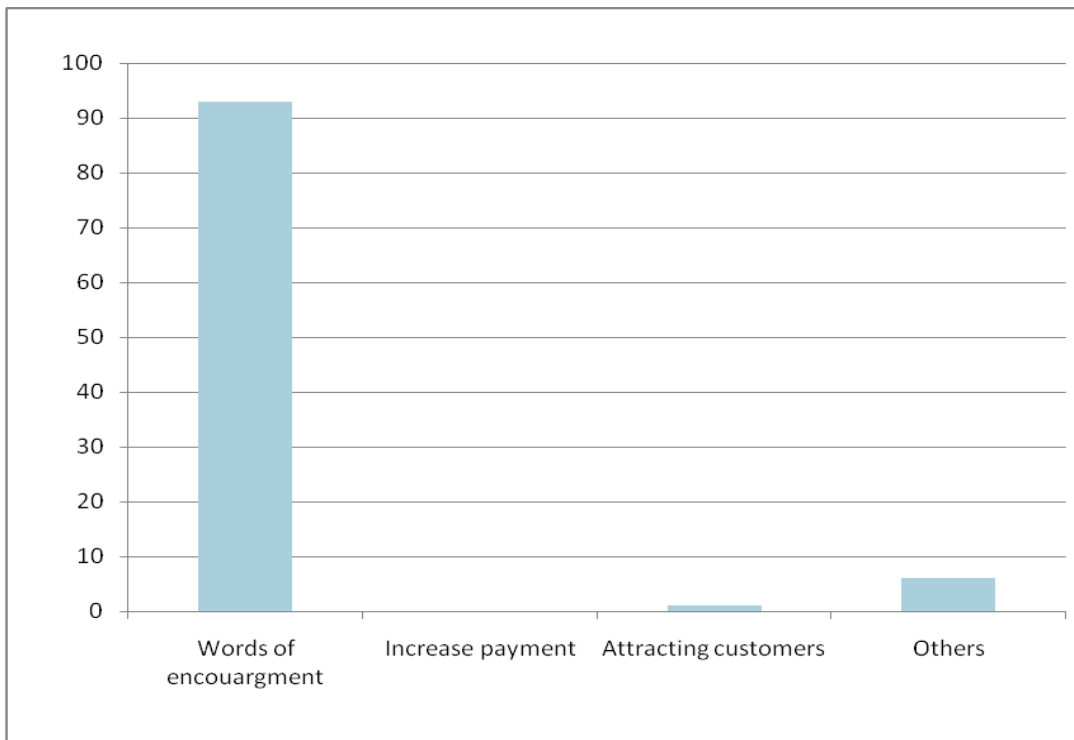
Good performance

Figure 11. Households' behavior towards workers regarding performance.

4.12 Condition of equipment for workers employed in the field.

The condition of equipment used at their various working places matters most when workers are expected to put up good performance. Some of the waste workers complain that equipment such as protective clothing and shoes, gloves, brooms, rake, shovel, plate and wheel barrow and tricycle are not in good condition. The exception is those who worked at the hospital, as they have enough equipment to exercise their duties. Some of the waste workers also mentioned that the use of the equipment had caused negative effect on their body system such as waist and spinal cord pains more especially the use of the manual tricycle and collection of waste from choked gutters. Also the researcher visited their workshop where care and maintenance of equipments usually take place. The workshop offered maintenance services to water tankers, tricycles and cars which were not road worthy. Figure 12 and 13 give a clear demonstration about the condition and sufficiency of equipment respectively.

Picture 3. Site for assembling of equipment after work.
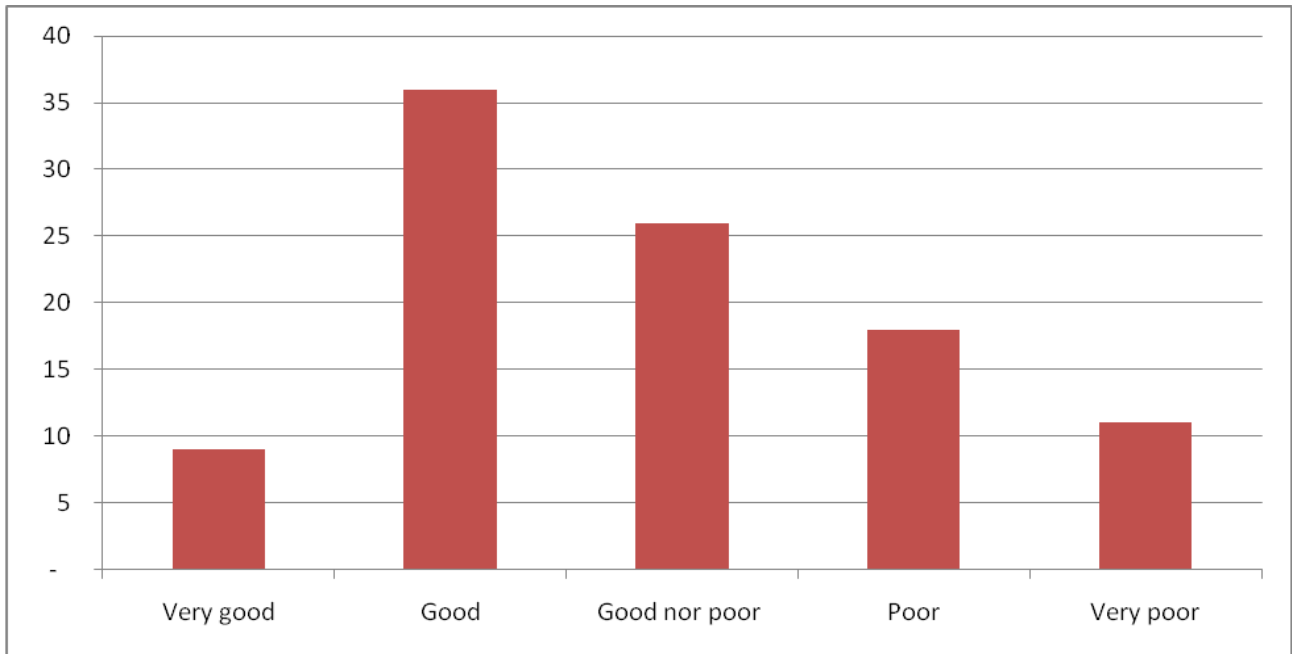
Figure 12. Condition of equipment.
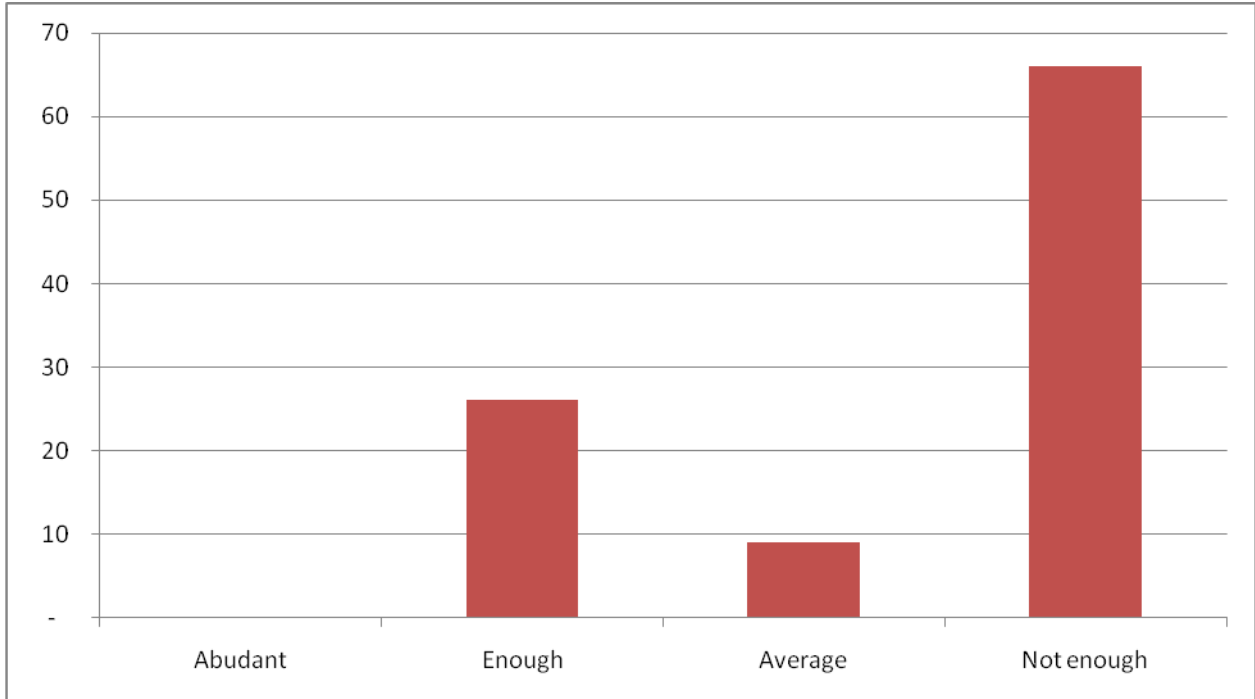
Figure 13. Sufficiency of equipment.

4.13 Other functions aside normal waste collection from households.

The workers seek to perform other duties apart from the normal waste collection. The survey proved activities zoomlion workers perfom aside their normal duities as expressed in percentage in figure 14. The company engaged in the extentive nationwide mosquito compaign. They clear environments that are condusive for mosqito and clean up choked gutter as well. They also provide education about how to use mosquito net and mosquito unfriendly environments which represents 23% in figure 16. Street sweeping is also another exercise the company performs within the entire street throughout the municipality that represents 57% in figure 14. Water supply is also another task the company perform within the municipality. The company supplies water to some households for domestic use in the communities and some public toilets in the community for efficient treatment of human waste which represents 6% and satination guides constitute 14%. With reference to the sanitation guide they ensure that people depoist their waste at the right place at right time. Apart from zoomlion the next responsible unit for the managemnt of solid waste is the municipal assembly who has also employed a group of people to work for communities where zoomlion could not make their service avaliable.
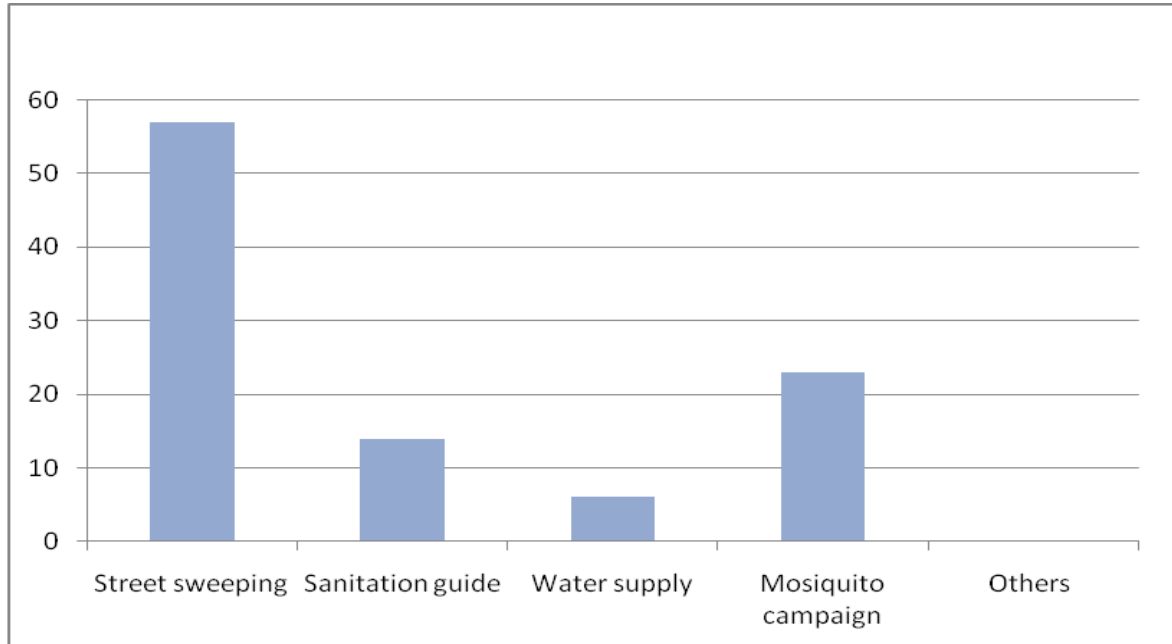
Figure 14. **Other functions performed by Zoomlion workers.**

4.14 Disposal types.

Tecnology plays a very vital role in the management of solid waste. The avaliable technology that waste workers employ to deal with immediate created waste is essential. USEPA, 1999 gave various categories of municipal solid waste disposals which are similar to the kinds of disposal that were recognised in the study. The study looked at the various technologies zoomlion used in terms of disposal of solid waste. Responses from management level claimed that they are still working hard to get the most efficient technique of dealing with waste. The avaliable ones include landfills, incinerators, improved dumping, and composting. The most popular ones are the landfills and composting. Incinerators are limited to the various health care centres especially in the regional hospital. The tipping and improved dumping are commonly found in the Accra and Kumasi which are the major cities in the country. Louis, 2004 supported this argument by saying changing in technology from burning community waste to recycle and use as a medium of energy is very prudent. Wilson, 2007 disagreed with the opinion that technology plays a very essential part in waste management. Wilson concluded with his view that managerial skills is most needed in waste managenent rather than technical know how. Figure 15 gives detailed

50

account of the various disposal types zoomlion employs, which are also expressed in percentages. Landfills reprsent 27% while composting represents 41%. Improved dumping, incinerators and others constitute 17%, 10% and 5% respectively in figure 15. Again, in support of technological issues Dickerson 1999 argued that technology is very significant in dealing with waste in a community. Gorddard, 1995 expressed his taught that problems such as landfills and incineration are economic in nature.
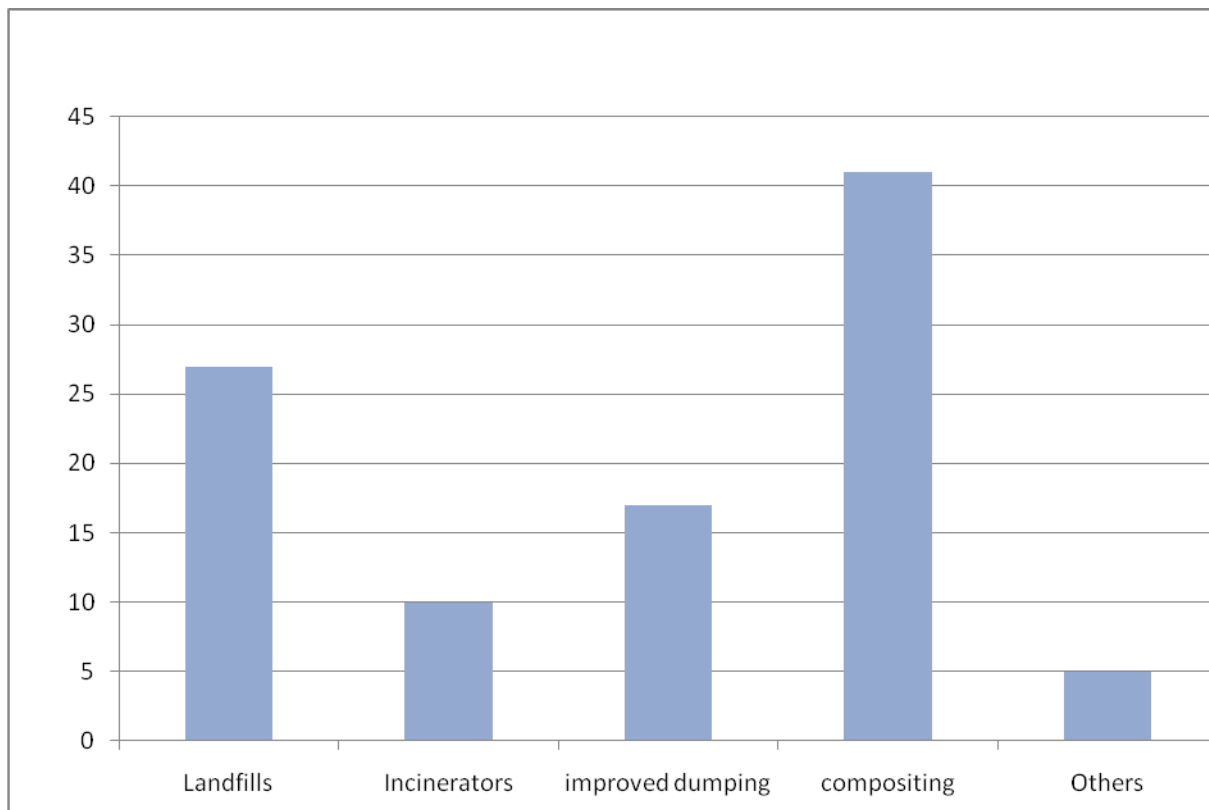
Figure 15. Types of garbage disposal.

4.15 Relationship between working hours and salaries.

The final section of the chapter will be centred on the amount of hours workers spend in their working places weekly with respect to the monthly and annual salary the company pays to them. The study found out that the number of hours workers spent at their working place weekly does not match the amount of salary. The average hours per week was caculated among all the respondents. The annual salary of workers was also computed. Report from most of the workers suggested that sometimes it takes like 3 months before they obtain their monthly salary. An open ended questionniare was also designed to gather information about wehether there was a need to increase their monthly pay. 22% gave the opinion there was no need while 78% requsted that there was need to raise the salary so as to earn enough to feed their family with basic needs. The average number of hours which workers spend at work daily and weekly is 7 hours and 20 hours respectively. The annual icome per worker is 600GHS which is equivalent to 396.7USD. With regard to financial issues Deshmukh et al, 2002 mentioned that, financial difficulties is a major obstacles preventing most developing countries from efficient treatment of solid waste.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

This chapter presents the synthesis of the entire work. In addition, conclusions, recommendations, and suggestions for further research will also be made.

5.1 Conclusions of the study.

This section gives a brief and clear answer to the various research questions that were designed for the study. The basic role Zoomlion plays in the community is the collection of solid wastes from households in the community and sometimes in public areas. The kinds of waste they normally work on include papers, rubbers, metals, glass, weeds, and foodstuffs. These wastes are often categorized into different departments at the final deposition site. Therefore the tipper drivers who often carried this waste to the final deposition are guided by the care takers of the site as where to deposit their waste depending on the kind of waste they brought.

 Some members of the community often express their satisfaction with the performance of the workers by giving them all kinds of praises and words of encouragement. In addition more customers are also attracted based on good performance from the workers. In the other hand, used verbal assault and all kinds of discouraging words on the workers when they failed to put up good performance.

The study identified that, the company performs other roles aside the normal waste collection which include nationwide mosquito campaign and water supply. For instance malaria is one of the major deadly diseases in the community threatening the living standard of the people and it eradication will be a great happiness to entire community and the nation as a whole.

The available technology for dealing with solid waste at efficient level is actually lacking based on the study. Some of the respondents pointed out that available equipment and machinery are out of date and therefore new ones should be made available to improve upon their efficiency level.

The company has created a lot of employment opportunities for the various sectors of the community more especially among the youth. But not all the workers are youth. The level of motivation for the workers is very low, therefore numerous respondents were not satisfied with their conditions. The rapport between the waste workers and management is very good. There are no strict requirements one must fulfill before being employed into the company especially educational requirements. Only few respondents had good education but the remaining ones have no education or only primary education. The company sometimes runs short in terms of finances to pay their workers sufficiently and timely.

5.2 Recommendations of the study

This section offers various recommendations the company should embark on ensure efficient progress of the company. The first issue to raise is the involvement of other stakeholders which have vested interest and knowledge in waste management in terms of management, planning and policies and implementing and monitoring programmes to ensure efficient running of the company.

The company must also follow the target set by the municipal assembly and even go beyond that by ensuring efficiency of solid waste collection in the municipality from the current 45% to 65% by the year 2015.

The government of Ghana should also intervene for the waste workers regarding the low salaries and ensure that, the amounts of salaries paid to workers in all the private sectors are not below the daily minimum wages. The government may also take legal action against private companies who break rules and regulations governing the minimum wages of workers. The government can also offer financial assistance to some of the private companies who are serving the interest of the entire community. The researcher recommends that, the government of Ghana should introduce management of solid waste in the various institutions in the country, more especially in the Ghana Education Services (GES).

The researcher recommends that the company can look for sponsorship from international organizations. International bodies can support them technically and financially. But the notion of over dependency must not be part and parcel of the game.

Another suggestion is that, industrial development must also be taken into consideration. As more industries are established in the country facilities for treating increased volumes of waste must be taken into consideration and put in place.

In addition, the motivation of the waste workers must also be taken into consideration more especially health risk and transportation system must be improved to motivate waste workers to deliver up to the expectation of the entire community.

Finally, links should also be created between the Ghana EPA and the various private sectors of waste management to facilitate the use of resources and materials available to create awareness of the environmental issues among the people in the community.

5.5 Suggestions for further research.

The first suggestion is that, more study should be done with the various households who employed solely the services of private sector waste collection in order to know their actual point of view regarding the performance of the waste workers. This is because, this study was limited to the waste workers and a few representatives of the community population known as assemblymen.

Another study can also be done on cost benefit analysis of waste collection activities.

Finally, a study can also be conducted on the impacts of private solid waste management system and public sector, to look at the similarities and the differences.

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Appendices

<u>**Section A.**</u>

<u>**Viability of the company**</u> [*Circle only the right answers*]

1. **What kind of solid waste do you collect from household?**

----

2. **What Type of refuse disposal do you work on?**

    1. Landfills
    2. Incineration
    3. Improved dumping
    4. Control tipping
    5. compositing
    6. Others Specify_____

 3. **What is the quantity of refuse you normal pick from each household?**

    1. One Plastic bag

    2. Two Plastic bags

    3. Three Plastic bags

    4. Others Specify_____

4. **Are you aware about other companies responsible for your refuse collection?**

    1. Sunyani Metropolitan Assembly(SMA)

    2. Community Disposal

    3. Self Disposal

    4. Others Specify_____

5. **What is the relationship between you and the households?**

1. Very Good

2. Good

3. Neither good nor poor

4. Poor

5. Very poor

6. What is the frequency of refuse collection from Household?

1. Once a month

2. Once a week

3. Twice in a week

4. Three times in a week

5. Four Times in a week

6. Others Specify_____

7. Do you support the idea of refuse collection fee?

1. Yes

2. No

8. How much do households pay for refuse collection on monthly bases? ……........GHC/month.

9. How do the households behave if they are not satisfied with your performance?

1. Report to the management level

2. Verbal assault

3. Personal warning

4. Others specify ---

10. What is their reaction when workers deliver up to their expectation?

1. Words of encouragement

2. Increase payment

3. Attracting more customers

4. Offering gift

5. Others specify--

11. Which of the following duties do you perform aside the normal waste collection from households?

1. Street sweeping

2. Sanitation guards

3. Water tanker

4. Nationwide mosquito campaign

5. Others specify-------------------------------

12. Indicate tools and equipment used in your working places?

1. Refuse containers

2. Manual tricycle

3. Road sweepers

4. Tipper truck

5. Others specify

13. How is the condition of the tools and equipment?

1. Very good

2. Good

3. Neither good nor poor

4. Poor

5. Very poor

14. Are the equipment sufficient for the waste collection?

   1. Enough

   2. Not enough

   3. Average

   4. Abundant

15. Do you have any health implication regarding the use of the equipment?

   1. Improvement of health

   2. Weaking your system

   3. Others, please specify--

16. Indicate which of the following disease affect household as result of improper waste

   management?
   1. Hepatitis A(Jaundice)
   2. Typhoid Fever
   3. Tuberculosis
   4. Cholera
   5. Malaria

17. Are you given training before using the equipment?

   1. Yes---- ( )

   2. No----- ( )

18. If yes, for how long are you given the training? ---**weeks.**

19. Does the management of the company organize an in-service training for the workers?

1. Yes--- ( )

2. No---- ( )

20. If yes, who bear the costs that are incurred in the workshop or seminar?

1. NGOs

2. Government

3. Sponsorship by the company itself

4. Others specify---

21. Which method(s) do you think is the best to collect the refuse collection fee?

1. Fee to be collect by the Municipal authority
2. A separate agency must be established to collect the fees.
3. Others ,please Specify_____

Section B

The employment

22. What should be the basis of charging the fees?

1. Volume of rubbish created

2. Income

3. Flat rate

4. Others, please Specify,_____

23. What kind of certificate one obtains before being qualified to be employed into the company?

    1. Junior High School Certificate

    2. Senior High School Certificate

    3. Diploma

    4. No qualification required

    5. Others please specify

24. Are there any incentives in the company?

  1. Yes

  2. No

  3. Don't Know

25. If yes, what are some of the incentives workers received?

  1. Free transportation system to work

  2. Access to free medical care

  3. Donation from NGOs and community

  4. Access to insurance

  5. Others please specify-------------------------------

26. What is the state of relationship between workers and management members?

  1. Very bad

  2. Bad

  3. Somehow bad

  4. Neither good nor bad

  5. Somehow good

27. How frequent do you go to work during the week? --

28. Is the money enough for your monthly expenses?

  1. Yes

  2. No

  3. Don't know

29. How many hours do you spend at your working place during the week?

---**hours.**

30. Is there any positive relation between your working hours and the amount of money

   you receive every month?

   1. Yes

    2 No

31. If no, what will be the causes of the lack of positive relation?

   1. Poor management of the company

   2. Cheating

   3. Financial constraints

   4. Others, please specify --------------------------------------

32. Does the company have enough financial resource to secure timely payment of it

   workers?

   1. Yes

   2. No

   3. Don't know

33. Who pays for your monthly salary?

1. Government

2. Metropolitanant Assembly

3. NGOs

4. Others, please specify -------------------------------------

34. Is there any gender preference during recruitment of new workers in the company?

   1. Yes--- ( )

   2. No----- ( )

35. If yes which gender stands the best chance of been employed into the company?

   1. Male

   2. Female

Section C

Socio-economic Information

36. Age of respondent [   ] [   ] [   ] years

37. Gender of respondent

1. Male
2. Female

38. Respondents highest level of Education:

1. No Education or Schooling
2. Primary School
3. Junior High
4. Senior High
5. Technical Education

6. Training College

7. Tertiary or University Education

INTERVIEW GUIDE OR CHECK LIST FOR ZOOMLION COORDINATORS

a. When was the company established? ....

b. what kind of solid waste do you managed? ………………………………………………..

c. How is the company been managed? --

----

d. How did the supervision aspect of the company take place?

e. The salary scale; what policy do you use in terms of paying your workers and how much

do you pay them per monthly?

----

f. What education qualification one must have before employed into the company? ……………

g. What are the long terms plans for the company? ---

----

h. What are some of the names of Competing Companies in the communities? ----------------

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----

i. What are the incentives that the company has set aside for the

   management members and the workers? --

----

j. How often do you organize in-service training for your workers in order to enhance their

   performance? ---

----

k. How much money is spent on machinery and other equipment for waste collection? --------

----

l. How much money is set aside for depreciation purpose? --

m. What is the total number of employee in the company? --