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Abstract

The inability of municipalities to handle the increasing amount of waste generated is a growing problem in many African cities.

This study attempts to address the problem of municipal solid waste management by looking the consideration of governance and community participation on waste management issues.

A theoretical framework is developed employing institutional theory analysis and the theory of capacity building. Which have been used as a basis to compare the theoretical and the actual practice when analyzing waste management systems in the municipalities. However poor performances of municipal waste management systems have been realized in Arusha and Dar es Salaam contributed by poor implementation of laws and low awareness creation which further demoralizes community participation. Moreover application of an Integrated Waste Management approach has been favored as the best way to manage solid waste.

Preface

This Research report is conducted for the 10th semester project at the Department of Development and Planning at Aalborg University in spring 2008.

The report addresses the problem of Municipal Solid Waste Management in two cities of Arusha and Dar es Salaam in Tanzania on the Governance and public community participation in waste management systems. Moreover integrated waste management is encouraged as the best approach to deal with municipal waste.

The method of reference in this report is based on the Chicago style where the author's surname and year of publication is referred to. In case of more than three authors, the primary author is referred followed by "et al". In addition the figures and tables are numbered according to the chapter number followed by a continuous numbering. The appendices and a CD for audio interview of the report are available at the end of the report.

The Author of this report would like to express her gratitude to the following persons and organizations that have helped in the writing of the report. First of all I would like to thank my supervisor Prof. Per Christensen for his genuine guidance and advice throughout the project. Second to the head of waste management departments in Arusha, Mr Nicholaus Ntobi, and Dar es Salaam municipalities, Mr Iddi Kimaro, Mr Ally Hatibu and Mr Kizito Nkwabi for their continuous contributions and support. And last but not least, my deepest appreciation to my parents for their love, care and moral support. Finally special thanks to my siblings Michael, Ester, Anne and Christina-the designer!

Julianne M Mungure.

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CHAPTER ONE

1. INTRODUCTION

Purpose: This chapter serves as the general introduction, highlighting the issues of Solid Waste Management in Africa. A problem formulation and research questions also form part of this chapter followed by the methodology and scope of the research work.

1.1 BACKGROUND OVERVIEW

In many parts of the African continent environmental problems has revealed to create a great challenge. This is especially witnessed in the section of solid waste management in different countries of the region. While the quantity of waste produced in cities continue to increasing daily, the effectiveness of the means of handling waste in terms of collection and disposal remains undesirably low.

According to the World Bank estimates of (1992), between 0.7 and 1.8 Kg per capita of waste is produced everyday in developed countries' urban areas and approximately 0.4 to 0.9 kg is produced in the cities of developing countries. Waste generation therefore tends to increases with an increase in population and economic growth which together add up to the problem of waste management posed not only on the environment but also on the public health. While environmental problems are mostly related to the effect of waste pollution, open landfills and blocked drainage systems exposes severe health problems to the population and especially the children in many developing countries. Most municipalities lack the efficient collection techniques as a result not all of the waste generated is collected. This is further evidenced by the increasing dumpsites and abandoned wastes and deposit in the city streets and open places in residential areas. The uncollected waste piling up then becomes a breeding ground for disease carrying organisms leading to diseases such as cholera and malaria. The African Development Bank projects for worse conditions if the trend of waste

production is left unchecked. Furthermore it warns that a possibility for the amount of waste generation to increase by approximately five times when we reach 2025 is quite big (ADB, 2002).

1.2 WASTE HANDLING IN AFRICA

A definition of Solid Waste or municipal solid waste as referred in this report is described according to Medina, (2000) as materials generated from the result of human daily activities resulting from areas such as households, public places and city streets, shops, offices and hospitals. These wastes have frequently been the responsibility of government authorities for collection, transportation and later disposal. In addition waste from industrial sectors have usually not been considered municipal however should not be underestimated when dealing with solid waste in general because in most cases they all end up in the same municipal solid waste stream. Moreover municipal solid waste in developing countries is composed of wastes from household refuse, institutional wastes, commercial wastes, streets sweepings and also remains from various construction works.

Most of the developing countries consist of mainly two Systems of handling waste. The first is a formal system which is managed by the government. It normally involves the cities' municipalities whereby the municipality has the responsibility to ensure safe, reliable and cost effective collection and final disposal of solid waste. This often requires large financial resources than in most cases allocated on the public budget therefore making it almost impractical to deal with the extent of the problem of waste management.(Gombya, 2000) In addition this type of system is frequently characterized as inefficient and expensive. The second is the informal system which engages mainly private dealers such as communities of scavengers and private associations, they represents a significant part of the economy as they recognize the potential part of certain materials such as plastic, bottles, paper and cans for domestic purposes. In some areas this operation includes charging some amount of money to residents for picking up their garbage. The involvement in municipal waste includes collecting, sorting, recycling and selling waste. (UNIDO, 2003) The two systems however are subjected to having very little interference and cooperation in all aspects of waste handling making the problem of waste management even worse and persistent.

The main problem of waste management in an African context is however not only brought about by the amount of waste accumulated in the cities but also the incapability of the governments and waste management authorities to keep up with the scope of the problem itself. To mention a few Tanzania for example is faced with major problems of solid waste management with an estimation of 30-50% of waste being left uncollected. (Onibokun et al, 1999) In the capital City of Dar-es-salaam estimates present that out of 3976 tons of solid wastes generated each day only 1440 tons are collected and sent to landfill for disposal. In addition approximately more than 70% of the daily waste generated is left near the houses, on the streets, markets or in drainage channels (Kizito Nkwabi, 2008).

In Kenya the capital city of Nairobi, solid waste generation ranges from about 800-1000 tons per day. But the city municipality has a capacity of collecting only 400 tonnes daily (ADB, 2002). Like wise in Malindi, a secondary largest town in Kenya estimates for 1991 indicate that less than 21% of waste generated reached the dumping sites. A parallel situation is also observed in Kinshasa, which is the capital and largest city of the Democratic Republic of Congo where waste is only collected in the minority of households while in the rest of the city it is left scattered as in the case of Dar-es-salaam. (Onibokun et al 1999, UNIDO 2003)

To fully understand the fundamental problems in the management of solid waste it is important to scrutinize on the governance atmosphere in connection with the policies structure, implementation strategies as well as the economic framework of a country. Moreover some key elements in the process of governance which are essential for the performance of the management systems in use have to be considered these include the effectiveness of the managerial and organizational structure, accountability and transparency in decision making. Furthermore the degree of participation with informal structures such as community based institutions, the public and private organizations and the coordination between formal and informal structures for collection, transportation and disposal of waste (Onibokun et al, 1999).

In general the problems of solid waste management and their solutions are different in Africa and the rest of developing countries as compared to those in developed nations not only on the various differences in their waste composition but also on the standards of waste management services. While in developed countries concentration is more on maximising the recovery of resources from wastes, in developing countries more attention is given to attaining proper collection, treatment and disposal. One of the means to go about this problem would be through incorporating a waste management approach which attests to be environmentally accepted, economically feasible and socially enviable. Integrated Solid Waste Management (ISWM) is one of most recommended and compatible approach for waste management which provides a framework for the development of a sustainable municipal solid waste service. Moreover it presents a use of various collection, transport and treatment options (White et al, 1999)

Consequently, the challenge of waste management is further being extended to the effect of methane emissions in the landfills which is a primary constituent of landfill gas and a potent greenhouse gas when released to the atmosphere. One of the most known project activities under the Kyoto protocol on Clean Development Mechanism (CDM) has been landfill gas management. This can be of a potential to Africa through benefiting from financing in the waste sector. The high investment costs and lack of expertise are some of the immediate obstacle most countries will face however this can be viewed as an opportunity where CDM could contribute by providing funds for such projects.

1.3 PROBLEM FORMULATION

Urban environmental problems are normally considered as problems that require long-term solution which most African nations can barely afford. Among these problems is a waste management issue which is a more critical problem because it is directly linked with protection of public health, safety and the environment. The management approaches, methods and techniques employed in waste management have been unsuccessful. Moreover in comparison with other public sectors it has been observed that sectors dealing with waste management have often received little attention from the governments.

One of the reasons for a long time persistence of the problem is due to the weak financial structure and institutional incapacity of the respective city municipalities to handle the problems. (UNIDO, 2003) However for a waste management system to work effectively there is a need of employing a more strategic, participatory approach that can address social, financial, environmental and also technical issues. This goes hand in hand with incorporating issues of governance including effective community participation.

Waste management is an important aspect of urban governance because it reflects not only on the consequences of the authorities dealing with waste but also the responses of the society on the performance of the systems used by these authorities. The success of the authorities implies good governance and therefore the state gains trust from the public. The opposite is also true, in case of failures the public tends to loose hope for their state. (Kironde, 1999)

Governance in this study is defined according to the World Bank (1992) definition of governance. Which is referred to *"the manner in which power is exercised in the management of a country's economic and social resources for development"* (World Bank, 1992)

Governance in an African context is therefore an important issue to be examined in order to determine the extent to which it responds to the challenges of environmental problems such as the municipal waste management. Moreover the report is of the opinion that proper governance involvement coupled with improved community participation in municipal waste management can result to not only effective waste management systems but also better looking and cleaner African cities.

With these considerations, the main research area of this investigation was formulated as follows;

To what extent are the elements of governance and public-community participation considered in the management of solid waste in African municipalities

The problem will be discussed and analyzed with the help of the following research questions;

What are the institutional mechanisms and arrangements for municipal waste management in African cities?

How does a waste management system function in terms of the relation between the government, municipalities and the community?

How can an Integrated Solid Waste Management approach improve the waste management system in African municipalities?

1.4 METHODOLOGY

1.4.1. Data collection

Primary and secondary sources of data collection have been employed. The study uses three sources of information for the primary data collection. This includes interviews, survey; collection of information from a group through interviews or application of questionnaire and observation. The primary data collection through the interviews and observations has been important because in Tanzania a country which is used as a case study, issues concerning solid waste management have received little authentic data. The methodological technique has been selected based on the fact that Yin (1994) suggests *"multiple sources of evidence as the way to ensure construct validity"*. The presentation of the primary data includes interviews, and participant observation. Interview is the first of the primary data acquired because it has been the first possible way of obtaining information from people with knowledge about municipal solid waste management systems and the involvement of private and public participation. The reason for using this way of primary data collection is explained in the following.

1.4.2 Interviews

The first part of the primary data collection has been attained through interviews because this was the most possible way of getting information from people with knowledge about municipal solid waste management issues. The four municipalities from two major cities in Tanzania were contacted through e-mails and telephone calls and based on the field of study representatives from each municipality were chosen basing on their knowledge and understanding of the waste management systems and their administrative responsibilities. In all 6 interviews with 9 interviewees were conducted. The interview among the interviewees lasted for 30 and 90 minutes depending on their involvement and the information required. A semi- structured interview has been suitable for the research this is because it left room for discussion. An audio recorder has been used in the interviews to facilitate data collection as well as increasing accuracy as a way of insuring validity. Interviews were conducted both in English and Swahili (the local language in Tanzania) depending on the preference of the interviewee however later transcriptions were all made in English. During transcribing (and translating the Swahili interviews into English) an elaboration of the interview in some cases was attempted in order to enable the interviewee information fit with the context of this report without changing the original meaning of the interviewee. An audio version of the interviews is presented in a CD found at the end of this report. A transcript of the interviews is furthermore presented in an appendix II at the end of the report.

1.4.3 Participant observation

Participant observation has been used as a way to examine the problem on the ground. Being a native of Tanzania and knowing most places in Dar es Salaam and Arusha contributed to the observation. Participant observation in the solid waste management system has been an eye opener to both revealed and those not revealed in the interviews. Many collection points, waste containers and disposal sites have been visited and photos taken. Different waste transportation equipments have been seen and photographed. All together this has contributed widely to grasp and understand more the state of waste disposal problem in the two cities. The observations part has helped in

validating data from the interviews and secondary sources. Moreover notes have been taken in all visits in addition to the photographs.

1.5 SCOPE AND LIMITATIONS OF THE STUDY

The scope of the study is limited to the African municipalities and more specifically to the municipalities of Dar es Salaam and Arusha in Tanzania. Both cities are potential for the country's economic, administrative and cultural centers and also among the largest and fastest growing cities in Africa with an estimated population of 2.5 and 1.3 million people respectively according to the 2002 national census covering an area of 1397 square kiometers for Dar es Salam and 93 square kilometers for Arusha . The cities are undergoing rapid urbanization leading to a high generation of waste therefore it is an issue of not only health but also environmental concern to the authorities. The literature reviews indicate that municipal waste management systems in Tanzania are handled in a similar way but there are variations in terms of operations and therefore the effectiveness of the systems at different municipalities. The situation of solid waste management from the municipalities in the two regions can therefore be generalized as a representation of the waste management situations in other municipalities in different regions of the country. Site visits to the case study has been conducted and also personal experience from the two cities as well as other African cities facilitated the study.

1.6 CONTENT OF CHAPTERS

Chapter one serves as the general introduction, highlighting the issues of Solid Waste Management in Africa. A problem formulation and research questions also form part of this chapter followed by the methodology and scope of the research work.

Chapter two presents the theoretical approach from institutional analysis according to Scott (2001) and Capacity Building according to Janickle (2006). Details of institutions constituents and analysis are presented her. The theories are used to identify the institutional set up of solid waste

management systems in municipalities which are later used in chapter six on the analysis of the report.

Chapter three introduces the basic concepts of Solid Waste Management. Furthermore, waste operations and challenges facing the municipalities are presented to give an overview of the waste management situation in Africa.

Chapter four gives an insight of the approaches for waste management systems in African municipalities. Also Integrated waste management approach which is promoted in this study is introduced in this chapter. Furthermore an overview of municipal solid waste management from the governance perspective is described.

Chapter five presents the case followed by the description of waste management operations in the case the information forms the base for the discussion in chapter six.

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Chapter six presents the analysis of the waste management system in the case followed by a discussion on the institutional analysis of waste management in the municipalities.

Chapter seven gives a summary and conclusion on the discussion from the previous chapters.

CHAPTER TWO

2. THEORETICAL FRAME WORK

Purpose: This chapter presents the theoretical approach from institutional analysis according to Scott (2001) and Capacity Building according to Janickle (2006). Details of institutions constituents and analysis will be presented. The theories are used to identify the institutional set up of solid waste management systems in municipalities which are used later in the analysis of this report.

2.1 CONCEPT OF INSTITUTION

A preliminary theory is important for any researcher in order to guide on the appropriate approach to use for the analysis. According to Yin (2003) *"Without any guidance of a theory will bring a misleading in understanding of the case"*. In other words with a help of a theory a researcher is guided in designing possible solutions to the problem in the case. In understanding the institutional theory and its operation, definition of institutions will be presented first and later in the chapter the relevance of the theory to the project will be described.

The concept of institution is attained through an understanding of the general meaning of institution from the formal forms of rules like constitutions, legal systems and government structures to include informal aspects of life. Meyer defines Institutions as "cultural rules giving collective meaning and value to particular entities and activities integrating them in to larger schemes." In this definition the behavior of individuals and their involvement in other social aspects is determined by wider rules (Meyer et al 1994 p10 in Scott and Meyer 1994). Institutions involve a series of definitions equipping one another. The definition according to Scott (2001) is *"Institutions are composed of cultural-cognitive, normative and regulative elements that, together with associated activities and resources, provide stability and meaning to social life.*

Although rules, norms and cultural beliefs are considered central ingredients of institutions, It is however imperative to consider human behavior which is creating and applying these norms, interpreting meanings or beliefs and formulating, modifying and obeying or disobeying these rules. Hence they cannot be separated from the associated behavior and material resources (Scott 2001). Consequently, institutions can either empower or restrain the actor's behavior therefore making them more or less capable of operating according to the rules. In solid waste management this implies that, the actor's behavior towards waste handling can influence the management towards success or failure of the systems in municipalities. In addition, the concept of institutions cannot be concluded without mentioning the three main elements or pillars of institutions. These are the regulative, normative and cultural cognitive which support and form the basis for distinguishing the characteristics of institutions.

2.2 THREE PILLARS OF INSTITUTION

There are significantly three pillars of institutions. These are regulative, normative and cultural cognitive systems which according to Scott (2001) have been identified as the vital ingredient of institutions. When looking from institutional perspectives of solid waste management, it is essential to consider all these facets as contributing in interdependent and mutual reinforcing ways to a social framework. This will assist an understanding of the way municipal solid waste should be managed within a particular social system.

2.2.1 Regulative Pillar

The regulative aspects of institutions constrain and regularize behavior with its processes of rule setting, monitoring and sanctioning activities. The regulatory pillar is often reinforced by rules and laws resulting to the elements of fear, force and expedient. Often the powerful actors use this type of pillar to impose their will to others through using threats of sanctions. An example is on the use of authority using its coercion power legitimated by a normative framework to support and constrain the exercise of power. In other words, when power and enforcement are being practiced in

some cases by the same actors meaning those who formulate the laws are the same implementing it, it is unarguably that the powerful actors will have the capacity to influence the outcome. The actor is becoming the rule maker, evaluator and implementer. It is considerably significant to involve a third party which is supposed to behave neutral in enforcement. In addition, institutions from a regulative pillars perspective depends on how the rules are interpreted and resolved, design of sanctions and incentives can bring yet another effects (Scott, 2001).

2.2.2 Normative Pillar

The normative pillar makes use of the role of values and norms. Values are conceptions of the preferred, together with the construction of standards to which existing structures or behavior can be compared and assessed, where as norms identify how things should be done by defining legitimate means to pursue valued ends. The normative system diverts away from the logic of consequences and put emphasis on appropriateness by defining the goals and objectives as well as the appropriate way to pursue them (Scott, 2001).

The normative pillar highlights that people behave in accordance with their culture, seeking to do the right thing and avoid wrongdoing. Thus, the unwritten rules and regulations that affect the behavior of people are consequently taken for granted as cited in Scott (2001, pg55) that *"these beliefs are not simply anticipations or predictions but prescriptions"* therefore people are expected to always know what exact actions or directions to take because the norms are constantly taken as given. Hence, the actors reflect the norms and values of institutions with which they belong.

2.2.3 Cultural Cognitive Pillar

The focal point of this pillar is based on shared conceptions that constitute the nature of social reality and the frames through which meaning is made. It has similar aspects like the normative but stresses on the cultural assumptions of *"the way we do these things"* as opposed to the normative which looks at *"how things should be done"*. In this pillar meanings arise in interactions and are maintained and transformed as they are employed to make sense of the ongoing stream of

occurrences. Moreover a cultural cognitive conception of institutions give emphasis to the manner in which the common framework of meaning is socially constructed (Scott, 2001)

However in many African countries most institutional characteristics are connected with reasons for reduced effectiveness of public sector performance such as in municipal solid waste management. This is partly contributed by the presence of low integration of formal rules with informal norms in ways that ensure good governance. By mainly focusing on creating or reorganizing government institutions and building individual skills may not by itself foster improved performances. The institutional context in which organizations and individuals operate is important to ensuring the necessary incentives and rewards for improved public sector performance hence in this case municipal solid waste management services. Therefore as individual capabilities, organizational processes and institutional frameworks are closely related in terms of attaining the same objectives, capacity building is yet another considerable approach to insure improved performances. The following will give an understanding of the relation between institutions and capacity building in an environmental management.

2.3 CAPACITY BUILDING

Insufficient capacity is a fundamental impediment to sound solid waste management in many African municipalities. An efficient, effective and environmentally sound municipal solid waste management operation requires building administrative capacity from the government and private sectors also technical capacity for operating, maintaining and monitoring the process.

Often a large number of employees working in solid waste management including the private sector, non governmental organizations and government institutions have insufficient technical and financial knowledge to operate efficiently. Capacity building inform of training for example is important in building human resource as well as institutional capacity at all levels. This implying for sustainable and effective solid waste systems there is a need for peer to peer training for all the

personnel who are engaged in waste management from waste pickers to local government officials in the municipalities.

According to the World Bank (1997), Capacity building refers to investment in people, institutions and practices that will, together, enable countries in the region to achieve their development objectives (World Bank (1997). But investing in people, institutions and practices requires knowledge, time and money. While some emphasis on the physical resources is a part of the capacity building process, it is not the whole. It therefore involves the process by which individuals, organizations, institutions and societies develop abilities (individually and collectively) to perform functions, solve problems and set and achieve objectives.

In addition, capacity building can further be understood as the process and means through which national governments and local communities develop the necessary skills and expertise to manage their environment and natural resources in a sustainable manner within their daily activities. McGinty (2002)

According to Janicke (1996) an analytical model for capacity building in environmental protection is presented with three categories characterized into five main aspects as follows.

Capacity Building Model

The capacities for the environment are constituted by: 1. The strength, competence and configuration of organized governmental and non governmental proponents of environmental protection. 2. The (a) cognitive-informational, (b) political-institutional, (c) economic-technological framework conditions.
The utilization of the existing capacity depends on: 3. The strategy, will and skill of proponents and 4. Their situative opportunities.
This has to be related to:

5. The kind of the problem: its urgency as well as the power, resources and options of the target group.

Table 2.1 Model for capacity building. Janicke (1996)

Explanations of the model to the context of this report are summarized in the following,

1. Strength, competence and configuration of organized governmental and non governmental proponents of environmental protection.

The establishment of government institutions is regarded by Janicke (1996) as a "*necessary condition for successful measures*". This implies that it is the national governments that are responsible for establishing the institutional and legal framework for municipal solid waste management and therefore ensuring that local governments have the necessary authority, powers and capacities for effective solid waste management. As also presented in one of his case studies in environmental improvements at national or regional level, Janicke (1996) emphasizes on the significance of government regulation as the most imperative and immediate factor in change. In many African governments responsibilities are frequently delegated without adequate support to capacity building at the local levels for instance in the areas of administration, financial management, technical systems and environmental protection.

Non governmental institutions have also been considered important groups in bringing positive changes to environmental challenges. For instance the private sectors operating in various forms of partnership with the public sector such as the municipal solid waste management may provide capital, management and organizational capacity including labour and technical skills while raising people's awareness of waste management problems. Besides working in partnership an increasing number of organizations may act by responding proactively to the problem of municipal solid waste management and therefore excreting more environmental pressure on the municipalities in dealing with the waste problem. (Schubeler *et al*, 1996)

2. The three framework conditions.

Capacity building can be differentiated according to the influence of the political, economic and cultural framework conditions.

(a) *Cognitive-Informational frame work conditions*,

Generally environmental knowledge and public awareness have been pointed out as the key factors influencing environmental protection and management. The variation in environmental awareness is a result of cultural traditions and value differences (Janicke 1996). Moreover the functioning of municipal solid waste management systems is influenced by waste handling patterns and attitudes of the public conditioned by the people's social and cultural context. As an initial step towards improvement, awareness building measures regarding environmental and sanitation issues in municipal solid waste management is an essential precondition. Without knowledge no problem is perceived therefore low public awareness is a consequence. A sound understanding of the social and cultural characteristics for disseminating knowledge and skills is essential to improving behavior patterns and attitudes regarding waste management. According to Janicke (1996) the main objective in capacity building in environmental protection might not to be to change cultural traditions but rather to improve informational and communicative capacities.

(b) *Political-institutional frame work conditions*,

Environmental management is influenced in number of ways by the political conditions. The existing relationship between local and central governments for instance according to the effective degree of decentralization, the form and extent of community participation in the public processes of policy making and the role of party politics in local government administration all have an influence in the management, governance and the type of waste management systems which is possible and appropriate.

(c) *Economic-technological framework conditions*.

In general waste management, technical and organizational nature depends on the economic condition of the country or municipality (Schubeler, 1996). However the economic performance is a difficult aspect of environmental capacity (Janicke, 1996). The reason is because it has not only a

strong but a conflicting impact on the environment, influencing both the structure of problems and the capacity to solve them but also its influence on capacity for environmental protection is complex and not very direct. Thus there is a need for connection to research, educational, communicative and administrative capacities. In addition technology transfer and transfer of expertise is one way of influencing the technological standard of a country's economy. (Janicke, 1996).

3. The strategy, will and skill of proponents.

Strategy implies a general approach to the problem. It involves a purposeful use of instrument, capacities and situative opportunities to achieve long term goals. Implementation of a strategy requires a long term process involving cooperation and coordination between various actors and partners contributing and building upon the existing activities and programmes (Schubeler, 1996). The strategies in addition depend on capacities of the available knowledge. Sustainable strategies of municipal solid waste management require measures in regard to the political, institutional, social, financial, economic, and technical aspects of waste management to have been taken into account. (Janicke, 1996)

4. Their situative opportunities

These are the short term variables to condition of action. In environmental management, headlines resulting to public debates on a concrete environmental problem have a strong influence of environmental change.

5. The kind of the problem: its urgency as well as the power, resources and options of the target group. The nature of the problem signifies whether it is easy or difficult to solve a given particular problem. An example on pollution is given by Janicke (1996) to explain the urgency of the problem according to how it is perceived by the public on whether the public considers it being serious to them or not or it is a threat to future generations. Consequently the problem can differently be viewed if the polluter is for example rich, has strong influence on society or if the responsible institutions are weak or if there are opportunities for other solutions. According to

Carew-Reid et al (1994) in Janicke (1996) points out that the structural nature of many problems leads to restrictions which may limit a certain given capacity. (Janicke, 1996)

2.4 RELEVANCE OF THEORY TO THE PROJECT

Institutional and capacity building theories gives an insight in what an organization or institution should be as a structure. It takes away the discussion of individual actors and replaces it with groups. It is from here its relevance is illustrated in the study of municipal solid waste management as institutions.

In reality the elements of institutions regulative, normative and cultural cognitive are not found clearly aligned and is likely one element may undermine the effect of the other. However in municipal solid waste management the importance of these elements can not be undermined as being part of the main factors contributing to the ineffectiveness of waste management systems. The theory is therefore used to assist bringing out the differences between environmental attitudes towards waste management and the actual practices of waste management systems in an institutional context.

Furthermore institutional theory has been useful in defining the role of actors involved in waste management system showing the variation of how they act based on their resources, activities and capabilities. In addition it provides a better understanding of organizational internal operations and linkages in regard to waste management in African municipalities.

Consequently the theory has been a helping tool in giving an understanding of municipal solid waste management as not only the actors struggling to provide the best waste management services, but also how they relate with other actors such as the government, private organizations and the community they seek to serve. In addition, since actors are institutionally constructed it is essential to assert their potential for reconstructing the rules, norms and beliefs that guide but not necessarily determine their actions.

The theory sets good pace for the analysis of institutional activities and relations. Institutions, formal and informal are increasing in number everyday and we are observing the issues of institutional interaction and interconnection coming to the forefront in politics and research. This however does not mean that there are no other theories that can be relevant to this project.

2.5 APPLICABILITY OF THE THEORY

Across Africa, administration of Municipal Solid Waste Management systems in general involves many different organizational forms and institutional arrangements which in many cases remain fairly consistent among countries. Municipal Solid waste responsibility rests within ministries of for example health, prime ministry or planning and development ministry. Mostly these ministries tend to give higher priorities to national issues especially those generating income unlike municipal solid waste. Though administration and financial constrains are among the major weaknesses of municipal solid waste management systems, the institutional context in which organizations and individuals operate is an important aspect worth analyzing in order to foster an improved performance in the waste sectors.

For instance, unlike social norms and values, national governments operate through regulation and control, thus enforcing responsibilities through making laws, regulation and policies which aim at helping the municipalities to have the necessary powers and capacities for an effective solid waste management. However regulation and control is not the only way, the normative and cultural cognitive pillars play a major role as Lambi (2007) argues that peoples culture have a greater influence on waste management and waste generation patterns are further determined by people's attitude and behaviors. In many places environmental protection is regarded as keeping waste out of sight through for example landfilling or burning, no major consideration are given to whether there are better and sustainable options. The theory is therefore useful in bringing out the elements of culture, regulative and normative embodied within institutions in the context of political, socio cultural, economic, regulating and technological issues to promote positively or negatively the

community perception and engagement towards waste management activities. In connection to institution analysis, the theory of capacity building is an additional tool in bringing the awareness of for example the knowledge and understanding of the staffs and individuals involved in the waste management systems. Their educational background, trainings might have an influence in relation to selection of priority problems in waste management issues that call for appropriate planning, implementation and monitoring abilities.

This study aims at contributing to the body of knowledge in waste management by looking at how and to what extent each of these elements is contributing to or hinder the success of municipal solid waste management systems in Dar es Salaam and Arusha.

CHAPTER THREE

3. CONCEPT OF SOLID WASTE MANAGEMENT

Purpose: This chapter presents the basic concepts of Solid Waste Management. Furthermore, waste operations and challenges facing municipalities are presented to give an overview of the waste management situation in Africa.

3.1 WASTE PRACTICES IN AFRICAN MUNICIPALITIES

Waste management varies from country to country in Africa. For example, in the eastern part of the continent environmental policymaking remains largely a function of the central government, but implementation of policies and legislations are handled by the local governments. This form of managing waste further support and accelerate the concept of decentralization which means that responsibilities for performing public services are shifted from the central government to lower authorities or even to private sectors. (Robertson W, 2002). But what does decentralization mean?

3.1.1Decentralization

Decentralization is about handing power over to the local level mainly from the central government. However it is not common for individuals and institutions to hand over power easily therefore the process of decentralization is in most cases long, frequently difficult and often requires extraordinary incentive to enact and implement. Moreover if decentralization process is not well planned and implemented, it will not function and will lead to more bureaucracy. However according to ADB (2002 pg23) decentralization is described as an excellent way to dealing with solid waste management issues.

Decentralization involves three dimensions namely political, financial and administrative which are primarily the main components of power.

Political dimension**,** also known as political decentralization it refers to the transfer of political authority to the local level. Generally decentralization is about power shifting, it is therefore a fundamentally political process.

Financial dimension commonly referred as financial or fiscal decentralization. It involves shifting of financial power to the local level through increasing or reducing conditions on the inter-governmental transfer of resources while giving jurisdictions a greater authority to generate their own revenue.

Administrative dimension*,* or administrative decentralization, it engages a full or partial transfer of a range of functional responsibilities to the local level such as in this case the waste management. However decentralization tends to be strong when the three mentioned dimensions are all transferred to the local level together (TPC, 2000).

Decentralization processes vary significantly even between countries of similar political and culture status. This is because each country faces its own unique combination of issues. In many parts of the continent decentralization has been facilitated by the international organizations. For example, In Uganda the decentralization process was being supported under the World Bank- financed Environment Management Project in 1996. Furthermore in Accra Ghana, a regional initiative named Managing Environment Locally in Sub Saharan Africa was being facilitated also by the World Bank with an aim of generating grounds for privatizing the management of solid waste. Privatization of solid waste management services is an alternative to the government managed operation (ADB, 2002).

An important aspect of decentralization is that it is expected to contribute to the elements of good governance through increasing community participation in decision making and enhancing government responsiveness, transparency and accountability. However these expectations are not always met because of the complex system that is attached to many geographic entities such as

international, national and local levels and societal factors involving the government, private sectors and the community at large (TPC, 2000).

While majority of the African countries have managed to handle waste at different levels of competence, in some countries the problem is further worsened by lack of official policies on solid waste management.

3.2 MUNICIPAL SOLID WASTE MANAGEMENT

Solid waste management can be described as a mechanism associated with the control of generation, storage, collection, transport, processing and disposal of solid wastes in a way that favors the best interests of public health and takes into considerations environmental concerns.

One of the responsibilities of a municipality is to collect, transport and safely dispose waste generated within its area. In many African municipalities this goal is barely accomplished as a result of inadequate coverage services due to poor infrastructures, limited utilization of recycling activities and poor landfill disposals techniques. (Tchobanoglous *et al*, 1993).

In its scope, Municipal solid waste management should therefore focus on all administrative, financial, legal, planning, and processing of functions that lead to finding solutions to all problems of solid wastes. (Tchobanoglous *et al*, 1993). In the following the activities carried out in municipal solid waste management are described.

3.2.1 Solid waste generation and composition

Solid waste generation varies between different countries, cities and municipalities in African. One important requirement in waste management is the provision a record of waste generation in terms of quantity and composition. It enables the management to deal better with the amount and the various categories of waste provided. It is hard to get waste generation statistics in quantities and

composition for all the countries in the region (Achankeng, 2003). However a few countries have been surveyed and the World Resources Institute gives some obtainable statistics on waste generation and collection from these countries as presented in the following table.

Table 3.1: Per capita solid waste generation and garbage collection efficiency (%) in selected African countries with their population estimates.

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	Douala	0.7	60	1.1
	Yaounde	0.8	44	1.0
Congo, DR	Kinshasa	1.2	0	6.3
Congo, Rep.	Brazzaville	0.6	72	0.9
Cote d'Ivoire	Abidjan	1.0	70	3.4
Egypt	Cairo	0.5	65	14.5
Gabia, The	Banjul	0.3	35	0.5
Ghana	Accra	0.4	60	1.7
Guinea	Conakry	0.4	60	1.7
Mauritania	Nouakchott	0.9	15	0.6
Morocco	Rabat	0.6	90	1.6
Namibia	Windhoek	0.7	93	-
Niger	Niamey	1.0	25	0.5
Nigeria	Ibadan	1.1	40	2.0
	Lagos	0.3	8	8.0
Senegal	Dakar	0.7	36	2.3
Tanzania	Dar es Salaam	1.0	25	2.3
Togo	Lome	1.9	27	0.8
Tunisia	Tunis	0.5	61	1.8
Uganda	Kampala	0.6	20	0.8
Zimbabwe	Harare	0.7	100	1.5

Source: World Resources, 1998-99

*Solid waste generated per person, in kilograms per day.

+Percentage of households with regular waste collection

As presented in table 3.1, solid waste generation rates for Africa´s main cities are estimated to vary from 0.3-1.4 kg per capita per day. This leads to an average of 0.78 as compared to 1.22kg per capita for industrialized Countries (Beukering and Sehker, 1999). Although developed countries have a higher average value of waste generation, their waste is controlled by well managed and equipped collection and disposal systems that are handled by well trained personnel. Furthermore public awareness and participation is another important influence to initiating appropriate solutions to achieve the ultimate goal of waste management in the community. The situation is different in the majority of the African nation where the waste collection and disposable systems are performing poorly. However a few countries including Morocco Namibia and Zimbabwe show better collection rates ranging from 90-100% efficiency. This could be explained by the efforts put forward by these countries in trying to cope with and utilize some of the waste management approaches and techniques used in developed countries as mentioned above.

3.2.2 Solid waste collection and transportation

Waste collection activities in African municipalities differ from the utilization of human and animal drawn carts such as wheelbarrows and pushcarts to trucks and trailers. However not all generated waste is collected. The rate of waste collection across the continent varies from 20 to 80% (ADB, 2002). This is because it is only a few areas in the municipalities that can easily be reached when for example trucks and trailers are to be used. This is because most of the streets have not been designed to allow such collection vehicles to pass. Some streets are narrow, unpaved or sloping and also slippery during the rain seasons. In such areas the volume of waste increases and is rarely collected. In Kampala Uganda, approximately more than 80% of the population does not obtain the benefits of the regular collection of house hold wastes. Collection services are more active and

limited to mainly the open areas in the cities and to households and businesses that are willing to pay for the services.

3.2.3 Solid waste treatment and disposal

One common solid waste treatment and disposal in Africa is through landfills or better known as open dumps. Open dumps can be explained as the dumping of solid waste in a shallow or deep land depressions. The waste is untreated, uncovered and not segregated. According to the United Nation Environmental Programme (UNEP), Open dumps are commonly preferred in African municipalities because they are considered as a cheap way to getting rid of solid waste (UNEP, 2005). However to reduce the amount of solid waste to landfills, many attempts have been made by various NGOs and supported by donors to introduce a presorting of household solid waste into categories of organic and inorganic, reusable and non-reusable waste. Furthermore composting with organic matter and recovery of other forms of solid waste has also been highly promoted (ADB,2002).

3.3 PROBLEMS WITH MUNICIPAL SOLID WASTE

The associated problems in African municipalities are basically related to inadequate institutional facilities to deal with the problem arising out of shortage of expertise, financial resources, legal and administrative enforcement of environmental regulations. Coupled with this is lack of public awareness and environmental ethics that result in uncontrolled solid waste disposal. The financial factor remains to be the main constraint as well as lack of sufficient awareness at the grassroots level of the waste generators resulting to the problem of littering. The uncollected waste is illegally dumped in open spaces, water bodies or even burnt on the street and roadsides. In addition poor waste management can further be associated with a negative impact on the public waste due to environmental pollution. The prevalence of diseases such as malaria, tetanus, diarrhea and cholera can be related to the polluted conditions caused by waste being left around (Achankeng, 2003)

3.3.1 Financial and Technical limitations

Financial resources allocated in the waste sectors are not sufficient to handle the persisting problems in the municipalities. The government budgets assigned to municipal solid waste services can only be used to reach less than 50% of the population. Moreover the collection and transport vehicles face frequent breakdowns sometimes reaching up to 80% for all the municipal vehicles being out of service. They involve high expenses in maintenance, repairs as well as when new spare parts have to be imported. (World Bank, 2008)

In considering the main technical operations involved in the management of municipal solid waste, the guidelines on the methods applied are based on the technically advanced nations and their regulations, which may not be amenable to the conditions of the developing countries. (Visvanathan C and Trankler J, 2003)

3.4 STAKEHOLDERS AND PUBLIC PARTICIPATION

Waste management stakeholders can be defined as individuals or organization with a legitimate interest towards achieving the goal of minimizing waste. One way of minimizing waste is by allowing the public in general be aware of the problems posed by ineffective management of waste. Therefore the government, formal and informal sectors, environmental organization and other groups can be working together to create this awareness through municipal solid waste management programs. The public involvement and participation is a means to create a sense of individual responsibility towards waste management and hence the sustainability of the systems.
(Visvanathan and Trankler 2003)

Waste management stakeholders can therefore be viewed as an important element in reaching for the communities while creating awareness about the environmental impacts resulting from waste disposal. This can be organized through various environmental programs which will initiate motivation and hence ensuring a continuous participation.

CHAPTER FOUR

4 WASTE MANAGEMENT AND GOVERNANCE

Purpose: This chapter gives an insight of approaches for waste management systems in African municipalities. Notably the approach mainly promoted in this study is that of Integrated Waste Management Systems. Furthermore an overview of municipal solid waste management from the governance perspective is described.

4.1 WASTE MANAGEMENT APPROACHES

When it comes to waste management approaches, no one particular approach has been identified to completely deal with the problem of solid waste in general instead an integrated approach involving community support is considered essential. Every region has its own unique profile regarding solid waste. The attitudes of people in different municipalities of each region vary regarding to waste management practices. The lack of awareness in communities in connection to the waste generation and handling can be considered as one reason why no single approach to waste management has been accepted as a best method. Since there is no preferred method, municipalities create their own best way to dealing with waste. However, most municipalities end up with the same option. The most common approaches in African municipalities are reviewed in the following.

4.1.1 Command and control

Command-and-control approach is one where political authorities mandate people, by enacting a law, to bring about a behavior and use an enforcement mechanism to get people to obey the law. In environmental management, the approach basically involves the setting of standards to protect or improve environmental quality. A standard is generally the tool used in this approach. It is a mandated level of performance enforced through a piece of legislation.

Waste management planning and policy decisions normally occur at the ministries level responsible for waste management which in most cases respond to political pressure for environmental protection. One weakness point of this approach is that in some instances the goals set by the ministries may differ from those of the local authorities who manage the stream of waste on daily basis. (UNEP- IETC, 1996)

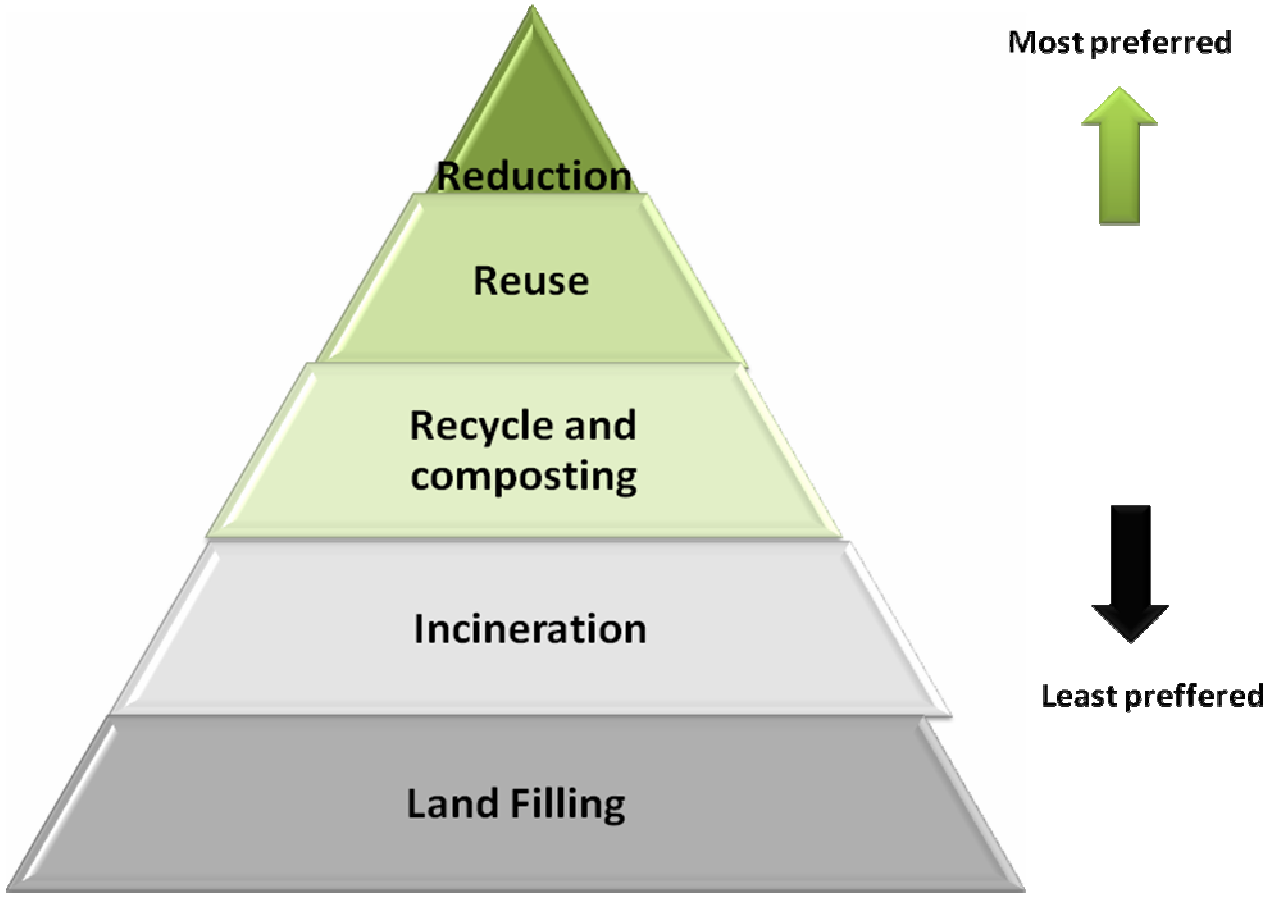
4.1.2 Integrated Waste Management Approach

Integrated Waste Management (IWM) is an approach to waste management that is most compatible with an environmentally sustainable development. It refers to the complementary use of a variety of practices to safely and effectively handle municipal solid waste. The strategy used to develop an integrated waste management system is to identify the levels at which the highest values of individual and collective materials can be recovered. The most favorable is reduction, which suggests using less to begin with and reusing more, thereby saving material production, resource cost, and energy. The least desirable is landfilling. The approach not only aims at maximizing recovery of reusable and recyclable materials, but also reduces pollution and protects human health and the environment (USEPA, 1995).

USEPA, (United States Environmental Protection Agency 2002) notes that a sound environmental management is achieved when the 3R concept is implemented according to its order. The concept refers to Reduce, Reuse and Recycle. The concept emphasizes on an increase in the ratio of recyclable materials, use of raw materials and manufacturing waste as well as an overall reduction in the resources and energy used.

Figure 4.1 in the following presents the hierarchy of IWM. Source reduction it is the most desirable option as opposed to landfilling which is the least favorable.

Fig 4.1 Hierarchy of Integrated Waste Management



Source; (ADB 2002)

Waste Reduction

The main idea is to minimize the amount of waste generated. A successful waste reduction strategy would be the most effective and promising way of dealing with solid waste management as the amount of waste for disposal is minimized and kept in check. But waste reduction also involves an aspect of culture on people's behavior and attitudes. (USEPA, 2002)

Reuse

Common materials for reuse include plastic bags, bottles, paper, cans and cardboards which are recovered for domestic purposes normally at household levels. The materials are sold to commercial centers which also sell it to the end users. The materials therefore only enter the waste stream when the can not be use for domestic consumption. Reuse plays a valuable resource conserving role. (ADB,2002)

Recycling and composting

Recycling is regarded as a self employment activity for the low income population or for the individuals who can not manage to be employed in the formal sectors. Composting is a controlled natural process of decomposition of organic waste material. Recycling and composting are beneficial in terms of taking up less land and leads to low rate of pollution. However according to African Development Bank (2002) little research is available on the importance and potential for re-use in African cities ADB(2002).

Incineration

Incineration method of waste management is only beneficial in regions where land suitable for landfilling is scarce due to for example geographical constrains, highly urbanized region or environmental conditions. The main benefit of incineration is reduction of weight and volume reaching up to 75% and 90% respectively (UNEP- IETC, 1996)

However the priority for this option in Africa remains low because of the high organic and water content of waste streams which make incinerators use more energy than it actually produces. (Achankeng, 2003)

Landfilling

Many landfills operate as dumps on open sites, wetlands or lands with water near the surface. The sites are usually not protected therefore waste pickers use the chance to visit the sites and sort valuable materials for selling or for their own consumptions (Achankeng, 2003). Notably in many

situations landfill is the only municipal solid waste management option available after municipal solid waste is collected (UNEP- IETC, 1996). Landfill operation mostly depends on the administration and management of the municipal solid waste management system. Types of landfills include uncontrolled open dumps, controlled dumps and secure sanitary landfills. Uncontrolled open dumps are the least effective disposal of municipal solid waste in relation to appropriate local health and environmental standards. (UNEP- IETC, 1996)

Landfilling is mentioned as the least preferred option in the integrated waste management hierarchy however it has been a common disposable practice in most African countries Tanzania being one of them. Most landfills are operated below the standards of sanitary practice leading to air and water pollution. Though incineration is a better option to landfilling, the high operation and maintenance costs associated with it and the organic content remain to be the limiting factors to this option. The practice of reusing plastics, paper, metals and other materials is a good recycling approach which is among the preferred methods for an integrated waste management practice.

4.2 THE CONCEPT OF GOVERNANCE AND MUNICIPAL SOLID WASTE MANAGEMENT

4.2.1 Municipal waste management in a governance perception

Waste management benefits the whole community in a particular area. Everyone can enjoy the benefit of the service without causing additional cost to anyone else. Since it is a shared service and everyone is part of it, it therefore can be viewed as a public commodity. The community then expects the authorities responsible for waste management to be responsible and keep the environment clean. This behavior can be related to reflecting to the normative pillar of institutional analysis discussed in chapter two of this report. It is these responsibilities in terms of power and resources between the government, local authorities and the communities which is of concern. The success of municipalities in waste management is in most cases likely reflected on the availability of resources as well as presence of good governance. (Kironde L and Yhidego M, 1997)

According to the country's legislation in Tanzania, the central government is the overall in charge of urban authorities. One of its responsibilities is to appoint a senior personnel who is liable for all urban authorities. In addition, the minister for local government remains to be the main approval of urban authorities' bylaws, budgets and proposals. However in some cases the government can directly have an effect on urban authorities by issuing directives. (Kironde, 1999)

4.2.2 The central government and Municipal waste management Relationship

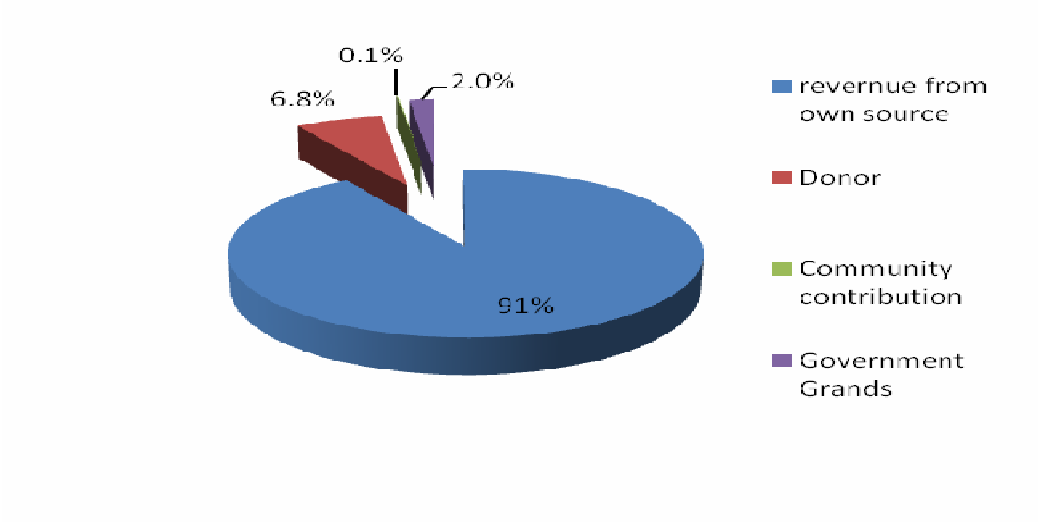
Solid waste management is generally considered a local issue, however the central government and national institutions play a big role and carry considerable responsibility in the whole system of municipal waste management.The central and local government relationship has an important implication in the governance of municipal solid waste management in terms of approval of laws and policies related to waste management and funds allocation. It is here where decentralization of power from the central governments to local authorities and within local authorities themselves becomes viable (Kironde, 1999).

Financing of local government

Budgets of the councils remain to be the key elements to be used in the implementation of ways of improving services to their inhabitants. Among the factors influencing the performance of local authorities in African municipalities is the problem of local financing. Mostly the source of revenue for local government includes market dues, business licenses, property taxes and development levies. In Dar es Salaam municipalities in Tanzania the revenue collected from these sources accounts for more than 90 percent of the total budget (Ntobi, Ally Hatibu 2008).

In the following figure percentages of the sources of funds for Dar es Salaam city council in 2004/2005 are presented.

Fig 4.2 Sources of Funds for Dar es Salaam Municipalities 2004/2005



Source; (Dar Es Salaam City Council, 2005)

From the figure above, the lowest contribution of municipal sources is obtained from the community which is 0.1% followed by government funds allocating only 2%. This can be viewed as an example of the total dependency on the local governments to deal with municipal solid waste management.

CHAPTER FIVE

5 THE CASE STUDY IN TANZANIA

Purpose: This chapter gives an introduction of the case followed by the description of waste management activities in the different municipalities.

5.1 BACKGROUND OF THE STUDY AREA

5.1.1 An overview of Tanzania

Tanzania is among the East African countries occupying an area of 945,087 km^2 bordering the Indian Ocean to the east, Mozambique, Malawi and Zambia to the south, Democratic Republic of Congo, Rwanda and Burundi to the west and Uganda and Kenya to the North. The country has a population of approximately 36 million people with a growth rate of 2%. Most of the population about 75% lives in the rural area. Tanzania is divided into 26 regions with a capital city of Dar es Salaam. The municipalities of the two regions Dar es Salaam and Arusha present the case study areas for this report. Dar e s Salaam city covering an area of 1,397Km^2 and population of approximately 2.5 million is divided into three municipalities namely Temeke Ilala and Kinondoni. The municipalities operate differently as each has its own day to day set up for solid waste management. Arusha city has an area of 93 Km^2 and population of around 1.3 million is consisted of only one municipality.

Fig 6.1 A map of Tanzania presenting main regions

Source: world Factbook 2003

5.2 THE MUNICIPALITIES

5.2.1 Arusha Municipality

Arusha Municipal Council is one of the five councils of Arusha region located in the Northern part of Tanzania. The city has an estimated population of about 359,044 which is of mixed ethnic groups including workers and business people. In addition, about 60,000 to 80,000 people enter and leave the Municipality everyday for their daily activities from the neighboring districts and regions.

Arusha is the largest commercial centre in north-eastern Tanzania and its economy depends mostly on commerce, industry, small scale agriculture and tourism.

The council covers an area of about 93 square kilometers. Administratively it is divided into 3 divisions, 17 wards and 10 registered and unregistered villages. (Arusha Municipal, 2007)
As it is for all the Local Government authorities in Tanzania, the Council's Health department is one responsible for solid waste management within Arusha Municipality.

Waste generation and collection

The refuse generated is estimated at an average of 375 tones per day, basing on population size and rate of generation per capital per day, of which only 130-165 tons (averagely 40%) are collected and disposed of. The remaining 60% is not collected due to limited financial resources required for purchasing enough refuse collection trucks and other equipment resulting to environmental pollution at waste collection centers. (Nicholaus Ntobi, 2008)

In the municipality, solid waste collection is concentrated in the Central Business District areas, while refuse generated in peri-urban areas where accessibility is difficult is treated as manure in plantations or buried, incinerated or left in the open. The Municipality, due to limited resources and equipment, is unable to collect solid waste from industries. In this case the industrial owners use their trucks to transport solid waste to the dumpsite. (Arusha Municipal, 2008)

Waste management facilities

The Council has 2 trailers and 5 refuse collection trucks of which some are too old to deliver the required services. Moreover the situation of the dumpsite in Murriet is surrounded by residential premises, causing health hazards to the nearby residents. (Arusha Municipal, Nicholaus Ntobi 2008)

5.2.2 Dar es Salaam Municipalities

In June 1996 the government abolished the city council and appointed the Dar Es Salaam City Commission as an interim administrative with the broad terms of references of total reform and structuring. The new restructuring was focusing on 3 aspects:

- Establishment of new three Municipalities (Ilala, Temeke and Kinondoni) which are autonomous responding to the local demands and conditions as well as delivering services.
- To have a City Council playing a coordinating role as a citywide but largely non executive institution.
- The Wards, to assume a delegated administrative responsibility so as to care for the immediate and basic needs of the residents.

After restructuring, the City Council became the city governing body which together with the three Municipalities operates in the same jurisdictional areas. The city council executes its administrative obligations through the city director. Below the city director follows the three heads of departments which are first the city administrative officer responsible for Finance and Administration department. Second, the city economist responsible for planning and coordination of all city development activities, and third, the city planner responsible for urban planning, environment and utilities services. Under the third department is where the solid waste management section together with other eight different sections is positioned in the administrative structure of Dar es Salaam city council. (Dare s Salaam city council, 2004)

The City council performs a coordinating role and attends to issues cutting across the three municipalities such as Health services, fire and rescue and transportation.

ILALA MUNICIPALITY

Ilala Municipality bears the Status of “A District Administrative Centre in Dar Es Salaam Region”. It has an area of 210 square Kilometers and a population of 637,573 according to the 2002 national

census. In its administration, Ilala is subdivided into 3 divisions, 22 Wards, 65 Sub Wards and 9 villages. It further comprises of two settings, Urban and Semi Urban areas of which urban consist of 17 Wards and the semi urban 5 Wards.

To achieve good governance, the municipality is shaping its participatory budgeting and planning process in the council's plan and budget, by involving the community levels from all the 22 wards of the municipality to participate. It is also forming a new organization structure containing important aspects for monitoring and evaluating the process of Good governance through accountability, transparency, integrity and community participation. In addition a Focal Center for the community and other stakeholders is being established to encourage their participation through sharing of ideas, comments and complaints as a means to improve and facilitate good governance. The center also serves as a good device for improving coordination and participation between the municipal council authorities, other stakeholders and the community in general. (Ilala Municipal Council 2008)

Ilala Municipality has a total of 9 departments. The waste management department was formerly a part of a Health department but due to failures to deliver proper services to the community under this department, it was then shifted and established as an independent department.

Waste generation and collection

Waste generation ranges between 650 – 750 tons of solid waste per day and collection rates are between 300 – 420 tons per day. (approximately 46.1 – 56%). Collection services are provided by both the council and private operators.

Waste management facilities

The municipal has 3 tractors, 9 trucks, 16 trailers, 250 litter bins and one tri–motor bike.

KINONDONI MUNICIPALITY:

The Kinondoni Municipality has a total area of 531 Sq Km. It was established by Government Notice No 4 of the year 2000 issued by the Minister responsible for Local Government and Regional Administration. The Council is an autonomous institution and has 27 wards with 133 streets, 14 villages and 4 divisions. It is one of the three districts that together with the other districts of Ilala and Temeke constitute the Dar-Es-Salaam Region. Kinondoni is the largest in number of its inhabitants when compared to the other two municipalities. According to the 2002 national census, the Municipality had population of 1,088,667 people occupying 260,269 households, average municipal population density was about 2050 people per hectare. Municipal Council is governed through elected Councilors under a fully democratic system. It has a director of the Council, several head of departments and other relevant sections and a Mayor is elected among the Councilors (Kinondoni Municipal Council, 2008).

Waste generation and collection

Waste generation reaches up to 2026 tons of solid waste per day and the collection rate is approximately 40%. About 25% of the waste generated is recovered at the households, collection points and at the dumpsite. (Kizito Nkwabi, 2008)

Waste management facilities

The municipal has 6 trucks, 27 trailers towed by municipal and hired tractors (Kizito Nkwabi, 2008)

TEMEKE MUNICIPALITY

Temeke Municipality is the largest in size of the three districts of Dar es Salaam region covering an area of 656 square kilometers. The district has a total population of about 768,451 residing in 190,585 households according to the 2002 national census.

Administratively the municipality is divided into 3 divisions, Chang'ombe, Mbagala and Kigamboni. The divisions are further subdivided into 24 wards and 158 sub wards. (Temeke Municipal Council, 2008)

Waste generation and collection

Waste generation ranges between 500 – 600 tons of solid waste per day with a collection target of about 300 tons per day. However the collection rate has remained below 50 percent. (Ally Hatibu, 2008)

Waste management facilities

The municipal has 1 tractor, 11 trucks of which 9 of them have a capacity of carrying 7 tons each and 2 of them only carries 4tons each (Ally hatibu 2008)

5.2.2 Operational differences between Dar es Salaam municipalities

Infrastructure services have not been provided uniformly to the three municipalities. Ilala municipality for example is provided with the best services mainly from its position in the city. It is occupying the city's central business district and accommodating most government offices. Moreover privatization was initiated here thus it was the first municipality to be implemented among the three. On the other hand Temeke municipality is the most deficient in infrastructure services and solid waste management. Privatization has taken place late and the municipal progressed at a much slower rate from the influences of infrastructure, like roads which in addition has a greater impact on solid waste management services. (Mbuligwe 2004) The following figure 6.2 gives a geographical location of the three municipalities in Dar es Salaam.

Fig 6.2 A map showing the municipalities in Dar es Salaam.

Source: Dar es Salaam City Council, 2004

5.2.3 Summary of case description

The following is a quantitative summary of the above descriptions showing the variations between the four municipalities in terms of their areas, population and municipal divisions. Among the four municipalities Kinondoni is the largest according to its population size while Temeke is the largest

according to the area occupied. Arusha is the smallest comparatively in both area and population size.

Table 6.1 A summary of the case study.

Description	**Arusha**	**Dar es Salaam**		
Municipality	Arusha	Ilala	Kinondoni	Temeke
Area (Square Kilometers)	93	210	531	656
Population(2002 statistics)	359,044	637,573	1,088,667	768,451
Divisions	3	3	4	3
Wards	17	22	27	24
Sub-wards	-	65	-	158
Villages	10	9	14	-

CHAPTER SIX

6 ARUSHA AND DAR ES SALAAM MUNICIPALITIES

Purpose: This chapter presents the analysis of the waste management system in the case followed by a discussion on the institutional analysis of waste management in the municipalities.

6.1 WASTE COLLECTION, TRANSPORT AND DISPOSAL

Waste collection operations are generally done in collaboration between the municipalities, waste contractors and the pushcart boys. Averagely waste collection percentages are observed to be below 50% in both Arusha and Dar es Salaam municipalities. This can partly be explained by the means and facilities used for waste transportation which give an indication on the limits of the amount of waste that can be transported to the dumpsites per day. In the following, presentation of waste generation and collection is given followed by waste transportation facilities available as well as waste carrying capacities to give an insight of waste management operations in each municipality.

Table 6.2 A summary of Solid waste generated and collected in Arusha and Dar es Salaam municipalities.

Municipality	**Waste Generation (Tons/day)**	**Waste collection (Tons/day)**	**% of Waste collection**
Arusha	375	130-165	35-44
Ilala	650 – 750	300 – 420	46-56
Kinondoni	2026	810	40
Temeke	500 – 600	245 – 294	49
Total	**3551 – 3751**	**1485 – 1689**	**42 – 45**

Table 6.2 Waste generation and collection in Arusha and Dar es salaam municipalities.

There has been no exact information obtained on the amount of waste recovered or recycled during this research but the general figure is believed to have reached about 25% recovery of the total waste generated. According to Kinondoni municipal solid waste manager, he illustrates that "*We are now slowly picking up into the issue of recycling and recovering where some people have employed themselves on this. Though we have not set any proper systems for this to know the exact amount but according to previous studies the approximation is about 25% recovery. For example metal is now recovered by 90%, plastic has also a high recovery rate"*(Kizito Nkwabi, 2008)

Waste collection and transfer is done in a franchise type of privatization whereby the municipalities give the contractors and community based organizations the authority to collect refuse as well as to collect refuse charges from households in particular locations where the service is provided. The municipality is then left with cleaning of major roads and streets, open spaces and public areas as a main area of operation but also remain as a back up service for contractors in case of a break down or when assistance is required. (Musa Kimaro, Ally Hatibu 2008)

Currently kinondoni has the highest number of contractors which is 26 followed by Ilala 17, Arusha 5 and Temeke is remained with only 2 contractors after 11 of them left. The amount of waste generated daily calls for proper transporting facilities from the municipalities and the contractors. The following table presents the number of equipments that are used for waste collection and transport in the four municipalities. The facilities involved in waste operations are mostly trucks and trailers. In the bracket is a number presenting the average carrying capacity of the vehicles in tons. The trucks and trailers for municipalities also include those which are hired on contract bases.

Table 6.3 Waste collection and transport facilities in Arusha and Dar es Salaam municipalities

Municipality	Trucks (Tons)		Trailers (Tons)	
	Municipal	**Contractors**	**Municipal**	**Contractors**
Arusha	5 (7)	4 (7.5)	2 (4)	
Ilala	13 (7)	21 (5)	16 (4)	
Kinondoni	9 (5)	18 (5)	27 (8)	7 (6)
Temeke	11 (7)	2 (7)	1 (4)	

If one assumes that all the trucks and trailers are all in good working condition in the four municipalities, the following situation is likely to be observed for waste collection per day.

Table 6.4 Facilities to accomplishing waste generation and collection per day.

Municipality	**vehicles carrying capacity (tons/trip)**	**Average waste Generation (tons/day)**	**Required trips/day to finish generation**	**Average waste collection (tons/day)**	**Required trips/day to finish collection**	**Distance to Dumpsite (Km)**
Arusha	73	375	5	148	2.0	7
Ilala	260	1400	5	360	1.4	8
Kinondoni	393	2026	5	810	2.1	5
Temeke	95	550	6	270	2.8	10

(For calculations of the figures see appendix III)

The vehicles carrying capacity of a municipality is obtained from a total capacity of the trucks and the trailers of both municipalities and contractors. The required trips per day is obtained from dividing the trips per day by facilities carrying capacity. (see appendix III).

The table gives an overview of the average number of trips the vehicles require to be able to transfer all the waste generated and collected to the disposal sites. For example in the case of Arusha municipality, if the present carrying capacity of the vehicles is 73 tons per trip and the total waste generated per day is 375 tons then 5 trips of the that capacity are required to transfer all the waste generated per day to a dumpsite. In the same condition 2 trips are required to transfer all collected 148 tons of waste. Likewise for Ilala, the total carrying capacity adds up to 260 tons per trip, thus 5 trips can transfer all the waste generated and only about 2 trips for the collected waste per day.

The implication is that depending on the amount of waste generated, the municipalities would have been able to transfer all the waste generated per day to the dumpsites with the present carrying capacity by making 5 trips /day for Arusha, Ilala, kinondoni and 6 trips per day for Temeke. But that is not what is happening because the municipalities as well as the contractors can afford to make an average of three trips per day per vehicle at present. This is mainly because of the distances between the collection sites and the dumpsites ranging between 5 to 10 Kilometers each way (see table 6.4) but also because of the time it takes to load the vehicles which takes place manually. In addition it is not always the case that all the vehicles are on the road because they face frequent breakdowns as a result of their old age as well as lack of regular services and maintenance due to insufficient sources of funds. With the present capacity it is found difficult for the municipalities to be able to transfer all generated municipal solid waste which requires five to six trips daily.

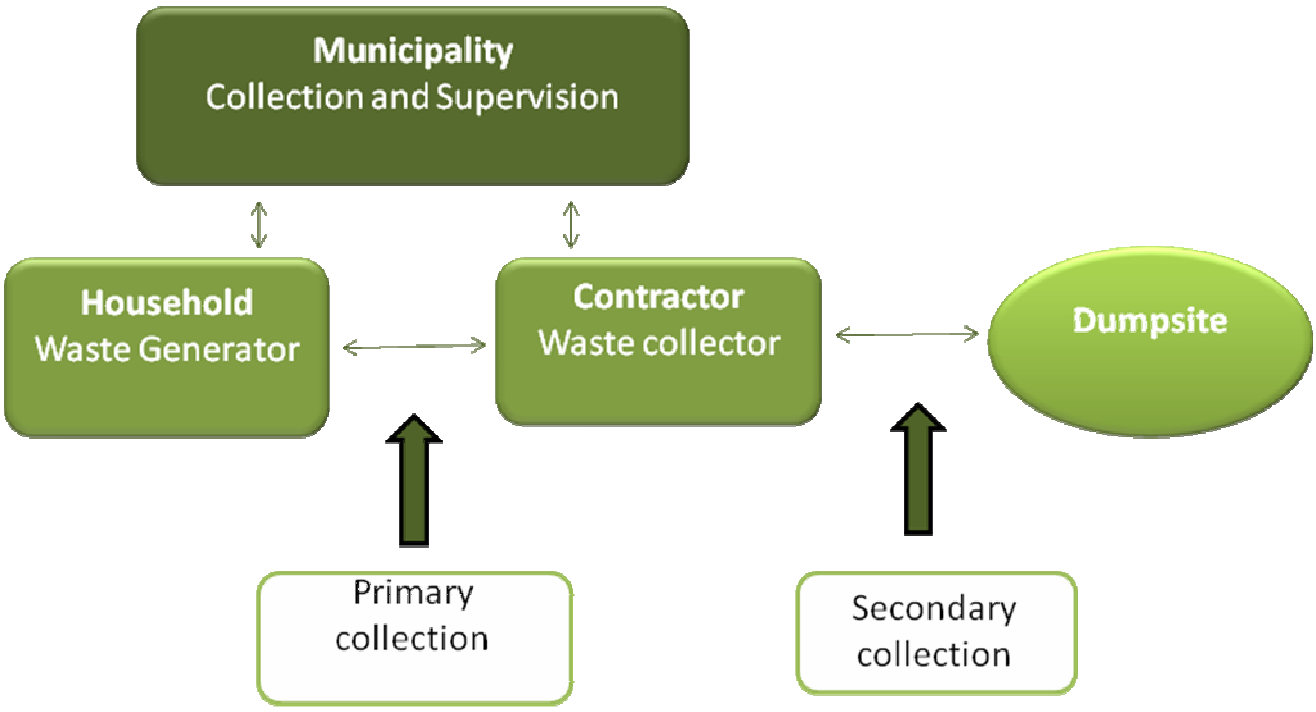
Overcoming the situation could be through increasing the carrying capacities such as attaining more trucks preferably of 10 to 40tons capacity. However these possibilities for the municipalities seem to be hindered by the shortage of funds.

6.1.1 Solid Waste Management practices

The municipalities are the overall in charge of waste management systems which include waste generation at the households, waste contractors, waste pickers as well as other private waste participants and producers to ensure proper collection, transport and disposal at the dumpsites.

The following figure 6.2 presents a relationship for solid waste management between the municipalities, households and contractors including the two stages of waste collection.

Fig 6.3 Municipal Solid Waste Management relationship



Waste collection activities is done in a mixed type of operations involving a door to door collection for the planned areas and a selected collection point for inhabitants of unplanned areas. Waste is transported from households to the collection points (primary collection) by the use of pushcarts

handled mainly by boys who engage in waste collection activities as their main source of getting income after getting paid from each household they collect waste. Later waste is transported to the dumpsites (secondary collection), Murieti dumpsite in Arusha and Kigogo dumpsite in Dar es Salaam using trucks, tractors and trailers.

The following figures 6.3 and 6.4 present means of transporting waste. Pushcarts for primary waste collection and trucks for secondary waste collection. The pictures were taken in April 08 in Dar es salaam by the author.

Fig 6.4 Waste collection by Pushcarts

Fig 6.5 Waste collection by Trucks

Generation of municipal solid waste mainly happens at the household's level. Though not all the waste generated is collected some of it is disposed off at this level through burning or throwing it at the pit holes beside the houses. Those who do not have such alternatives due to space or location have to use the municipal solid waste management systems.

From when waste is collected at the household to when it reaches the dumpsite it passes through various stages. From the households the pushcart boys collect and send it to the collection site when doing this they use the opportunity to sort out the valuable materials before dumping it on the

collection sites. At the collection site, another group of people known as 'waste pickers' or 'scavengers' are present whose main concern is to recover materials in order to sell for reuse or recycling, sometimes they also find materials for their own consumption (Medina 2005).

The same group of waste pickers is also found at the dumpsites where solid waste is finally disposed. The waste pickers operations at the dumpsite seem to have been incorporated well into the normal operation of the sites. As observed in kigogo dumpsite in Dar es Salaam, before the refuse is dumped on the ground waste pickers engage in pulling out piles of mixed wastes from the trucks as they sort out materials of their interest. After a short time the bulldozer then compact the wastes and cover them with a layer of sawdust. The materials recovered are then sold for reuse such as paper for wrapping items in shops or for recycling in the steel and bottle industries.

Fig 6.6 Waste pickers sorting

Fig 6.7 Bulldozer compacting after sorting

6.2 INSTITUTIONAL ANALYSIS OF MUNICIPAL SOLID WASTE MANAGEMENT

This part aims at outlining the extent to which an institutional environment plays a role in influencing the effectiveness of municipal solid waste management systems through a number of factors.

6.2.1 Role of regulatory structures

The regulative pillar in solid waste management systems in the country is organized through a chain of command running in the three levels, the central government, the local government and the municipalities. In 2000 waste management by laws were set up to help assist cooperation with various waste stakeholders such as waste contractors and also as a way of disciplining defaulters. However in some cases there has been a soft implementation of these laws especially in the areas regarded to be inhabited by low income households for instance in many parts of Temeke municipality and mbauda areas in Arusha municipality where most inhabitants earn their living by farming and raising a few cattle (Ally Hatibu, Mwajuma M, Nembris J and Yunis S, 2008)

Therefore in such cases where part of the community lack the resources to pay for refuse collection charges, the regulatory set up tends to have no or very minimal effect. Consequently in Temeke municipality waste contractors have been withdrawing one after another because of the difficulties of getting back returns after giving out the services. This leaves them in a situation where they are unable to pay for their workers as well as maintaining their vehicles and various equipments (Ally Hatibu, 2008).

The experience on the problem paying for waste services observed in all four municipalities in the two cities can be observed as one area that has not been successfully addressed by presence of regulatory structures. Further more this can be viewed as a threat to community participation especially when the law tends to become selective effective.

Despite the fact that regulation is a useful tool towards attaining the most desired behavior in a community, it can hardly function alone as individuals evade by developing ways of going around regulations by exploiting slight vagueness in the by laws. For instance it is stated in the by-laws that *"every household in low to middle areas is required to pay 500 to 1000 shillings every month. The by laws also define household as "a family or a set of parents with or without children"* (Arusha Municipal Commission By-laws, 2001). Since there is little or no information on the number of families living in high density and/or unplanned areas and that no figure is given to explain what stands for a family size, enforcement of this regulation becomes impracticable.

Moreover not all the by laws are enforced equally according to how they state. For example Arusha Municipal Commission provides 23 by laws, among them the by law 9(3) states that *"any person who will perform against any of the by laws outlined will have to pay a fine of not exceeding 50,000shs"* (Arusha Municipal Commission By laws, 2001). However not all of them seem to be regarded at the same measure, for example it is a common routine to report individuals who do not pay for waste collection services but not to those who litter the environment. Representatives of Faraja Women Group in Arusha which is voluntary organization dealing with environmental activities explains:

"Although it is obvious to see waste scattered around people's home and premises, no person has so far been charged for not keeping his/her environment clean as stipulated in the by laws" (Mwajuma M, Nembris J and Yunis S, 2008). The implication could be that those who dispose of waste indiscriminately do so in defiance of council by laws which are prohibiting the uncontrolled disposal of waste, and that defying one law leads individuals to defying others.

Furthermore, the regulations outlined for sorting waste at household level impose some difficulties in its implementation. The waste recycled by private waste collectors and scavengers is mostly paper, glass and plastic bottles, steel and cans which make up a small fraction of the total waste generated (Mussa Kimaro, 2008). This makes implementation of waste sorting regulations difficult even at the household level due to the low amount of waste that is considered for recycle, but also

those involved in recycling activities do not form a strong enough pressure group to influence the implementation of sorting waste regulations.

Fig 6.8 Scavenger collecting valuable materials

Fig 6.9 Waste sorting at a collection point

Waste recyclers in Tanzania include Small Industries Development Organization (SIDO) an environmental active organization which has given plastic materials a priority in recycling because of the littering and blockage of industrial infrastructure caused by waste plastic materials. Apart from plastic the organization also focuses on wood, paper and metal waste recycling. (Sido, 2008)

6.2.2 Role of normative Pillar

The normative pillar includes values and norms and "the regulatory and normative can be mutually reinforcing" (Scott 2001). In municipal solid waste management the normative and regulative pillars are completing each other toward achieving effective waste management systems. The normative pillar plays its role from first of all developing the system through sharing a common objective of reducing the environmental impact resulting from improper management of waste. This pillar is therefore shared by all actors within the municipal waste systems in the sense that considerations for making the regulations are based on the normative understanding of the common

problem hence setting objectives towards attaining proper solutions. Consequently it can be observed that the actors who are engaged in the normative pillar could as well be the actors employed in the regulative pillar. Meaning setting of such regulations require consideration on the possibility of the community to relate and apply them without disregarding their norms and values.

Before privatization of the waste sector in Tanzania, a waste management service was among the free services provided by the government like it was the case for health and education services. But after privatization in 1993 a regulation on refuse collection charges has been imposed which requires for communities to participate in waste management through payments. This transition from not paying to paying can be related to a normative situation that is being transformed to another way of doing things with the help of a regulatory structure.

Among the problems facing solid waste management in Ilala municipality is the tendency of not paying for refuse collection charges. This has not always been because people are poor and that they cannot entirely afford to pay, but it a result of the fact that they had been *"used to the old system of a free service"* (Musa Kimaro 2008) adding to this (Nicholaus Ntobi 2008) explains that *"you can easily prove this because you will find that the same person who does not pay for waste collection charges also refuses to pay for school fees for his kids from the same reasons"*. This gives an example of a situation where a regulatory structure is being influenced by norms in the community.

Lack of law enforcement is in addition contributing to lack of commitment to doing the right things leading to people doing as they wish. With considerations from the four municipalities, lack of law enforcement in connection to lack of commitment can be related to the role of a normative pillar because without laws and regulations there are no directives to specify how things should be done.

In Temeke municipality laws and regulations are even weaker in enforcement because currently they lack the work force to do waste collection after about 11 contractors left thus this could be seen as a way of encouraging community participation. *"We use laws and regulations when the work is*

being done. For example now we can not use these laws by 100 % when we are trying to get people to do the work" (Ally Hatibu, 2008). This is also experienced in Ilala Municipality where laws and regulations are perceived to have a negative influence to the community when used. "*We have laws and regulations to use when things are not done properly but that is not our intention because it is has negative implication. We are not here to punish the community we want them to know the proper ways of handling waste. We would rather educate than give them fines"* (Mussa Kimaro, 2008). Similarly in Kinondoni municipality no high priority is given to the use of laws and regulations, Kizito clarifies that *"I don't favor very much the use of law enforcement because it may discourage if not well used. I think what is required here is more of a consultation work, making the community understand what should be done and why"* (Kizito Nkwabi, 2008)

On the other hand in Arusha municipality the perception is different according to Mr Ntobi who insisted that people are aware of waste management laws and regulations but there is a major weakness of commitment to these laws mainly because of people's attitude and behavior that tends to ignore them. He explains that *"About law enforcement they are aware, if you want to test them on whether they are aware or not is when you catch somebody disposing waste in areas not allowed he/she will apologize immediately, why because she/he is aware that she/he is not doing the right thing. So they have the general awareness of the law that once you produce waste you have to dispose it the right way. What they do is negligence"(Nicholaus Ntobi, 2008)*

Thus law enforcement can be seen as a tool that not only helps to shape the community to doing things the way they are supposed to be done but also educate and creates the awareness hence commitment to how things should be done. On his general view about the effect of regulations and law enforcement on the community, Kimaro adds *"they all have an effect because once we give fine to an individual others want to know why and so they learn from it. With out laws and regulations it becomes difficult to work."* (Mussa Kimaro, 2008)

Emphasis on designing regulations for better solid waste management systems therefore need to go hand in hand with changing people's values and norms on their perception of the regulations.

6.2.3 Role of cultural cognitive

In the municipalities solid waste management has not been regarded as something that requires high priority. There is a general lack of concern as to how waste is disposed of as far as it is out of people's houses. The role of cultural cognitive can be observed in connection to the previous use of a free service system, municipal responsibilities on waste and the low priority given to waste management as described in the following.

A free service

One important aspect which can be related to the role of culture cognitive in Tanzania regardless of which municipality in the region is the political history of the country after independence. The country attained a policy of socialism and self reliance. It is during this time when many public services such as education, health care, water and waste systems to mention a few became free. It is there for in connection to this period that people are still used to the system of a free service hence became part of the people's culture. The major problem that was observed to hinder solid waste management system in the municipalities is the tendencies of refusing to pay for solid waste services that resulted to some municipal waste contractors leave their jobs especially in Temeke and Kinondoni municipalities. In responding to why the community behaves this way now Mr Ntobi explains that *"It is our culture, people are used to the free public services that we had some years ago if you remember health care, education, water were all free. So people have taken it that everything is for free. It will take time for people to understand"* (Nicholaus Ntobi, 2008). Furthermore when related with of low awareness of the community on issues of waste management Kimaro adds that *"Awareness is still a problem but I can say that more than 40% of the inhabitants are aware of issues concerning waste management activities. Mostly the problems come in connection with the previous free service systems"* (Mussa Kimaro, 2008). Culture therefore develops with how we are used to doing things and to change it, it will require some time and education. (Mussa Kimaro, 2008).

Waste is for municipalities

There has been a general tendency of thinking that waste management is purely a responsibility of the municipalities. The idea might have been facilitated by the fact that it is the municipalities which have been dealing with the collection and transfer of solid waste in the cities. Consequently it has negatively affected the efforts of the municipalities on waste management. Waste management begins at the household level with proper storage followed by disposal on selected collection points as stated in the by-laws. But people do not adhere to these rules resulting to waste scattering in various places. In both Arusha and Ilala municipalities, this has been mentioned among the main hindrances to municipal solid waste management. Ntobi confirms that" *Generally the main problems faced are all* alike*, but the major problem in Tanzania disregarding which municipality you go to is that people are not cooperative with the council they think the refuse they produce is for the municipal council"*(Andrew Ntobi, 2008). In addition Kimaro further explain that"*we are also not keen on the whole issue people think it is a responsibility of a waste manager or a municipality."* (Mussa Kimaro, 2008).

The tendency of ignoring

Municipal waste management issues have not been perceived as major problems that require immediate attention when compared to other problems in the country for example education and health. Likewise there has been no major public outcry of the problem though people are living in areas surrounded with waste, unlike for example when a hospital runs out of malaria tablets. According to Temeke municipality the problem is further escalated by an attitude of ignoring and not giving a priority by giving an example of the value of the car the district mayor is using which could easily give the municipality 3-4 collection trucks. (Ally Hatibu, 2008)

Moreover, the low priority municipal solid waste management departments receive could be related to the fact that they do not generate revenue for the municipalities but rather they use money for fueling, vehicle maintenances and other waste management related expenditures. According to Hatibu, *"In general waste departments are not very much considered even at the municipal level*

because we are seen as "spenders", we don't generate any income so sometimes they tend to ignore us" (Ally Hatibu, 2008). The attitude of "*ignoring"* and the influence of "*priorities"* are here related to the role played by cultural cognitive in the society.

The culture of living with waste

In Swahili language there is a phrase which goes like *"jambo usilolijua ni kama usiku wa giza"* meaning "what you do not know is like the night darkness." The solid waste scattered around people's premises and in towns can be perceived as being part of people's way of living. None of the municipalities has been able to achieve 100% solid waste collection system before which in other words it could be connected to the fact that the majority of inhabitants have never experienced being out of the waste site. "Being out of the waste site" means a pure sanitary situation and is here related to the "night darkness" because it is a condition that has not been practically observed in a municipalities. Hence with the present achievements of less than 50% waste collection, the perception can be generalized as endurable. Unlike in the developed world with a writer's personal experience in Denmark for example where waste scattered is considered disgusting and unbearable to live with.

6.3 Capacities of municipal waste management institutions

In solid waste management one could look at how well the institution functions in order to create better regulative, normative and cultural cognitive aspects of waste management activities.

The regulative structures of waste management in the municipalities do not comprise of stringent rules or laws governing waste management. The existing policy and the by-laws are rarely implemented and there is no strict follow up. In Tanzania the application of the existing policies on municipal solid waste management is very minimal. The first National environmental policy (NEP) and the Environment Action Plan (NEAP) came out in 1997. The policies stipulated six main environmental problems in the country including environmental pollution which also served as a framework for waste management. However lack of financial resources and capacity has been some

of the obstacles to the implementation of these policies. Moreover there is still a limited capacity at the local levels to assume the responsibility of solid waste management, proposals and decisions are reported to the municipalities and then to the ministries of local government and the ministry of health.

Furthermore in the normative and cultural cognitive aspects of waste management, public attitude and behavior may be perceived as the main hindrance to the performance of waste management systems. However public awareness and law enforcement on the other hand could yield a positive impact. As people practice what they see from others, formal and informal education through, public-education campaigns, trainings and performances is one way which aims at letting the community know of how serious the waste problem is. This includes having announcements on radios and televisions about both the positive and negative effects of solid waste as many might not be aware of the price they are paying for not disposing waste properly. In so doing the community gets involved and those who practice accordingly become good trainers to others. As knowledge is a continuous process, with time the change of public behavior and attitude will be appreciated.

Capacity for solid waste managers is yet another important issue for better performances of solid waste management systems. This is because better plans to affect the waste situation will depend on their knowledge of the issue. The solid waste problem is common for the entire country but different municipalities have different characteristics and ways of handling the problem and therefore no single plan works for all. The difference in peoples' income in the three municipalities in Dar-es-Salaam necessitated the Municipal waster manager in Temeke to come up with a plan of involving and encouraging push-cart boys in the municipal system. This is because the equipments used by push-cart boys are cheaper to maintain than the contractor's and therefore they require less collection fees from the households. But also due to its highly unplanned settlement the use of push-carts further facilitates the work. Thus, the technological know-how of the solid waste personnel is an important tool. Moreover their knowledge base is further attributed by proper training which calls for presence of training institutions in the system.

Conclusively, incorporating all the above aspects into waste management system in the municipalities might yield better results in addressing the situation however might not possibly solve the problem at hand. Creating a better regulatory, normative and cultural cognitive institution requires for long term strategies on the governance of proper solid waste management supported by better environmental policy formulation,

According to Janicke (1996) "*The main implication for the debate on sustainable development is that long-term strategies must include concepts for improving the conditions of environmental action (capacity-building)"* Capacity building for municipalities therefore involves the operational abilities of a municipality as a result of efficiency institutional structures, management capacity of the institutions and the use of appropriate technologies.

CHAPTER SEVEN

7 CONCLUSION AND PERSPECTIVES

7.1 CONCLUSION

Managing solid waste has been a major problem in many African municipalities. Studies conducted in other parts of the region including Nairobi, Kinshasa, Nigeria and Johannesburg have revealed the problem to be among the most pressing concerns which is evidently found to increase with the growing cities of developing nations (Onibokun et al, 1999). This description which presents a general picture of the waste situation in many cities in the continent can as well be confirmed in the four municipalities of the two main cities, Dar es Salaam and Arusha in Tanzania.

Though improvements on the waste management sector in the country have been observed such as directly involving part of the community to deal with municipal waste issues, however a number of institutional factors that influence the performance of waste management systems remain crucial for improving the sanitary conditions of the municipalities. This study set out to investigate on the elements of governance and public-community participation in the management of solid waste in African municipalities.

From the discussion, the major problem with solid waste management systems in Arusha and Dar es Salaam is greatly observed to have been in connection with the waste collection services in the four municipalities which have not been successful in reaching out for the entire population within their areas therefore making the collection rates to have remained below 50 percent of the total waste generated. Although this can be related to the fact that nationally approximately 70 percent of the urban populations live in squatter/unplanned settlements and that around 60 percent of urban housing are found in these settlements. (Ntobi, 2008) However this can not totally explain on the reason as to why the situation of solid waste management in these cities is the way it is.

Thus, from the investigation the study concludes on the reasons to achieving proper waste management systems in most African municipalities to be contributed by the following factors. The factors are presented according to either governance influences or community influences. This is because some factors have been observed to be related to the governance of solid waste management systems in place while some are related to the community itself in general. However in some cases some effects may be contributed by an influence of both factors (Governance and community). In the four municipalities discussed in this project the effects of these factors can be connected to contributing to low achievements of solid waste collection which in average reaches less than 50% of the total waste generated. Figure 7.1 gives a summary of the effects.

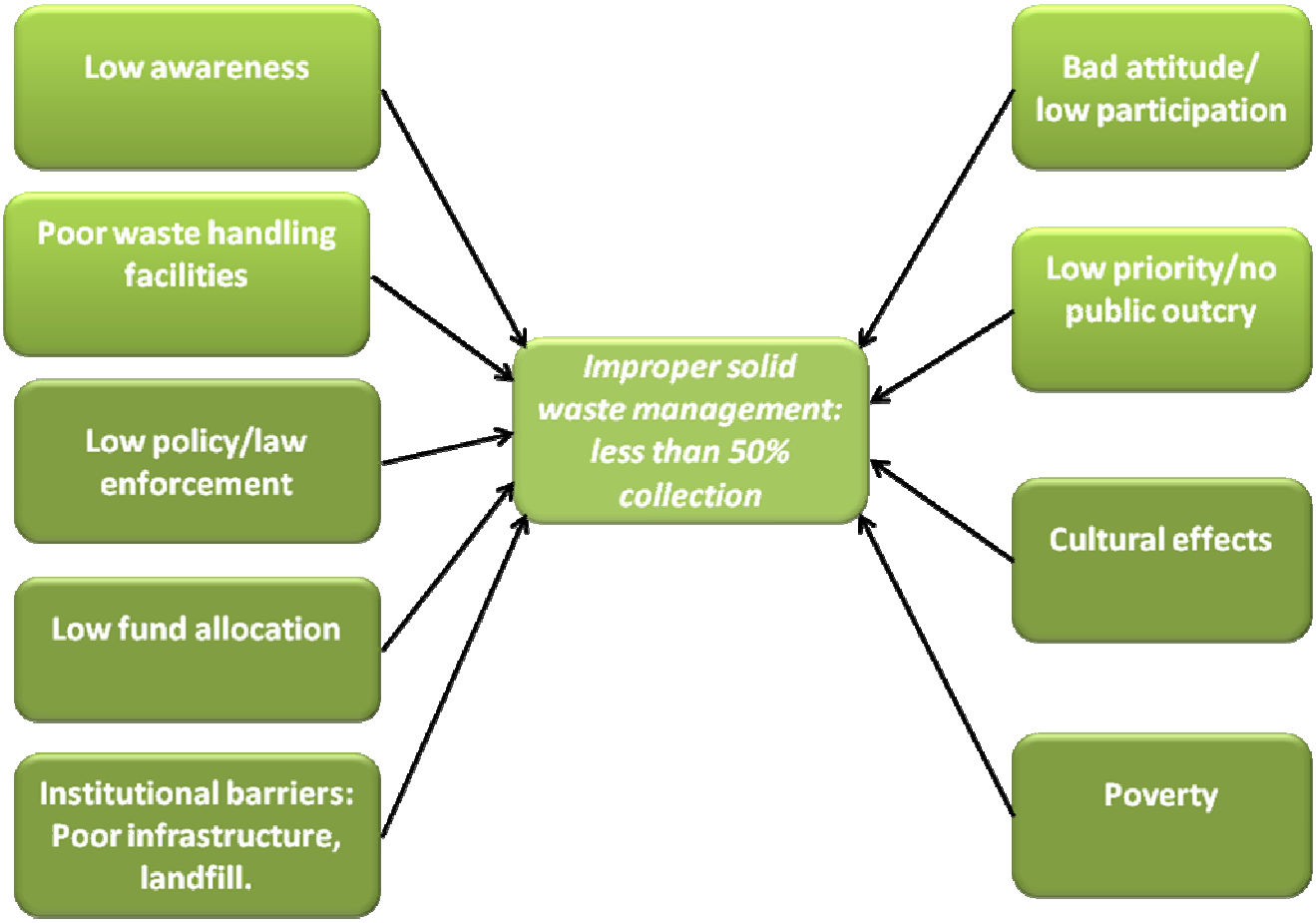


Fig 7.1: Main issues contributing to improper solid waste management.

7.1.1 Governance influences of solid waste management

Administratively the present structure of waste management does not appear to be proactively towards achieving the expected goals of waste collection in the municipalities. Arusha and Kinondoni for example have set a target for achieving up to 75% by the end of the year 2010 (Kizito Nkwabi, Nicholaus Ntobi 2008). Though the plan is good but is it practically possible? From the current collection percentage of 44% to reach 75%, it requires better institutional arrangements which have not been observed to go with the pace of the plan that is required to attain 75% waste collection. Although a plan of 75% achievement is specifically mentioned for Arusha and kinondoni municipalities, the situation can be generalized to Ilala and Temeke including other municipalities in the country which follow under the same structure of waste governance.

The poor institutional arrangements mentioned above according to this report are related to the weaknesses of the overall governance of solid waste management as described in the following.

There is currently insufficient support from the central government to waste management schemes financially. The municipalities depend totally on their own sources mainly from property taxes collection. In case of fund allocation from the government the amount is mostly inadequate and not all 100% of the amount promised is received which further cripples the efforts toward improvements. (Nicholaus Ntobi, 2008). However to curb this, each municipality struggles differently to be able to keep up with the daily expenses. According to Arusha municipality the more waste they collect the more the revenue, thus incase of mechanical faults for the collection vehicles for example, the situation is compensated by hiring private trucks therefore maintain the daily revenue collection (Nicholaus Ntobi, 2008). On the other hand Ilala and Kinondoni's revenue collection is comparatively better due to their position in the city. Ilala occupies the city centre therefore surrounded mostly by offices and commercial buildings where as kinondoni occupies the industrial area in addition both municipalities inhabit average to high income population. Temeke is however facing the worst situation because its area is mostly occupied by households of low income population thus it cannot depend solely on the daily revenue collection.

Thus, due to the high running cost the waste departments have been unable to accumulate enough resources to improve on the management systems. Provision of funds from the government could help in areas such as acquiring better and efficient waste handling equipments and improved waste collection sites which can currently be termed as temporary dumpsites due to their conditions.

From the national regulative framework, though policies and regulations exist, there is lack of enforcement and sanctions placed for non compliance. Waste management is governed by first the national Environmental Management Act of 2004 which provides for legal and institutional framework for sustainable management of the environment and second by the municipal by-laws of 2002. However poor introduction of the former from the government authorities to the community has left the policy ineffective on waste management activities. The municipal by-laws are formulated at the local level and cited according to the municipal commission of the respective municipalities. Hence each municipality has its own set of by-laws. As pointed out in Ilala Municipality that they depend more on the use of by-laws than the environmental act because people are not aware of it. Though the responsibility of raising awareness lies on both the local and central authorities little has been done to enforce it as noted in Arusha municipality, which in consequence leaves the community with an impression that waste is a responsibility of the municipalities. In addition one form of poor regulative structure can be connected to the tendency of refusing to pay for waste collection charges for example in the case of Temeke municipality which lead to many contractors leaving the job. This can be regarded as a result of both low awareness but also lack of law enforcement and sanctions.

Moreover the ineffectiveness of the environmental laws is further contributed by the inefficient capacity to enforce it as well as lack of the working tools.

7.1.2 Community influences of solid waste management

With regards to the normative and cultural pillars, the community behaves as they do basing on what they know and what is practiced around. As a result, little concern is given to the impacts of their actions and attitudes. The effect of governance on regulative framework also applies here,

there is a general low awareness from the authorities on waste handling activities and the impacts associated with improper waste management such as diseases and pollution vis-a-vis the advantages associated with practicing a proper waste management scheme. Other conclusions that have been observed on the community influences of solid waste management include;

- Existence of free public service systems in the past years is a major influence on the community's response towards waste management activities in relation to paying for waste charges.
- A major part of the community participating in waste management activities is mainly involved in doing so because of the economic value that is associated with it. For example waste pickers, pushcart boys and the waste contractors.
- Waste collection is more effective in areas with high income sources than in low income areas.
- There is a random disposal of waste in different areas in the municipalities which can be regarded as a sign of low awareness and negligence towards waste disposal practices.
- Community participation on waste management activities is influenced by raising people's awareness through provision of knowledge, however culture plays a great role on individual basis.

7.2 INTEGRATED WASTE MANAGEMENT

Conclusively, Integrated Waste management is highly advocated in the report as the best approach to incorporate and handle the increasing volume of waste in the municipalities in Arusha and Dar es Salaam as well as in all African municipalities. The municipalities use landfill for waste disposal which is the least preferred method in Integrated Waste Management approach. However to fully incorporate the approach it requires for proper environmental policies specifically on pollution and waste reduction to be enacted and implemented. Moreover increased awareness and priorities to waste management systems to involved and encourage community participation.

The concept is beneficial for both the municipalities and the community because it primarily addresses on waste reduction, reuse and recycling resulting to a minimum amount of waste sent to the dumpsites therefore reducing the effect of pollution from solid waste in the landfills. Moreover it encourages on community participation through awareness creation, waste pickers get more recognized and their markets more secured moreover support to the existing and new recycling industries is increased due to availability of recycling materials encouraged by Integrated Waste management approach.

7.3 PERSPECTIVES

The issues discussed in this report do not constitute a finite set of issues that have an influence on the governance and community participation in the management of solid waste in the municipalities. However due to the limited scope of the study, other possible causes which could not be incorporated in the analysis of this report could be attempted in detail in further researches.

One of such argument would be to look further into waste characterization in the municipalities. Waste characterization information is often not available. Waste sorting activities occur at various stages of waste collection including sorting from the household, at collection points and at the dumpsites but the information for how much of the waste is sorted and therefore recovered from these points is only available in terms of general estimations.

The information from such study could for example give an indication of the amount of waste that is available for recycling. As recycling also determines the amount of waste that finally ends up in the landfill, the findings will equip waste management with better information on the management projections of the landfills. Moreover recycling could be seen as a source of income for the community and therefore waste collectors, but since little is known of what and how much is available for recycling, the availability of markets for various kinds of recyclable materials is still very low. Hence this is one area that needs further investigations.

Moreover the gap between the amount of waste generated and that of waste collected is yet another issue that cannot be overlooked. Throughout the report it has been observed that the municipalities have not been able to collect more than 50% of the total waste generated. A question could be where does the other percentage of the uncollected waste go? Is it all what is left scattered on the streets and at the collection points? How much is burnt at household levels? The information will be beneficial in filling the gaps for the missing parts in the overall puzzle of solid waste management.

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APPENDIX I

Interview Questions with Municipalities

The aim of conducting this Interview is purely for academic purpose for a M. Sc thesis in Municipal Solid Waste Management in Aalborg University Denmark.

1. Introduction, your profession and what you do?
2. Can you say a little about your municipality and the procedures you do in reference to waste management and sanitation?
3. What has been the problem with municipal solid waste management?
4. What do you think are the cause of these problems? And in your opinion what should be done.

5. Have you set any standard for waste collection to be achieved in your municipality, if so do you reach this goal? If not why?
6. What is the present hierarchy of waste in your municipality and what do you expect to achieve in the future? Do you practice Integrated Waste Management? If so, how is it implemented?
7. Do you face the same problems of waste management and operation if you compare to other neighboring municipalities? If yes, how? If no, are you satisfied with the service you provide?
8. Do you think the culture of the people has an impact on their attitude towards waste management and sanitation in general? If yes, how?
9. What would you say about public awareness on the issue of waste management do you think there is enough general knowledge about waste handling or even the need to pay for solid waste services for example? Do they get this knowledge on regular basis?

10. What can you say about the issue of law enforcement and environmental policies and regulation? Do you think they have any effect on people's attitude and behavior on waste?

11. In your opinion what is the history and role of the ministry responsible on issues about sanitation and solid waste management? And on what grounds are new policies formulated? Is it when the goal is not reached, or new ideas are invented or pressure from say external actors?

12. Is there any type of cooperation that enables for example waste collectors suggest new measures to municipal waste management? If yes, how? If no, why

13. I read that one of the problems in management has been inter institutional cooperation and collaboration. How is the communication strength between you and the various bodies (stakeholders) involved in solid waste management

14. Following the privatization of waste collection in Dar es Salaam, what role does the DCC play in waste management?

15. What would you say is the state of waste management in Dar es Salaam today? What percentage of the waste generated is collected and disposed?

16. How are the activities of waste collection financed? Is it enough? If not how do you manage?

17. I understand there are always problems in acquiring land for public waste disposal, how do you handle this problem? What factors influence or determine its location?

18. What do you think should be the way forward? If you have the chance what would you say the government and the community should do that will bring better waste management services in the municipalities?

Interview Questions with Other Organization

The aim of this Interview is purely for academic purpose for a M. Sc thesis in Municipal Solid Waste Management in Aalborg University Denmark.

1. Introduction and what your organization does.

2. Name of municipality…….

3. How do you dispose of waste from your institution?

a. Burn it b. Send it to community collection/ transfer point c. make compost d. collected by waste contractor's f. Other……

5 Why did you choose that method of waste disposal?

a. This is the practice in the community
b. It is the least expensive
c. There is no other option
d. The law
e. Other……

6 How do waste management activities affect your working environment/condition?

7 What do you think about how the municipality manages waste in your area; do you think they do enough to keep you aware and motivated in keeping your environment clean? How?

8 Are you satisfied with the service the municipality is providing? What is your opinion about waste management and how should it be improved to meet your expectations?

9 Do you think there is enough knowledge provided by the municipality on waste management issues to the community in general?

10 Do you think the government is doing enough to solve the waste problem? If yes what? If no, what is it not doing?

11 What can you do as an organization in helping to solve the problem?

APPENDIX II

Interviews with Municipalities

INTERVIEW WITH ARUSHA MUNICIPAL COUNCIL

Interviewee: Mr. Nicholaus Andrew Ntobi
Head of department of Solid Waste Management
Date: 14/04/2008

Introduction, your profession and what you do?
I am responsible for storage, collection, transportation and disposal of the municipal solid waste and to insure proper methods of storing their refuse and to help the public to use proper skip buckets legalized by the government. We do house and house collection and route and route collection. People's response to waste management is still not very good, they think refuse is for the council but the council does not produce waste. We have two types of storages skip buckets and temporary collection points but still people throw out waste everywhere and not where we have directed them to put the refuse.
What has been the problem with municipal solid waste management?
People do not want to participate let alone being educated through the use of newspaper, loud speakers and the local radio. But also as municipal we lack enough equipment such as collection trucks to handle all the municipal solid waste. Also about 75% of the area is unplanned settlement which is inaccessible.
Have you set any standard for waste collection to be achieved in your municipality, if so do you reach this goal? If not why?
Our target is to collect at least 75% of the waste generated. Even if we have not reached that now but we have managed to get to 55% mostly from the planned settlement.
Do you face the same problems of waste management and operation if you compare to other neighboring municipalities? If yes, how? If no, are you satisfied with the service you provide?
Generally the main problems faced are all alike, but the major problem in Tanzania disregarding which municipality you go to is that people are not cooperative with the council they think the refuse they produce is for the municipal council.
What would you say about public awareness on the issue of waste management do you think there is enough general knowledge about waste handling or even the need to pay for solid waste services for example? Do they get this knowledge on regular basis?
There is no enough knowledge, in my opinion we have to invest more on the public education. People do not like the idea of paying for waste collection. You are coming to tell me to pay for refuse meanwhile I can not buy for my bread do you think I will understand you? But also some people are very rude, they have enough income but it is just the attitude. You can find somebody whom you know is willing to pay lets say 1000shs per month but he will not just because of being rude saying I am not paying. About law enforcement they are aware, if you want to test them on

whether they are aware or not is when you catch somebody disposing waste in areas not allowed he/she will apologize immediately, why because she/he is aware that she/he is not doing the right thing. So they have the general awareness of the law that once you produce waste you have to dispose it the right way. What they do is negligence.

In your opinion what is the history and role of the ministry responsible on issues about sanitation and solid waste management? And on what grounds are new policies formulated? Is it when the goal is not reached, or new ideas are invented or pressure from say external actors?

The difficulty is because of lack of funds. We need more trucks for example, also the need of sensitizing with the public but they have left all these for the local government. The relation is there as they work according to the law. They make policies and regulation and the local government have to work on them. But we still need a lot of support, the central government should inject money to the local government but they are not doing it. Our sources of money is through property tax, market dues and funds from the government which again we don't get 100% of what they promise to give per year we could get maybe 55% or 75%.

Is there any type of cooperation that enables for example waste collectors suggest new measures to municipal waste management? If yes, how? If no, why

No, we do it ourselves, suggesting ways of improving the work.

I read that one of the problems in management has been inter institutional cooperation and collaboration. How is the communication strength between you and the various bodies (stakeholders) involved in solid waste management.

The collaboration is there but very little. For example the government institution next to our building here they have transport to transport their refuse to the dumpsite but if we experience problems and could not manage to collect even for a week they will not take the initiatives to do anything instead they will call the municipality. We charge them, we have two ways of charging either you pay and we collect refuse or you send your refuse to the dumpsite and we charge you for using the dumpsite. Collection is done after two days and we manage to do the planned areas daily. Similarly in the unplanned areas we have allocated a collection point where refuse is temporarily stored and we also collect from these areas after every to days. The problem of transportation also comes because we lack standby trucks; once the truck has a mechanical problem then the work is delayed. Meaning we loose revenue too because the more we collect the more the income. The same source is also used to maintain the collection trucks.

I understand there are always problems in acquiring land for public waste disposal, how do you handle this problem? What factors influence or determine its location?

We have one dumpsite in Murieti for the whole municipality and it was allocated in the urban master plan so we don't have a problem with the community around because it was allocated there before they came.

What do you think should be the way forward? If you have the chance what would you say the government and the community should do that will bring better waste management services in the municipalities?

More involvement of the public. We have contractors but people are not paying. There is a need to change their understanding and attitude. Just imagine there are people who do not even want to pay fees for their children to go to school thinking it is a responsibility of the government and not them.

You can easily prove this because you will find that the same person who does not pay for waste collection charges also refuses to pay for school fees for his kids from the same reasonsIt is our culture, people are used to the free public services that we had some years ago if you remember health care, education, water were all free. So people have taken it that everything is for free. It will take for people to understand.

Generally in Tanzania and Africa in my opinion we have to come up with programs which will educate the public fully. Second the governments should be involved fully on helping the local governments to facilitate all the measures. Example one truck costs millions of money, a local government cannot afford to buy this basing on the revenue collection alone. The government has to provide enough resources.

INTERVIEW WITH ILALA MUNICIPAL COUNCIL

Interviewee: Mr. Mussa Iddi Kimaro
Ilala Municipal Solid Waste Manager
Date: 21/04/2008

Can you say a little about your municipality and the procedures you do in reference to waste management and sanitation?
This department was formerly under the ministry of health, because of the workload it was made into an independent department. We deal with collecting solid waste including street sweeping and we have partly privatized the work through tendering process since 1994 when the first phase took place. But the municipal is left with areas that are not yet privatized and also serves as a back up service to help the contractors when they need assistance. Tendering is franchised where we delegate some tasks and we remain with some like law enforcement.
What has been the problem with municipal solid waste management?
Main problem is it used to be a free service and so problems arise in getting payments.
Poverty many people have low income when it comes to households.
Political interference especially when it comes to elections. Politicians can make waste management activities very successful or even accelerate the problem.
Lack of funds, we mainly depend on collection of revenue. We used to get some money from the central government for the health department for health vehicles maintenance before. For example in our expenditures now we pay 74 million to street sweepers alone.
Lack of a sanitary landfill. We have a dump where all the waste is disposed in kigogo. It is located where people live and its accessibility is almost impossible during rainy seasons. There have been several cases of fire incidents happening at the dump.
Lack of general knowledge to the public and to staffs dealing with waste. We lack an institution to educate our staffs because waste management is a profession on its own.
Poor infrastructure. Poor accessibility especially to the un surveyed areas.

Insufficient equipments. In Ilala we require not less than 58 trucks which could be used to collect all 750 tons but now we have only 34 including those of the contractors.

Have you set any standard for waste collection to be achieved in your municipality, if so do you reach this goal? If not why?

Waste generation is 750 tons, collection target is 600tons so far we have managed to collect 540tons last month but it fluctuates depending on season. We also have special collection points for the squatter areas mostly managed by contractors these are in kipawa, kiwalani and gongo la mboto areas.

Do you face the same problems of waste management and operation if you compare to other neighboring municipalities? If yes, how? If no, are you satisfied with the service you provide?

The municipalities are located close to each other so the problems faced are mostly similar. The difference might be on the amount of revenue collected at the end of the day. Though we are trying to reach the target for waste collection but we still have a long way to go because of all the other problems like inefficient financial support, political problems etc.

Do you think the culture of the people has an impact on their attitude towards waste management and sanitation in general? If yes, how?

We normally in our houses have budgets for water, electricity and its now that people are trying to accept that they have to pay for health care, we also have a budget for food but we do not have a budget for waste collection charges. Before we did not even pay for education, now culture is comes with how we are used to doing things and to change it requires some time and education. If we had that education from before we would have avoided some re-occurring diseases. But we are also not keen on the whole issue people think it is a responsibility of a waste manager or a municipality. We have laws and regulations to use when things are not done properly but that is not our intention because it is has negative implication. We are not here to punish the community we want them to know the proper ways of handling waste. We would rather educate than give them fines. But Laws and regulations are very important without them nothing will get done.

What would you say about public awareness on the issue of waste management do you think there is enough general knowledge about waste handling or even the need to pay for solid waste services for example? Do they get this knowledge on regular basis?

Awareness is still a problem but I can say that more than 40% of the inhabitants are aware of issues concerning waste management activities. Mostly the problems come in connection with the previous free service systems. But comparatively in Ilala people are aware of privatization and the need for them to pay charges for refuse collection. The awareness is done through various environmental and health committees using key/famous people with good convincing power.

However there is still low support in terms of household waste sorting.

What can you say about the issue of law enforcement and environmental policies and regulation? Do you think they have any effect on people's attitude and behavior on waste?

We have an environmental act from 2004, the municipal bylaws are from 2001, and council regulations are from 1982. We implement/use all these. People are aware of the bylaws but not of the environmental act because it is new. They all have an effect because once we give fine to an individual others want to know why and so they learn from it. With out laws and regulations it becomes difficult to work.

In your opinion what is the history and role of the ministry responsible on issues about sanitation and solid waste management? And on what grounds are new policies formulated? Is it when the goal is not reached, or new ideas are invented or pressure from say external actors?
We are under the prime ministers office. But we soon expect to have our own ministry of local governments. The role of the ministry is to give training opportunities and to make new policies.
The relation between us and the central government is mainly in terms of giving monthly or quarterly reports for updates from the council. The feedback and recommendations come through the same chain.
Is there any type of cooperation that enables for example waste collectors suggest new measures to municipal waste management? If yes, how? If no, why
We have meetings with the contractors very often, it is important that we keep contact every time because as we take rounds we see areas which require immediate attention therefore we call them and ask them to repair them. The goal is to keep the municipality clean. We also receive ideas from contractors and work on them.
Following the privatization of waste collection in Dar es Salaam, what role does the DCC play in waste management?
We call the council a floating city it deals with cross cutting issues like road construction lets say from Ilala through kinondoni to Temeke. It is the council which is responsible of signing agreements here. When it comes to waste management the council is left with the landfill issue. We as a municipality we are allowed to have our own landfill which will serve for Ilala municipality but when we raise this we raise conflicts with the council saying that is their responsibility. Therefore their role is dumpsite and court issues.
How are the activities of waste collection financed? Is it enough? If not how do you manage?
Through street sweeping, financed by Ilala municipal council, garbage collection financed by the community and Ilala municipal council. Therefore contractors are paid by the community and we incur costs for what we collect like fuel, truck drivers and loaders. Street sweeping include grass cutting sand removal, waste collection and drainage cleaning. We don't get anything from the government.
I understand there are always problems in acquiring land for public waste disposal, how do you handle this problem? What factors influence or determine its location?
Dar es Salaam municipal council manages this issue. IMF once financed for a good sanitary disposal landfill in Arusha but if you go to the site and see the landfill and compare with the money spent on that project you will be left with many questions. To construct a good landfill you use a lot of money, so when you compare with the expected effects resulting from not having it and that people are aware of them, then it becomes justified. For a municipality like this to use billions of money for a sanitary landfill while hospitals do not have enough malaria tablets is not an easy decision. So priority here is collection of waste first and not its disposal. What people need to see is proper waste collection system working and not good quality disposal site.
What do you think should be the way forward? If you have the chance what would you say the government and the community should do that will bring better waste management services in the municipalities?
Contractors have two obligations; to collect waste and to collect charges. They should be involved with only one task and somebody else does eg the municipal collects and pays the contractors. Or

there should be a 2% on property tax. The municipality now does not know how much is collected by contractors. By doing this the amount collected will also help to cover for some expenses for the wards with low income inhabitants. The waste policies and municipal bylaws should be strengthened. Terms for contractors should be increased from the current 3years to 5 or at least 10years.

INTERVIEW WITH TEMEKE MUNICIPAL COUNCIL

Interviewee: Mr. Ally Hatibu
Temeke Municipal Solid Waste Manager
Date: 23/04/2008

Introduction, your profession and what you do?
Environmental Health officer in Temeke municipality. We deal with management of solid waste. Waste generation rate is between 500-600tons from the population of more than 500,000 according to the 2002 national census . We had more than 11 contractors in 11 wards of Temeke municipality. Among the problems we are facing is lack of awareness and creation from the community. In 1999 we had 4 contractors and in 2002 we had 6-7 contractors and in 2005 we had 11 of them. But because of the low response from the community in paying for waste collection, many contractors left and we are now left with 2 who are responsible for 2 wards. After the contractors left a group of boys came out with pushcarts and started collecting waste from house to house as a result of this we chose two collection points in mwembe yanga and Temeke mwisho areas. So we are now transporting waste from these collection points to the dumpsite.
Do you think the culture of the people has an impact on their attitude towards waste management and sanitation in general? If yes, how?
Culture is one problem but another ne I think is capital. Many people in Temeke municipality have low income if you compare it to the other two. When the pushcarts boys come around for collection most people pay but of cause the amount they pay to these boys is much less as compared to paying the contractors due to their advanced equipments and machineries. There for this shows willingness to pay, but how much that is a question. But on the other hand they are forced to pay because they have no other alternative to do with their waste. The community brought it to the municipality that the problem is the charges are expensive. We explained why the charges are like that and we had a committee going round to educate them in meeting and we also used loud speakers. But still the response was low. Another issue that was observed is when it comes to payments. Every household is supposed to give 1000tsh every month to the contractor. For example in a house lives more than 5-6 families in rooms rent out while in another room lives a single person. For this house to pay a thousand each it becomes a problem. That means the contractor could be able to collect six to seven thousands per house but because of the problem of not paying they had to pull out one after another. It is a serious problem to the municipality because before when the contractors were doing the work, they would take all the waste to the dumpsite themselves but now it is the work of the municipality to transfer it from the collection sites to the dumpsite. The municipality is now advertising tenders for new contractors. And to avoid the previous situation from occurring the

municipal is planning to collect refuse charges through other means such as property tax and then pay the contractors by looking at the waste tons generated in wards.
We are now working closely with the two contractors left so they don't leave as well, one of the reasons keeping them still is because of the areas they are involved. They both are within industrial and business areas, when they collect charges from 30-40 industries per day they don't complain.
Have you set any standard for waste collection to be achieved in your municipality, if so do you reach this goal? If not why?
We generate 500-600tons of waste per day and we collect about 45-46% target is 300tons per day.
Do you face the same problems of waste management and operation if you compare to other neighboring municipalities? If yes, how? If no, are you satisfied with the service you provide?
Many of the problems are the similar maybe except for the issue of resources, the others are in a better position if you look at Ilala which is at the center they collect more revenue so financially they are far better than us here in temeke. In general waste departments are not very much considered even at the municipal level because we are seen as "spenders", we don't generate any income so sometimes they tend to ignore us. You can see it yourself even the offices do not look to be at the same level.
What would you say about public awareness on the issue of waste management do you think there is enough general knowledge about waste handling or even the need to pay for solid waste services for example? Do they get this knowledge on regular basis?
We use laws and regulations when the work is being done. For example now we can not use these laws by 100 % when we are trying to get people to do the work. But when a pushcart boy decides to throw waste in a place different from the two collection points we will punish him because he knows how to do it the right way. Another example is when somebody else brings a lorry full of waste to the collection point while we know he/she is capable of taking it direct to the dumpsite. We will give him/her a fine.
In your opinion what is the history and role of the ministry responsible on issues about sanitation and solid waste management? And on what grounds are new policies formulated? Is it when the goal is not reached, or new ideas are invented or pressure from say external actors?
The ministry is mainly a policy maker, we report to the ministry of local government and to the ministry of health.
Is there any type of cooperation that enables for example waste collectors suggest new measures to municipal waste management? If yes, how? If no, why
We have a good relationship with them and we are happy for what they do, collecting from house to house is not easy. The charges base on negotiations between them and households normally it ranges between 500-1000tsh depending on the amount of waste.
I read that one of the problems in management has been inter institutional cooperation and collaboration. How is the communication strength between you and the various bodies (stakeholders) involved in solid waste management
We face problems example with political leaders when they decide to stand on the community side advocating that the amount to pay for refuse collection is high and not possible. Everyone knows that is said mostly for popularity reasons and not reality. But as a result it damages our efforts because the community insists on not paying claiming that it is an order from the local leader.

Another problem is from the Army compounds and households. They refuse to pay saying it should come from the president that they have to pay for refuse collection. This paints a bad picture to the civilians as they feel no justice.
How are the activities of waste collection financed? Is it enough? If not how do you manage?
Through municipal tax collection.
I understand there are always problems in acquiring land for public waste disposal, how do you handle this problem? What factors influence or determine its location?
The city council is in charge of the dumpsite. There was a request from people living in kigogo to the council because their land was slowly being eroded by a river so they asked for help through landfilling. But the place is now full by the end of this year we have to stop using it. There is a contractor maintaining it and the municipalities pay for using it.
What do you think should be the way forward? If you have the chance what would you say the government and the community should do that will bring better waste management services in the municipalities?
Central government should at least support by providing waste transport vehicles. The problem is also escalated by the tendency of ignoring some issues for example if you look at the car the district mayor is using it roughly costs more than 120million tsh, but we fail to get a truck costing 30-40million tsh. Therefore to me I would say it is ignoring and not being a priority. Also it has no public outcry, if you take for example that a hospital runs out of malaria tablets there will be a huge outcry and it will be responded immediately. Maybe also the awareness is low. In the parliament they talk of schools, hospitals but no body talks of waste management problems. There are several government and non government environmental organizations which have a lot of money but their impact on sanitation issues is very small still. For example NEMC (National Environmental Management Council) for five years lasting this year, I remember they had 400billion tshs and the major donors is where you are, the Scandinavian countries. That is a lot of money it should have been able to do something else apart from planting trees.

INTERVIEW WITH KINONDONI MUNICIPAL COUNCIL

Interviewee: Mr.Kizito Nkwabi
Kinondoni Municipal Solid Waste Manager
Date: 23/04/2008

Introduction, your profession and what you do?
What has been the problem with municipal solid waste management?
There is no major recognition to policy makers, there is no national policy. Waste management has not been given the same level of recognition like other issues example water or malaria. How can you talk of recycling while you still have major problem with collection? Waste management is not under a specific ministry. It is under ministry of health and ministry of local governments. There are political complexities. We have low exposure and no innovations. It's a challenge to my country.
Have you set any standard for waste collection to be achieved in your municipality, if so do you reach this goal? If not why?

We generate about 2026 per day the population is over 1 million. We have about 4 wards in the rural areas where collection is not well done. We are now slowly picking up into the issue of recycling and recovering where some people have employed themselves on this. Though we have not set and proper systems for this to know the exact amount but according to previous studies the approximation is about 25% recovery. For example metal is now recovered by 90%, plastic has also a high recovery rate. The process begins at home during collection then at collection points and finally at the dump site.

Have you set any standard for waste collection to be achieved in your municipality, if so do you reach this goal? If not why?

Target is 75% because but about 25% is recovered, also there is a fraction which is in the rural areas therefore reaching75% is a bit difficult bearing in mind that also our facilities are not very good. That target has been a ten years plan ending in 2010.

Do you face the same problems of waste management and operation if you compare to other neighboring municipalities? If yes, how? If no, are you satisfied with the service you provide?

Some of them yes, the problem is also caused by peoples migration due to daily activities if I compare it to other regions some of them generate hardly 100tons but they have problems still. So I think it should be about planning. And low priorities in budgeting but also low revenue collection. We have faced a problem with the contractors leaving because of low collection charges which they get in return. In December 2007 four of them left. We have a total of 22 contractors now.

What would you say about public awareness on the issue of waste management do you think there is enough general knowledge about waste handling or even the need to pay for solid waste services for example? Do they get this knowledge on regular basis?

Waste management awareness is a continuous process and not something to do once in the media, meetings or only when we have visitors in the country or maybe during elections it will not help if the knowledge is seasonal. Also motivation should be to both ways the service provider and the receiver. We now have low support from the central government and the politicians which is not motivating us. We lack a proper plan for waste management. If the community does not have a plan for waste collection for contractors their cooperation is low and therefore no motivation. On the other hand if the contractors are not doing his work well by satisfying the inhabitants and then insists to be paid for collection, it discourages people as it appears they are only after money. This lowers motivation and so cooperation.

What can you say about the issue of law enforcement and environmental policies and regulation? Do you think they have any effect on people's attitude and behavior on waste?

I don't favor very much the use of law enforcement because it may discourage if not well used. I think what is required here is more of a consultation work, making the community understand what should be done and why. Because if you happen to have about 100 defaulters in two days for example, then those are not defaulters. They are people who did not understand. Legal measures can be taken to 2 or 3 people but not 100. In this case it is you (the municipality) who has not done your work right not them. So the use of law enforcement depends on the situation and it should not be used as a weapon but it should be used in a harmonized environment and themselves should be good teachers of the others. That is what we want to see.

In your opinion what is the history and role of the ministry responsible on issues about sanitation and solid waste management? And on what grounds are new policies formulated? Is it when the goal is not reached, or new ideas are invented or pressure from say external actors?

What I know is those policies do not touch exactly on what is required to be mentioned, they copy mostly from developed countries. Most of the policies and legislations hardly mention about the situation especially on the waste management issues. Some of these people have gone for studies abroad and when they return home they want us to do exactly what they have seen there forgetting that we are not at the same pace. They might be giving us instructions for separation and recycling but in my opinion we need to do better and proper collection first then we can talk better about recycling. The by laws require every household to have a storage bin but most do not have them, so we still have problems with collection but yet this person from abroad (an expert) with an education in waste management insists on separate systems and recycling. We need to think about other things and we need a different approach than copying the approach used by developed countries.

Is there any type of cooperation that enables for example waste collectors suggest new measures to municipal waste management? If yes, how? If no, why

Yes, the municipality has official meetings with them regularly once per month. We remind them of the proper ways to do their work example they have to have safety gears like boots, masks, and gloves, the by laws state this. The contractors are supposed to buy these and give them to their workers. But once they don't abide to the regulation we can not really chase them out because we need them so here is where harmonization is important. There are times when the municipal has enough fund for this and so we buy and give them. But it depends on the budget. But they also bring their ideas and we discuss with them example when they require some amendments in the by laws.

I read that one of the problems in management has been inter institutional cooperation and collaboration. How is the communication strength between you and the various bodies (stakeholders) involved in solid waste management?

The problem we experience sometime is when example government's institutions in some areas have their own preference of a contractor not the one we allocate due to their own interests. This means we have to make new administrative boundaries so that we can monitor. It sometimes create some clashes. Sometime we let them do according to their wishes and sometimes not because not all of them will dispose waste where we require them to this gives us some extra work.

Following the privatization of waste collection in Dar es Salaam, what role does the DCC play in waste management?

Dar s salaam city council coordinates cross cutting issues. They manage the dumpsite. They are preparing another dumpsite which is more than 40kms from here and they have directed us to use that once this is closed. But the problem is that we are not ready in terms of our working equipments. The Lorries we use are not that sustainable and it will cost us more that twice because of the distance. If we had a truck carrying about 40tons per trip then it would have been feasible but not with 4 or 7 tons trucks. Otherwise we need to think of transfer stations. It is however the DCC which is supposed to coordinate these sanitary landfill, transportation and/or transfer stations and trucks. Before instructing us to use the landfill. The other task is to prepare strategies for example for recycling and also for treatment of the hazardous waste because it is not proper as it is now every hospital deals with it individually. Some of them end up in the dumpsite.

What would you say is the state of waste management in Dar es Salaam today? What percentage of the waste generated is collected and disposed?
Generally I would say we are above 40% for the whole city.
How are the activities of waste collection financed? Is it enough? If not how do you manage?
The system of finance need to be changed because we don't know for example how much the contractors collect but they come to us saying they are not getting anything. We cannot deny or accept this because we cannot justify it. We need to have a mechanism of monitoring this. According to regulations the government is in charge of collecting waste charges but the by law states that the tender can be given to an agent for collection. But if well planned and there is commitment, transparency and accountability the contractors can still do it both. We could collect it from property tax but what percentage should be included? We tried incorporating it with water and electricity bills but it did not work out. But something should be done here.
What do you think should be the way forward? If you have the chance what would you say the government and the community should do that will bring better waste management services in the municipalities?
The central government should look at waste management as a priority in terms of growth of cities and public health in general. And standardize the service. We need transport for waste. We got 2 new trucks on donation from Japan but they stayed at the port for 6months because we could not pay tax. We could have gotten them upon their arrival if the government considered it as a priority.

INTERVIEW WITH A WASTE CONTRACTOR ARUSHA MUNICIPALITY
Interviewee: Mwajuma R Mwenda, Nembris Julius and Yunis Salema.
Faraja Women Group.
Date: 16/04/2008

Introduction, your profession and what you do?
It's a voluntary group of 13 women who are involved in cleaning the environment. We started working with environmental issues after the privatization of waste management activities at the municipality. The group has a procedure of meeting after every 3 months. We plan for daily activities for the ward which is divided into portions. We use pushcarts to collect waste and transfer it to a selected waste collection point. After two days we hire a lorry which takes it to the main dump. We face a problem at collection points because no body wants garbage in their areas. We also sweep along the roadsides but on that we have employed some people to do the work.
How is your group financed?
Through refuse collection charges we get 500tsh per month from households and between 2500-5000 tshs according to the scale of business.
Are you satisfied with the response of payment?
No, we are not satisfied because most of them don't pay it accordingly. They are not used to the system of paying for waste collection and there is low awareness about this. Also political reasons count because the politicians are afraid of insisting for payments in fear of not being elected next time.
How is the collaboration between you and the municipality?

We have good communication because we have several meetings with them and they help us incase we fail to hire a lorry. The lorry from the municipal will transport the waste we collect for that day. But the problems are there too. For example the policies are not reinforced, they cannot charge any person for not keeping his/her environment clean. Also the municipalities do not go into households, they pick waste from the small dumps that is why some wards are still dirty as compared to others.

How much do you collect per day in your ward?

We can collect up to 12tons, many inhabitants are of low income and mostly depend on their livestock.

How is the relation between you, the local and the central government?

At the local level it has been very well because our group chairperson is also a local leader of the area so she insists about waste management in all her meetings with the community this gives a good example for the ward because the area is always clean. Therefore there is a good cooperation with the management at the local level. But the central government has not been helpful apart from setting the privatization framework.

What can you say about the issue of law enforcement and environmental policies and regulation?

In our opinion the law helps very much because the defaulters have been sent court and as a result of that they paid us the money we required.

Which problems do you face in your daily work?

In unplanned areas it is very difficult to reach especially during rainy season. We have a problem of transportation, we don't have a truck for collecting waste. Sometimes our suggestions to the higher levels are not well taken and acted upon. For example the local government will mostly respond there is no funds.

What are your achievements?

We have managed to eradicate cholera since 2004, we have a cleaner area today than before and also we have gained popularity the group is well known and this makes it easy for us when we go to some organizations.

What do you think should be the way forward?

Our suggestions to the public, more education should be given in terms of seminars on health and environment. Policies should be enforced so that people become aware of them.

INTERVIEW WITH A WASTE CONTRACTOR ARUSHA MUNICIPALITY
Interviewee: Steven Sademaki (Management Assistant)
Joachim Savati (Revenue collector)
Kivesi Investment Tanzania Limited
Date 16/04/08

Introduction, your profession and what you do?
We started this work in 2004 when the arusha municipality advertised a tender for municipal waste contractor. We are responsible for 2 wards central ward and levolosi ward. We have two Lorries of 7 tons and we have employed 20 people who work for us. We have a collection plan for daily routines.

How is your investment financed?
We depend totally from the waste collection charges. We also have to pay to the municipality for using the street buckets and the disposal site at Murieti.

How much do you collect in the wards per day?
Average waste collection is 21 tons per day in the central ward and 20 tons in levolosi ward hence about 41tons per day in total.

How would you describe people's attitude towards waste management?
Low, every household is supposed to have a container for waste collection but majority of them use plastic bags and it gives us problems in handling because the bags are very soft. Also many don't pay as required; some of them do after they have been reported in court. To avoid this situation would be better if the municipality includes waste charges when they give out licenses to conduct businesses for those who are supposed to pay 65-70% waste charges according to by-laws. But also a general awareness about waste management and handling is required maybe through regular meetings.

Are you also involved in doing waste recycling?
No, there has been no plan for emphasizing that generally but we have attended a one week seminar about that.

Which problems do you face in your daily work?
Our trucks are not in very good conditions so we face a lot of breakdown and repairs which take a lot of time and the work is delayed. People do not pay for waste collection; it's a lot of work to get the money. The policies are there but many of them are not known and they are ineffective. Also during rainy season like now the work becomes very difficult.

What are you achievements?

We have managed to make a cleaner environment and we are very happy to see we are making a change, also the rate of diseases such as cholera and malaria has gone down.

What do you think should be a way forward?
Enforcement of the present laws and policies will help improve the situation of the present waste management because the contractors themselves can not do all the work. Also there should be a municipal court dealing with municipal issues only such as those of refusing to pay for waste. The present one at local level takes a long time and there is little help.

Appendix III

calculations

Calculations for:

Facilities carrying capacityfor municipalities
Arusha: (5x7tons) + (4x7.5tons) + (2x4tons) = 73 tons
Ilala: (13x7tons) + (21x5tons) + (16x4) = 260tons
Kinondoni: (9x5) + (18x5) + (27x8) + (7x6) = 393tons
Temeke: (11x7ton) + (2x7) + (1x4) = 95 tons

Required trips /day to accomplish Waste generation
Arusha: 375/73 = 5 trips/day
Ilala: 1400/127 = 5 trips/day
Kinondoni: 2026/133 = 5.2 trips/day
Temeke: 550/77 = 5.3 trips/day

Required trips/day to finish waste collection
Arusha: 148/73 = 2.0 trips/day
Ilala: 360/260 = 1.4 trips/day
Kinondoni: 810/393 = 2.1 trips/day
Temeke: 270/77 = 2.8 trips/day