ANALYSIS OF THE DETERMINANTS OF PARTICIPATION OF STAKEHOLDERS IN SOLID WASTE MANAGEMENT IN ZARIA, NIGERIA

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DECLARATION

I hereby declare that the work in this Doctoral dissertation titled, ANALYSIS OF THE DETERMINANTS OF PARTICIPATION OF STAKEHOLDERS IN SOLID WASTE MANAGEMENT IN ZARIA, NIGERIA was performed by me in the Department of Urban and Regional Planning under the supervision of Professors J.B. Kaltho, M.B. Yunusa and Dr. A. Ahmed. The information derived from the literature has been duly acknowledged in the text and a list of references provided. No part of this dissertation has been presented for another degree at any institution.

CERTIFICATION

This dissertation titled ANALYSIS OF THE DETERMINANTS OF PARTICIPATION OF STAKEHOLDERS IN SOLID WASTE MANAGEMENT IN ZARIA, NIGERIA by UKOJE, JOY EDE meets the regulations governing the award of the degree of Doctor of Philosophy of Urban and Regional Planning of Ahmadu Bello University, and is approved for its contribution to knowledge and literary presentation.

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DEDICATION

This dissertation is dedicated to my children, Ojone, Ojochogwu, Ojodale and Ojogbe

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I would like to thank all those who have, in one way or the other made the task of conducting this research memorable for me. I wish to express my sincere appreciation to my supervisors, Professors J.B. Kaltho, M.B. Yunusa and Dr. A. Ahmed, who selflessly offered their precious time and energy to make sure this work was completed. My special thanks go to the Head of Department, Dr. Ahmed who helped speed up the process for the completion of this work.

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ABSTRACT

This study analyses the participation of stakeholders in solid waste management in Zaria. It considers the framework for participation and character of relationships between stakeholders. It assesses the outcome of solid waste management by stakeholders through the basic concept of effectiveness to target user needs. The study utilises the cluster and random methods of sampling to select the neighbourhoods, households and stakeholder groups for data collection. The data collected was subjected to descriptive and inferential statistical analysis. The result reveals a lack of recognition and cooperation with non-public institution stakeholders in the solid waste management framework in Zaria. There are inadequate collection and disposal of solid waste by the stakeholders. At the household level, solid waste management is haphazardly undertaken as waste storage and disposal do not conform to the requirement for effectiveness. Significant differences were found in accessibility, rate of collection, frequency of solid waste collection and level of safe disposal while secondary waste collection coverage by stakeholders does not show a significant difference. The stakeholders' secondary collection coverage was effective as 87 percent of stakeholders have an extensive coverage of the households. Most of the variables of the performance are dependent on technical, user and management characteristics. The key explanations for the performance of stakeholders are linked to the institutional framework, legal, technical and socio-cultural factors. The factors range from non recognition of the roles of other stakeholders, a limited legal framework that emphasises environmental sanitation rather than a sustainable solid waste management, grossly inadequate infrastructure, a rather limited scope for cooperation among the stakeholders. The study recommends that all the stakeholders should be recognized as important components of solid waste management and so are included in the institutional framework. Also, for increased participation from the public and communities policy recommendations were made to focus on the determinants with strong impacts on performance.

Key Words:

Stakeholders Participation, Performance, Framework, Solid Waste Management, Practices, Institutional set-up, Determinants, Local government council, Zaria Urban Area.

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CHAPTER ONE

INTRODUCTION AND DESIGN OF THE STUDY

1.1 INTRODUCTION

Prior to the 1990s, solid waste management in Nigeria and other developing countries was generally dominated by the public sector using supply side objectives and principles. This encompasses all the functions undertaken from waste collection, transfer, treatment recycling resource recovery the final disposal. The placement of solid waste management under the public sector agency was because waste management was seen as a public good. In recent times, however, circumstances have created a need for change in solid waste management strategy and responsibilities. Changing economic situations and rapid urbanization have not only increased the quantity of solid waste generation but altered its composition (Bartone and Bernstein, 1993). The magnitude of need for solid waste services has also far exceeded the capacity of the public sector, thus leading to low collection rates across the country.

In Nigeria, the solid waste management situation is so deplorable that urban areas are dotted with heaps of refuse. Often times, these block roads and drainages and have become sources of pollution to both surface and underground water resources. Poorly managed refuse dumps are breeding grounds for disease pets and vectors and the conditions generally are responsible for poor environmental sanitation.

Globally, the realization of the shortcomings of the public sector in the provision of urban services has called for a paradigm shift in solid waste management services delivery. In a prescriptive advocacy, Ostrom, Schoeder and Wynne, (1993) suggest that

multiple nested institutions are necessary in urban environmental contexts. This canvasses for the participation of the stakeholders: State, Private sector, community and households in solid waste management under a single management. Participation of stakeholders is seen by Mitlin (2001), Beall (1997), and Chambers (1994) to be necessary for sustainable development and good governance. In response, participatory solid waste management strategies and programmes, involving Non Governmental Organizations (NGOs), Community-Based Organizations (CBOs), and formal private sectors have been implemented in many parts of the world. Examples have been given of the utilization of these strategies in Hanoi, Vietnam (Richardson, 2003), Cairo, Egypt (Myllyla, 2001), Lagos, Nigeria (Olanrewaju, 2000) and Benin, Nigeria (Ogu, 2000).

Partnership of the public sector with other stakeholders for solid waste management is a growing global agenda based on its merits. But many authors have reported private sector and community participation as generally minimal, with little cooperation from households (Ogu, 2000; Ali and Snel, 1999; Onibokun and Kumuyi, 1999; Thuy, 1998 and Cointreau-Levine, 1994). In particular, participation of these stakeholders faces many challenges in African cities. The consensus from these and similar studies is that stakeholder participation needs to be strengthened for effective urban solid waste management. However, how this can be achieved is rarely explored, but is necessary for progress to be made. It requires understanding of the practices, frameworks and constraints of existing solid waste management. Insights obtained from study of the determinants of stakeholders' solid waste management in specific city situations therefore shall help in isolating elements of strength and weaknesses of the practices towards corrective action. This constitutes the issues for this study in Zaria, Nigeria.

1.2 STATEMENT OF RESEARCH PROBLEM.

Solid waste management is one of the constitutional functions of the Local Government in Zaria and other towns in Nigeria. Although this service is essential to Public Health and environmental protections, solid waste management in Zaria, like most cities of developing countries is highly unsatisfactory. There is presence of mounting heaps of waste on major roads and highways, open spaces and drainage channels resulting in general environmental pollution. This has led many to question the capacity of the local government to perform this very important function.

The poor public sector performance has led many authors to conclude that the local governments are not adequately equipped technically and financially to manage solid waste. In response, there is a widespread search for institutional alternatives and means to increase solid waste service provision. In the past, addressing the problem focused on the technical aspect of different means of collection and disposal (World Bank, 1992). Currently, researchers have suggested for adoption of participatory approach in order to take advantage of comparative advantages of stakeholder (Okoye and Okoye, 2008; Egwuleka, 2009; Thuy, 1998).

However, studies on participatory solid waste management by Okoye and Okoye, (2008), Richardson, (2003), Ogu, (2000), Klundert and Lardinios, (1995) have focused on filling the gap created by an inefficient public sector. In addition, Thuy (1998), Pacheco (1993), and Furedy (1992), investigated the social and economic benefits of stakeholder actions in solid waste management; and Furedy (1992 and 1990) studied the prospects for changing the behaviour of citizens toward waste reduction and recovery.

The study had focused on the economic activities of waste pickers and recyclers, the potentials for employment generation and therefore the prospects and benefits of solid waste management for poverty alleviation and resource use in the urban areas.

The focus of studies on social and economic contribution of stakeholders is a major addition to the literature on solid waste management. However, they have shortcomings from the perspective that participatory limitations for effective solid waste management are not adequately explained. It is therefore important to analyse the participation of stakeholders and the factors responsible for the status of the solid waste management in Zaria. The study therefore analyses the factors responsible for the performance of stakeholders in solid waste management in Zaria to show the current status of the solid waste management in the town.

In this context, the argument is that the analysis of the processes and administrative framework for stakeholder participation in solid waste management is essential for a better understanding of the performance in urban areas, in this case Zaria. The demand for participatory development has led to a search for strategies to increase the benefits of participation and to restructure the public sector so that stakeholders have incentives to match the demand of users with effective services. The issue therefore is about rules and regulations, regulatory institutions and the organization for participation. How valid is this situation, and how can this be explained? This study attempts to clarify these questions. Insights provided by answers to these questions are used to provide an understanding of the shortcoming of existing practices and opportunities for strengthening stakeholder participation in solid waste management. Hence, the

stakeholders and their competency, organization, structure and management style may be responsible for the performance in solid waste management in Zaria.

The study therefore, sets out to answer the following specific questions:

i. What is the structure and level of the participation of stakeholders in solid waste management in Zaria?

ii. How effective is the performance of stakeholders' solid waste management in Zaria?

iii. What factors determine the participation of stakeholders in solid waste management in Zaria?

1.3 AIM AND OBJECTIVES

1.3.1 Aim

The aim of the study is to analyse the participation of stakeholders in solid waste management in Zaria and make appropriate recommendations for improvement.

1.3.2 Objectives

The operational objectives to realise the aim are:

i. To describe the existing solid waste management framework in Zaria.

ii. To examine the solid waste management practices of stakeholders in Zaria.

iii. To assess the performance of stakeholders' solid waste management in Zaria.

iv. To analyse the factors underlying the participation of stakeholders' solid waste management in Zaria.

v. To make recommendations for improvement of the participation of stakeholders in solid waste management in Zaria.

1.4 WHO ARE THE STAKEHOLDERS IN SOLID WASTE MANAGEMENT?

A wide range of individuals, groups and organisations are concerned with solid waste management as service users, service providers, intermediaries and regulators. According to Bernstein (2004), a stakeholder in solid waste management is a person or an organisation that have an interest or a stake (Bernstein, 2004; Klundert and Anschutz, 2001). Stakeholders in solid waste management differ for every city. However, Klundert and Lardinios (1995) identified main stakeholders in solid waste management in developing countries to include: National Government, Municipal Governments, the formal private sector, informal private sector, CBOs, NGOs, individuals and households.

1.5 SIGNIFICANCE OF THE STUDY

In recent times, outcome of various research works have led to a number of changes in the approach to solid waste management globally. In Nigeria for example, partnerships between the public and private sectors, as well as collaboration with communities, have been implemented and promoted in solid waste management. In the light of the above, the Federal Ministry of Environment (FMOE 2005) has produced a number of guidelines for solid waste management in Nigeria and proposals for the involvement of stakeholders. While there are some studies by Onibokun and Kumuyi (1999), Kironde (1999), and Attahi (1999) documenting actors in the governance of solid waste management systems in Africa, there is inadequate information about the performance

and dynamics of relationships between stakeholders. A clear knowledge of the process and the framework for the participation of stakeholders in solid waste management will aid the formulation of more functional solid waste management strategies. Thus, the study fits well within the debate for adopting the participatory approach for resolving environmental problems. This posture has been widespread since the 1990s based on the consensus that development needs to be anchored on local solutions and community participation (Mwangi, 2000).

1.6 SCOPE AND DELIMITATION

The scope of stakeholders' participation in solid waste management is wide ranging and covers the organisation of human and material resources for collection, transportation, treatment and processing, recovery and disposal. Several studies have documented the contribution of stakeholders to solid waste treatment and recovery (Egwueleka. 2008; Furedy, 1992). The very problematic areas of stakeholder participation as noted by Amokaye (2006) and Aina (1994) are collection and disposal. But the determinants of performance of participants in collection and disposal in specific cities are poorly understood to facilitate viable policy adjustments. In the context of this study, the scope is limited to unveiling the dynamics of complex relationships and participation of stakeholders in solid waste collection and disposal processes from the perspective of users.

The focus of this study is the stakeholders' participation in the management of municipal solid waste. Solid waste management includes the collection, treatment and disposal of municipal, industrial and special wastes. This study is limited to analyzing

domestic solid waste management. As such, other categories of waste are not discussed. This is because much of the policies and attention in Nigeria are focused on industrial and special types of waste. Spatially, the study area is limited to the urbanised section of Zaria, and therefore, does not include areas like Bassawa, Bomo, Dakace, Dembo that are rural settlements at the fringes of urban Zaria. The analysis of participation and determinants is done at the city level and not for individual stakeholder.

1.7 THEORETICAL FRAMEWORK

Attempts at explaining the decision, actions and relationships between various actors and interests in development cut across many fields of study, particularly political science, economics and public administration. A variety of approaches have been developed and applied in development studies. Some are state centered; analysing the actions of those within the state system, while others are society centered, in that the regard market or power relationships within society as determining what happens.

In public administration, state centered approaches tend to analyse the actions of those within the state system as determining decision-making, actions and relationships in development. The dominant approach-policy analysis, from which much of the urban management literature derives, tend to focus on the decision-making process. In the idealized model, decision-makers and bureaucrats are assumed to be neutral in assembling the necessary information and assessing alternative compressively without bias. Such rational models assume an absence of self-interest on the part of decision-makers, or at least assume the existence of rules of the game which effectively prevents the pursuit of self-interest.

However, due to the failures of the state in Africa, much attention is now paid by administration theorist for bureaucratic reform. The failure of the state theory seeks to explain why those in charge of the state do not have effective control over other group or classes in society (Hyden, 1999). This approach has relevance in the analysis of the stakeholders in development. The state is not able to act independently of the communities they represent and in this sense warrant the need for the development of alternative structures of administration particularly, at the local level to ensure development.

Two historically dominant economic models- the Marxist and Neo-classical economics are used to analyse decisions, actions and relationships. Marxist theory and its derivatives such as dependency theory and structuralism, regard what happens within the state as a consequence of class conflicts within the society (Devas, 1999). Currently, a more orthodox notion of the state is as an instrument of domination. The state is neither an arena nor an impartial moderator of conflicting interest. Critical to understanding the state, is the question of who controls it (Hyden, 1999). For instance, Leys in Hyden(1999), placed much emphases on the fact that the state in Africa is exercised not by an independent and assertive domestic class of capitalist, but by a 'comprador' or 'bureaucratic' bourgeoisie, which uses its control of the state to feather its own nest with the help of access to public funds. Thus, the approach has weaknesses in practical application to analysis of stakeholders in development as decision-making within the state is restricted to the bureaucrats. Thus Marxism and Neo-Marxism only provide explanation of the broad socio-economic system, and so are not helpful in

analysis of the complex inter-relationships between numerous actors and groups in urban development (Pickvance, 1995).

Neo-classical economics is only strong in explaining individual behavior in market-based decisions rather than non-economic behavior such as an intra-household and intra-community sharing and kingship allegiances associated to participation by the civil society (Devas, 1999). It does not provide for an analysis of decision-making in the public realm. To address this deficiency, economists attempt to explain behavior in the public realm through the rational choice theory. Rational choice theory and its derivatives- public choice theory, analyses how individuals and groups seek to gain access to and control over public resources in the 'political market place' (Devas, 1999). These approaches have gained importance in development theory and policy, but have relatively few empirical applications. It became increasingly clear that the crude utilitarianism of rational choice theory is so overly simplistic that it quickly lost credibility as an explanatory tool. Scholars have tempered its original assumption about human-interest by incorporating into their analysis the role of institutions in shaping public or collective actions. This limits its usefulness in explaining the complex pattern of interaction among stakeholders in urban areas.

In the political science literature, most of the researches on urban politics have been based on the North, notably USA (Devas, 1999). The dominant model of urban politics has been pluralism. The theory was developed originally in relation to the USA (Polsby, 1980). Pluralism is based on the premise that political power is fragmented and dispersed, and that there are many actors and interests. The theory seeks to explain how

the differences in decision-making and power relationships among different actors and interest influence outcome.

Even though the Pluralist theory assumes that all actors can command at least some resources, it recognises that actors have access to very different level of resources and relative bargaining strengths. Thus, the concept of stratified pluralism introduced by Judge (1995) explains how the outcomes are likely to be very unequal. To explain the inequality elite theory assumes that all decisions are effectively controlled by a few with little or no opportunity for others to exert influence or change the situation (Evans, 1995). However, history abound with examples of where the elite groups have managed to dominate, whether through authoritarian regimes or through control over democratic political processes. Elite theory seems less convincing as an explanation of the highly fragmented and un-controlled decision-making processes in most cities of developing world.

Another approach with relevance to cities of developing world is regime theory, which seeks to analyse the condition under which effective coalitions of interest emerge to bring about public purposes (Stoker, 19950). Regime theory is concerned with the workability of participatory arrangements and with developing the capacity to act. As such, building networks and coalitions with stakeholders are likely to be important. Regime theory can help explain elements of political and bureaucratic behavior in the cities of developing world, and thus important in decision-making and actions among stakeholders.

Analysis of policy networks seek to examine the networks, both formal and informal, through which interest groups are able to influence public policy. These networks, according to Nunan (1997), may range from; stable policy communities' to ad hoc 'issue networks', depending on the sector and issue. Rhodes' analysis in UK noted that policy networks can limit participation, privilege certain interest and decide which issues will be included in the agenda (Rhodes, 1997). In developing world, policy influence is likely to be more ad hoc and informal, and as a result, may not be transparent.

A relatively recent concept is the state-society synergy: popularized by Putnam and later by Moser as social capital (Moser, 1996; Putnam, 1993). This is in many ways parallel to the new institutional economics in which Evans (1995) argues that there are circumstances where cooperation between the public sector and society can be catalyst for development. Putnam's original observations on Italy correlated strong social capital with civic engagement and the performance of government. In this latter sense, social capital can also contribute to democratic and sustainable governance.

1.7.1 Conceptual Framework

There is no one over-arching approach which adequately explains the range of processes, relationships and behavior among the stakeholders in development in urban areas, particularly, in developing world. Insight can be drawn from the range of approaches outlined in the preceding section. It is also clear that it is not sufficient to examine just the formal, but also informal institutions and processes, since much of what happens is determined by informal interactions. Thus, according to Devas, ''a more fruitful approach

appears to be through the analysis of interest, and how they influence public policy, whether formally or informally'' (Devas, 1999. P.25)

In response to the political models, Porio (1997) identified two key questions with regard to power and political relationships among different stakeholders which should inform area of data generation;

- What is the nature of the relationship among stakeholders at certain political and economic conjunctures?
- What are the forms of negotiations that strengthen or weaken the position of stakeholders?

Grindle (1980) provides a useful framework for analyzing the politics of policy implementation. The work hypothesises that policy implementation is affected by both the content of policy (including the interest which are affected, the types of benefits which arise, the extent of change envisioned, the capacity of the implementers, and so on) and the context of implementation (including the power, interest and strategies of the actors involved, the characteristics of the regimes or institutions involved, and the responsiveness of those institutions).

The advantage of the public policy network is that it allows for integration of the formal and informal networks. Interest of the stakeholders' interacts through both formal and informal structures and processes (Batley, 1993). In other words, there are institutional structures, processes and rules of the game which affect the interaction and hence the outcomes of stakeholders actions.

Drawing from the preceding sections, a broad framework for analysis of stakeholders in solid waste management can be arrived at. Thus, this study is interested in the outcome of the relationships between formal and informal processes and factors that determine the outcome of the stakeholders' solid waste management in Zaria. The main component of the framework is given in Fig 1.1. The analytical model is a tool that serves the following purposes:

i. Identification of all the actors and interests involved,

ii. Definition of the context and the constraints within which the actors operate,

iii. Establishment of the processes of decision-making, and the rules which governs those processes,

iv. Assessment of the outcomes.

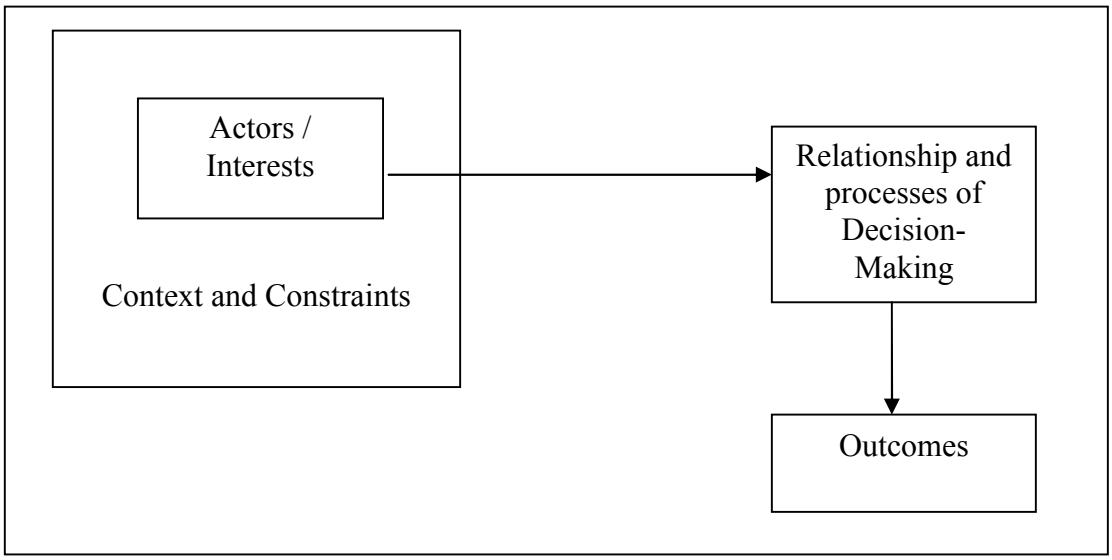


Fig. 1.1 Model of Relationships in Participation and outcomes

Source: Adapted from Devas, 2000, 1999 and Narayan, 1995.

The various actors, parties and interests involved in solid waste management can be grouped as Governmental, formal and informal private businesses, NGOs and CBOs,

and Households and Individuals. The contexts and constraints within which the actors or interests operate include:

i. The legal and regulatory environment and

ii. Access to resources

The relationships between actors and interests are linked to the process of decision-making and serves as determinants that give explanations for the outcome. The outcomes are related to the performance of stakeholders. The model gives the key features of data requirement for this study. The details and methods used are presented in Chapter Three.

1.8 THE STUDY AREA

1.8.1 Location and Size

Zaria Urban Area is located between latitudes 10^{o} 57' 36" N and 11º 15' 32"N, longitudes 7^{o} 39'00"E and 7º 53' 02"E. It is about 85km north of Kaduna. The urban area is made up of two local governments: Sabon Gari and Zaria (Fig. 1.2). Zaria is one of the seven Hausa States, and it is situated in the southern part of Hausaland in Northern Nigeria. It is the administrative headquarter of Zazzau Kingdom.

The population of Zaria at the 2006 census figure is put at 695,069 (FGN 2007). This figure ranks Zaria second only to Kaduna in the state. This population is shared by the two local government areas, that is, Zaria and Sabon Gari as shown in Table 1.1. Due to the fact that official population assessment in Nigeria reflects administrative boundaries rather than settlements, this population figure also captures rural areas that are at the

periphery but whose jurisdiction falls within Zaria and Sabon Gari Local Government Areas.

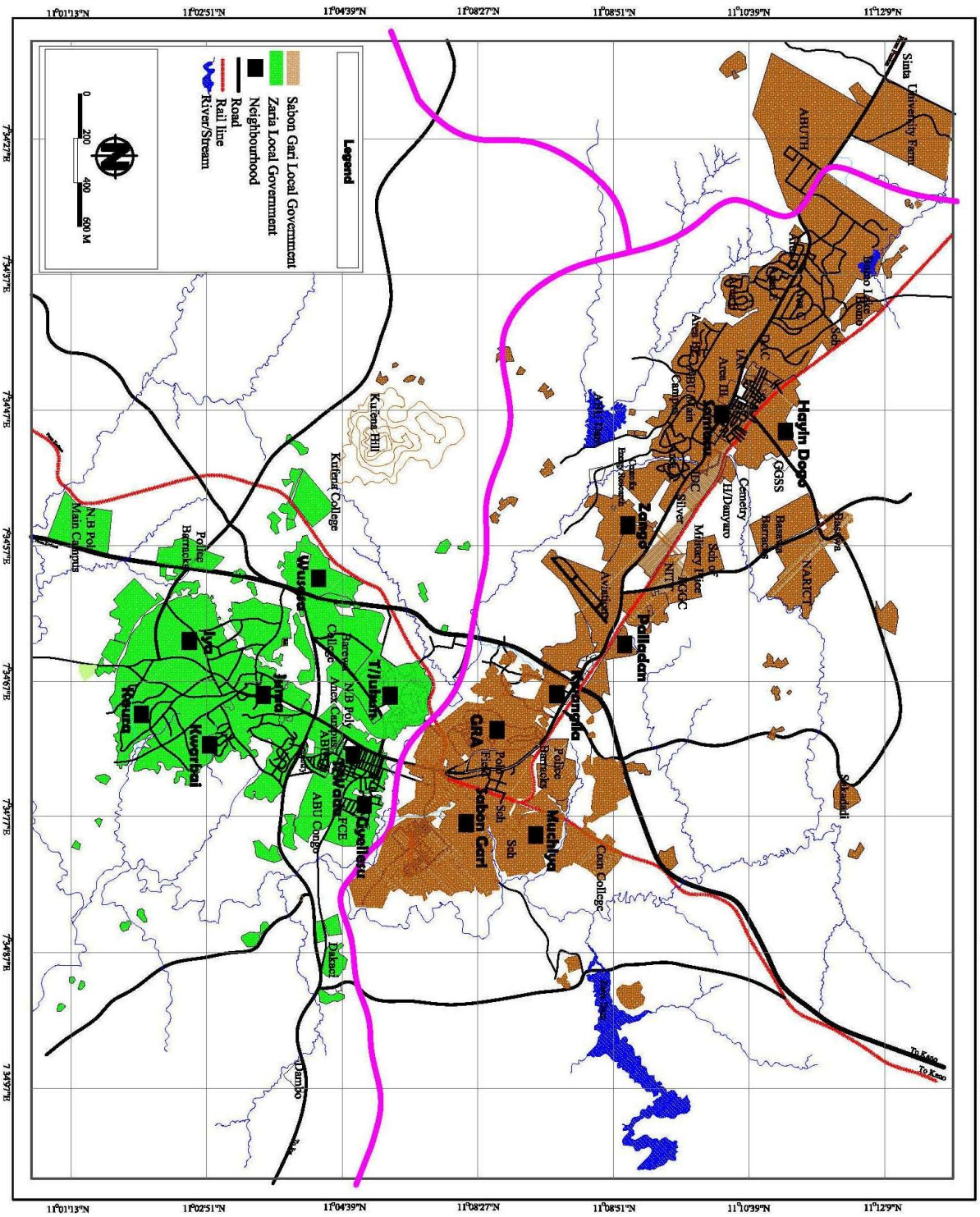


Fig. 1.2: ZARIA URBAN AREA: Local Government Area.
Source: Field Survey, 2009.

An estimate was made on the basis of a projection of the 2006 census figure to 2009 for the local government areas based on the National Average Growth Rate of 3.5 percent per annum. The estimate gives a total population of 770,635 for Zaria Urban Area.

Table 1.1: Population of Zaria Urban Area.

Local government Area	Sex				Total population	Total (%)	Estimated Population for 2009
	Male	(%)	Female	(%)			
Sabon Gari	149,004	41.0	137,867	41.5	286,871	41.3	318,059
Zaria	214,057	59.0	194,141	58.5	408,198	58.7	452,576
Total	383,061	100.0	332,008	100.0	695,069	100.0	770,635

Source: FGN (2007) and Adjusted to 2008 at 3.5% Annual Growth Rate

Zaria is an important nodal point for both the railway and the road systems. It is connected to the north and southern part of the country by roads and railway. This nodal position in the national transportation system has attracted commercial, administrative and educational institutions to it. This causes a substantial expansion of Zaria. In this connection, there has been an increase in Zaria's population as a number of immigrants from other parts of the country are attracted to it.

1.8.2 Physical Form of Zaria

The present day Zaria is formed by four distinct urban sectors – Zaria City, Tudun Wada, Sabon Gari and Samaru (Fig. 1.3).

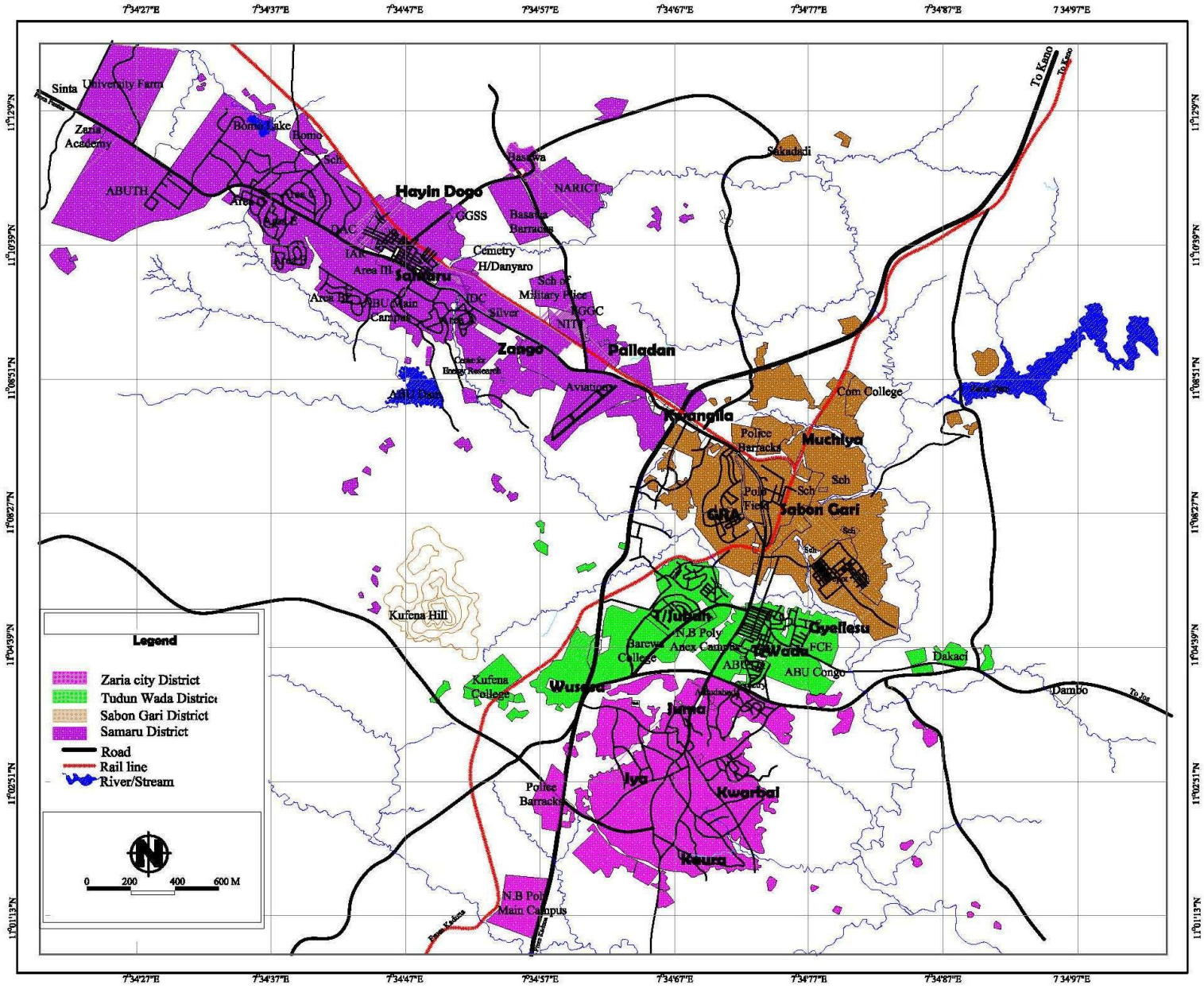


Fig. 1.3: ZARIA URBAN AREA: Existing Planning District.
Source: Field Survey, 2009.

Zaria City

Zaria city, which is the headquarters of the Zazzau Emirate, lies in the south of Zaria. The original walled city retains much of the physical character of the traditional indigenous settlement of the Muslim Hausa- Fulani population. The city still has a traditional character of perimeter wall, a complex maze of mud-walled compounds, and major roads secured by gates (Kofas) leading to the Emir's palace, the Friday mosque, and the market area.

Tudun Wada

Tudun Wada is situated immediately north of the main city gate. It was the original strangers' quarters for non-natives of northern Nigerian origin. In recent times, however, Tudun Wada is inhabited by a more mixed population. Tudun Wada is characterized by a mixture of modern and traditional architecture with a street system in grid-iron pattern (Kaduna State Government, 1979). It is in this quarter that most of Zaria's academic institutions are located. Several expansions have been made to Tudun Wada as it now extends to Gaskiya, and Tudun Jukun.

Sabon Gari

To the north of Tudun Wada lies Sabon Gari. Sabon Gari was created by colonial policy to house strangers from the southern parts of the country. This is a recent quarters in Zaria and was built after the railway reached Zaria in 1911. It houses immigrants of mixed cultures and religions. Sabon Gari was laid out on grid iron street pattern, which is indicative of an attempt at planning. The area is characterized by medium and low density residential plots. Later, areas like Muchia, Chikaji and Dogon Bauchi sectors

were engulfed by development. Adjacent to Sabon Gari lies the Government Reservation Area (GRA). It is characterised by West European oriented urban design pattern. The roads are properly laid out, plots are mainly of low density and there are a lot of organised open spaces.

The Sabon Gari area was zoned to residential, commercial, industrial, health, education and recreational uses. This district has now transformed to become a commercial and entertainment centre of Zaria. The GRA was originally reserved exclusively for the British administrators but indigenous officers now occupy the area. It has the Zaria Club, the Polo field, Race Course and the Golf Club situated in it. After the GRA, moving northwards are a few indigenous settlements of Kwangila, Hanwa , and Dogorawa.

Samaru

Samaru is in the northernmost section and is the most recent addition to ZUA. It is a religiously and culturally mixed settlement. Samaru evolved from a small colonial farming settlement into a large community. Samaru village owes its growth to the influence of Ahmadu Bello University and the Institute for Agricultural Research. The settlement is inhabited mostly by people working in the university. The settlement has expanded over time to include other settlements like Zango, Palladan, Layin Zomo and Bomo.

1.8.3 Socio-Cultural Characteristics

The composition of Zaria population is less heterogeneous than that of Kaduna or Kano. Nevertheless, Sabon Gari and Samaru population are more heterogeneous in character. The sectors of the town are activity specific. The indigenous small-scale craft industry has been traditionally well developed, it is owned by a system of interdependent family enterprises. This is especially evident in the Zaria city. Small groups of tanners, leather works, dyers, potters and blacksmiths are found normally concentrated in a small cluster of adjacent compounds in the wards of the city. These crafts are handed down from one generation to another. Light industries are concentrated in Tudun Wada and Sabon Gari districts. In these districts, most of the firms and a number of the widest range of modern crafts and small industries are located. The modern crafts include tailoring, barbing, silver smiths, carpentry, etc (Sokomba, 1980).

Education constitutes an important activity in Zaria and this gives a distinct character to the urban settlement. Also, education adds to the cosmopolitan character of Zaria and the morphological diversity it has occasioned. The concentration of educational activities in Zaria has considerably diversified the composition of its inhabitants by bringing together people of different nationalities and ethnic groupings.

1.8.4 Household Characteristics

This sub-section gives highlight of the household characteristics of Zaria as they relate household size and income.

1.8.4.1 Household Size and Income

Most households live in compounds with an average of three other households, an average of 9 people per household and a compound size of 22people (Sani, 2006). The majority of households are low income earners. Most of the households' heads, that is, about 46 percent earns less than □10,000 per month.

Apart from the GRA that can be described as having a relatively high level of income, all the other neighbourhoods can be classified as low-income areas.

1.9 SUMMARY

This chapter introduces the study. The problems in the participation of stakeholders in solid waste management within the context of Zaria are highlighted. This was followed by a brief presentation of the theoretical considerations for decision-making and the adopted conceptual model followed. This highlights how the type of relationships between actors and interests generate outcomes. The chapter ends with the presentation of the background study of Zaria. It illustrates the form and socio-economic characteristics of Zaria.

CHAPTER TWO

OVERVIEW OF STAKEHOLDERS PARTICIPATION IN SOLID WASTE MANAGEMENT

2.1 INTRODUCTION

This chapter presents a review on participation and stakeholders in solid waste management together with participatory strategies and stakeholders' waste handling practices. The aim is to highlight the major features and issues with stakeholder's participation in solid waste management. To achieve this, the literature review revolves around Africa and developing countries with particular reference to Nigeria. Special attention is placed on the role of governments' policy making and legal frameworks in solid waste management.

2.2 THE CONCEPT OF PARTICIPATION AND FRAMEWORKS FOR SOLID WASTE MANAGEMENT

With the reduction in funding and provision of infrastructure by government and growing donor interest in people's centered development strategies, significant attention is being placed on people's participation. People's participation in decision making service delivery and local ownership of projects is believed to lead to effective performance. The belief has played a central part in the shift in institutional strategies from supply – driven to demand – driven approaches, which respond to the felt needs and aspirations of users. This brings to the forefront the role of a full range of actors and stakeholders in service provision (Myllyla, 2001; UDBN, 1998 and Schubeler, 1996).

2.2.1 The Concept of Participation

Definitions of participation abound, but very often, the meaning of participation is a rendition of the culture that defines it. However, all the definitions of participation include, in some measure, the notions of contributing, influencing, sharing, or redistributing power and of control, resources, benefits, knowledge, and skills to be gained through public involvement in decision making (Schubeler, 1996; Narayan, 1995 and UNCHS, 1991).

There is much debate among practitioners and in the literature about whether participation is a means or an end, or both (Narayan, 1995; World Bank, 1992). If participation is viewed as a means to defined end and not as an end in itself, the goal of participation will be to optimize involvement of stakeholders for attainment of the desired project goals. The desired goals in solid waste management projects include improved solid waste management systems and cleaner environment. For the purpose of this study, participation is defined as a voluntary process by which stakeholders – CBOs, NGOs, formal and informal businesses, and households contribute to solid waste management. The essence of participation is the exercise of voice and choice. Thus participation is viewed as a means to an end in itself. Therefore, the goal of participation is to optimize involvement of stakeholders for the attainment of the desired project goals. The desired goals in solid waste management project include improvement in the system and cleaner environment.

2.2.2 Participatory Frameworks for Solid Waste Management

Due to urbanisation and industrialisation across the world, solid waste management has now assumed a global issue (Bulle, 1999). Many different actors have experimented with various technological options to find viable alternatives for collection and disposal of waste. According to dalla Torre (1992), the problems with solid waste management are more than technical issues. Instead, the management of solid waste has socio-political and cultural dimensions that need solutions through imaginative policies, administrative reorientation, institutional and organisational arrangements and an informed population (Schubeler, Wehrle and Christen, 1996).

The conventional public management of waste is seen by Kant and Berry (2001) to be the most efficient irrespective of the nature of the waste to be managed or the socio-economic conditions of the people. However, emerging literature on solid waste management suggests that involvement of professional collector teams and resident organisations can prove effective in solid waste management rather than the public institutions only. Some authors like Olley and Olbina (1999), Osuocha (1999), Douglass (1992) and Omuta (1988), argued that involvement of resident community and individuals can bring about a better process of solid waste management.

In a related manner, Anschutz (1996), Devas and Rakodi (1993) claimed that public participation in management of solid waste is desirable based on the fact that, Firstly it will lead to men and women taking decisions regarding their own life, and most directly regarding issues that affect their daily life, Secondly, and more practically is that service will be more efficient and effective if it is in line with the local needs and conditions,

and with the priorities and capacities of the men and women concerned, and Thirdly, that the solid waste management services will cover a larger population, if community, private as well as public resources are mobilised. In the same vein, Snel (1999) found that sharing of responsibilities between the public institutions, private sector, NGOs and the people helps in improving environmental health of a large area.

Lee (1994) has noted that the provision of support by external NGOs has great potential in terms of empowerment and environmental issues. A recent study by Myllyla (2001) extended the importance of external support further when it was discovered that NGO's intervention in solid waste management among the Zabbaleen evolved into a development intervention, in which environmental issues were closely linked to income generation, women's empowerment, education and health care. But Klundert and Lardinois (1995) argued that a top down approach to community development is not effective and cautioned that intervention agencies, even with the best of intentions, impose foreign concepts and programmes which could lead to unsustainable results. However, these researchers noted that forming partnerships between communities, the public, formal and informal private sector can be successful approach to strengthening urban environmental management.

Pioneering works in the study of governance of solid waste in Africa by Onibokun and Kumuyi (1999), Kironde (1999) and Swilling and Hutt (1999) are significant to the understanding of partnership in solid waste management. These studies serve as a benchmark to the knowledge of governance of solid waste by documenting the levels of involvement of stakeholders in solid waste management in major urban centres.

However, because they did not analyse the processes and framework for stakeholders' participation, the recommendations from these studies and the policies that emanated from the results could not be significant in strengthening participatory activities.

2.3 SOLID WASTE MANAGEMENT STAKEHOLDERS AND STRATEGIES FOR PARTICIPATION

The participation of stakeholders – state, market, community and households constitute the main focus of this study. Relevant areas of interest include the identification of main stakeholders in solid waste management, their interests and objectives, and the constraints within which they operate. Four main strategies are identified for the purpose of defining the manner in which service management tasks and responsibilities are shared between stakeholders at the community and government levels, and how it structures relationships between them.

2.3.1 Solid Waste Management Stakeholders

Based on the above conceptions in section 1.7, the following section describes the main stakeholders and interests with indications of the likely objectives, sources of power, or legitimacy and the constraints within which they operate.

2.3.1.1 National Government

National governments are responsible for establishing the institutional and legal framework for urban management including solid waste management and as well as ensuring that local governments have the necessary capacities for effective management (Gidman, Blore, Lorentzen and Schutten-belt, 1995). In Nigeria responsibility was

undertaken by the Federal Environmental Protection Agency (FEPA), and now by the Federal Ministry of environment (FMOE). The FMOE has eight departments, and the one most relevant here is the department of Pollution Control and Environmental Health. FMOE has the Primary responsibility for developing policies, strategies and action plans.

However, in many countries, responsibility is delegated without adequate support to the local government to help it perform its functions effectively (Wekwete, 1997). Capacity is constrained by limited financial resources, and inability of the national government to effectively enforce policies locally.

2.3.1.2 State Government

The states Governments have the responsibility to implement national policy on environment and solid waste in the state. In Nigeria, the state governments are to supervise the local governments and enforce by-laws, impose recycling responsibilities on industries and businesses, promote environmental awareness and provide law for solid waste management infrastructure (FMOE, 2000, p.15). This responsibility is undertaken by KEPA in Kaduna state.

2.3.1.3 Municipal Governments

Local municipal governments have roles in the set up and operation of solid waste management systems. Most urban authorities receive their powers and obligations from a central government on matters of powers and responsibilities to protect the rights of citizens, and provide services for the common good (Gidman et al, 1995). For instance,

the municipal governments are the legal owners of waste once it is put out for collection (Schubeler et al 1996). This responsibility of ownership is assigned to the Health Department of the local government authority in Nigeria.

The local governments must implement laws and regulations to fulfill their statutory obligation. Besides the legal obligations, local governments are usually motivated by political and social interests in policies and projects. Yet, service user satisfaction, approval of higher government authorities and financial viability of the operation are important criteria of successful solid waste management from the perspective of local governments. Many authors like Wekwete (1997) and Dillinger (1993), have identified the problems of local government authorities to include inability to raise revenues commensurate with the responsibility for service provision, and poor caliber of staff due to poor pay rates. Sometimes, the powers of municipal authorities are eroded by special purpose agencies such as Urban Planning and Development Boards.

2.3.1.4 Formal Private Sector

The formal private sector is here understood to refer to private sector corporations, institutions, firms and individuals, operating registered and or incorporated businesses with official business licenses, organized labour force governed by labour laws, some degree of capital investment, and generally modern technology (Furedy, 1990). In general, the defining characteristic of the formal private sector is the motivation to generate profit on investments.

Formal private companies are involved in wide-ranging activities in waste management systems, varying from waste collection, resource recovery, incineration and landfill operation. The participation in the waste management system is in a number of ways, including: entering into contracts paid by the municipality to perform collection, processing, disposal or cleaning services for compensation; entering into contracts with individuals or businesses for collection services, and functioning as a purchaser of recovered materials. Rakodi (1997), and Cointreau -Levine (1994) have specified types of solid waste services that can be privatised.

Since the private sector is profit motivated, there is the fear that it may not serve the people equally (Gidman et al 1995). For example, Lardinois (1996) observed in Guatemala that some of the private sector enterprises decide for themselves who they will provide their service for. Therefore, leaving these services in the hands of the private sector can turn a public monopoly into a private monopoly (Gidman et al, 1995). Since the private sector is not politically accountable, there is a strong need for regulation by the public sector. However, Satterthwaite (1999) thinks that the local state apparatus in the south is too weak to control private sector companies sufficiently.

Regardless of the worries, there is a strong belief that the private sector handles the service provision best. Governments should therefore adopt an enabling approach to supporting private agents in enhancing equity. Some public service providers have dramatically improved the delivery of services, and have often reduced costs by using small and micro-scale local community or private enterprises to fill the gap in services delivery (Harper, 2000).

2.3.1.5 The Informal Private Sector

The term 'informal private sector' refers to unregistered, and unregulated activities carried out by individuals and or family or community enterprises, that engage in value adding activities on a small – scale with minimal capital input, using local materials and labour intensive techniques (Furedy, 1989). The informal private sector functions informally outside the formal framework (Rogerson, 2001). Informal sector groups can be important in service production if they are recognised, organised and incorporated into the formal system (Wilson, Velis and Cheeseman, 2005).

Informal sector waste collection and recycling are often driven by poverty, and initiated personally and spontaneously in the struggle for survival. Consequently, the choice of materials to collect is in the first place determined by the value of the waste materials, and in the second place, by the ease of extraction, handling and transport. In general, the informal sector consists of two types of activities; Firstly, individuals and families performing activities which provide subsistence, and Secondly, small businesses operating in much the same way as the larger, registered counterparts, but without the benefit of official registration.

Although the sector has started to be acknowledged, the attitude of the municipal authorities can be repressive and tolerance. Rogerson (2001) observed that policy makers are more prohibitive than accommodative towards the sector, and that they see waste pickers as a source of embarrassment. They often send officials to block the activities of this sector when important or international delegates are visiting. Gidman et

al (1995) believes that informal activities are transitional, and may disappear automatically with economic growth.

2.3.1.6 Community – Based Organisations

Community-based organisations are not a new phenomenon in Africa. However, these have been recently considered as actors in urban development. Community groups are playing an important role in the provision of services in many countries (Heden, 1999). This group evolved naturally in response to the failure of the public sector to provide for the needs of the people (Stren and White, 1989).

The community and its representatives have direct interest in waste management, as residents, service users and tax payers. Because communities in the low-income areas generally receive marginal or no services in terms of public transport, electricity, drinking water, sanitation, drainage and also of waste removal, they sometimes take the initiative to organise CBOs with the direct goal of self-help and improving living conditions. Such CBOs may receive external assistance in the form of technical and or financial aid from different agencies. Sometimes these activities may also take the form of direct participation in waste management, such as feeding organic materials directly to livestock. Usable materials like bottles are often reused by the members of the low-income community themselves.

CBOs mainly participate in primary waste collection systems, separation at source experiments and implementation of programmes. CBOs may also take a role in the actual provision of service, including operations and maintenance, and even in the

construction of services. These CBOs, speaking for the individuals or members involved, play an important role in waste management system development processes.

However, there are problems commonly associated with letting CBOs carryout local services. These are associated with the difficulties to grow and become formalised as part of partnership in urban administration (Rakodi, 1997). CBOs have been shown to abandon projects after implementations as people could not be trusted to maintain the project without public sector support (Rakodi, 1997).

2.3.1.7 Non – Governmental Organisations

The term NGO can refer to such diverse organisations as universities, labour organisations, environmental organisations and lobbies, sometimes even donor organisations can fall under this heading. NGOs are non – economic, political, ethnic, class and religious networks that can work locally, nationally or internationally with the goal of organising people to reach common objectives (Aina, 1990). There are few strong NGOs in Africa (Potter, Binns, Elliot and Smith, 1999). However, NGOs are more famous in Asia (Harper, 2000).

Generally, NGOs are intermediate organisations which are not directly and continuously involved in community projects. They do not only advocate, but can also be involved in awareness – raising, advocacy, and decision-making. They can also act as intermediaries between grassroots initiatives (CBOs) and municipal governments or serve the ideological, political or altruistic interest of international organisations. The role of NGOs as partner organisations in waste management systems include serving as

an umbrella organisations under which CBOs operate and acting as a channel for donor financing. As partners, NGOs can sometimes confer a degree of credibility and perspective on the informal sector in the eyes of the municipality.

In recent times, NGOs have been criticised for doing little to build the capacity of the people they work with (Mitlin, 2001; Desai, 1995). Increasingly there is widespread recognition of difficulties in relations between NGOs and grassroots organisations than was once thought. NGOs have been known to impose their agendas on some of the local self – help organisations they work with. Another problem is the NGO's reliance on traditional and community leadership which use these contacts to reinforce their position (Desai, 1995).

2.3.1.8 Individuals and Households

Urban households and individuals have become more involved in the system of management (Wekwete, 1997). Some scholars have questioned whether households and individuals should be included in a discussion of participation, since participation implies collective action. However, households and individuals clearly are part of the participants. If we are to have a complete picture of the interactions between interests, households and individuals cannot be left out. And moreover, CBOs are made up of households and individuals.

Several factors ranging from the type of service, to social practices and the nature of local politics shape participation at this level. However, the primary objective at this level is to improve supply of services. Relationship with government includes

negotiation to obtain services, paying taxes and paying for services, and joining CBOs to lobby for services. Individuals and households in urban areas are seen not to be very amenable to collective or popular participation. This is commonly attributed to the heterogeneous nature of urban communities. The argument is that social capital is weaker in urban areas due to the heterogeneity and mobility of the population (Philips, 2002).

2.3.2 Strategies for Participation

Participation exists in a wide variety of forms, ranging from government involvement in community – based development activities to peoples participation in government directed functions. These strategies are in no way exclusive as they often take place at the same time. Four main strategic approaches are identified. Each strategy defines the sharing of tasks and responsibilities between stakeholders at the community and government levels, structures of the relationships between them and the strengths and drawbacks in the application.

2.3.2.1 Community-Based Strategy

The community-based strategy constitutes the most elementary form of participation. The frame of reference for development inputs is the social group or community itself. According to Schubeler (1996), the main objectives of this strategy are to support the local development of services; enhance community groups' capacity to manage service development; and enable the processes through appropriate changes in the legal, technical, and policy context. Typical measures include organisational and technical

extension services. Enabling measures involve recognition of people's rights to self-help and improvements in development and awareness building programmes.

The principal strengths of this approach are its maximum use of the self-organising and self-managed potentials of the community. The major draw backs are its inability to mobilise more than a modest volume of resource, introduce representative and functionally – oriented organisation and linking the local development to the municipal network.

2.3.2.2 Area – Based Strategies

Essentially government-managed strategy, area-based strategies are the common form of government directed programmes for participatory services upgrading. Rather than a social group, a particular residential area constitutes the frame of reference for development efforts. Programmes involve beneficiaries at various stages of the development process. The principal objectives of these strategies are towards improving the efficiency and cost effectiveness of government activities through appropriate inputs by the people concerned (Narayan, 1995). Typical measures include awareness building, community participation in demand analysis and the choice of solution, and mobilisation of resources for implementation and operation and maintenance. It may also include organisational capacity- building.

This strategy is well suited for channeling larger volumes of resources and for ensuring more effective linkages between local level development and municipal systems.

However, loss of community ownership and poor cost recovery are common problems with this strategy.

2.3.2.3 Functionally- Based Strategies

This is a more advanced form of partnership between government and the public. It depends on multiple stakeholder participation and employs the functional structure of the infrastructure system as the frame of reference for organising developmental inputs. The development activities are organised based on clearly designated or defined areas of responsibility for each stakeholder. In addition, the establishment of effective collaboration between the various domains is critical (Schubeler, 1996). Typically, a community group will take responsibility for managing and financing activities such as local garbage collection, while the municipality will ensure the tasks such as onward transfer and disposal of solid waste materials.

The functionally-based collaborative strategies have high potential to empowering participating community groups. Because project implementation and financing are clearly in community hands, loss of project 'ownership' and poor cost recovery do not become problems. However, there are difficulties related to coordination and linkage between community facilities and the government sponsored facilities.

2.3.2.4 Process-Based Strategies

In this strategy, development activities are government-sponsored. But unlike the area-based strategy, the activity is on city wide scale and the entire process of service development and management forms the frame of reference for activity organisation.

People both as users of service and as citizens participate by way of specific inputs to government directed management activities. The basic objective is to improve the efficiency, demand responsiveness, and accountability of infrastructure service management through a general decentralisation of delivery processes (Schubeler, 1996). Decentralisation involves devolving decision making processes and operational responsibilities to more local bodies and opening management functions at each level to the exchange of information form 'below'.

Privatisation is a form of decentralisation strategy. Decentralisation strategies depend upon measures of institutional development to increase responsibility and authority to local bodies and develop their capacities. The strength of a decentralisation strategy derives from both its mobilisation of creative capacities at all levels of society, and its more productive use of available capacities and potentials.

2.4 Contributions and Determinants of Performance of Participatory Action.

Observations have led many people to believe that participatory action can contribute greatly to the success of development projects. According to Narayan, (1995), one of the most important areas of contribution from the perspective of service agencies and users is in the performance outcome of the infrastructure. Performance as used in this study is taken to mean a form of contribution of participation to the provision of solid waste service delivery. In this way, performance emanates from participation. However, several factors can affect the success of collective action. Some of these factors are related to the attributes of the project while others are related to the rules and decision-making arrangements.

2.4.1 Contribution of Participatory Action

Stakeholders' participation contributes in several ways to the provision, operation and maintenance of infrastructural system. These contributions could be financial, social and psychological costs and benefits. Users and services providers are likely to participate when the benefits outweigh the costs, just as agencies are likely to foster both the users and stakeholders' participation when the benefits of doing so outstrip the costs to the agency (Narayan, 1995). However, knowledge about the costs and benefits of participation is very limited. Nevertheless, from institutional agencies and households perspectives, participation as an input or an independent variable derive not only from cost reduction and resource mobilization, but also from more effective targeting of real needs of the users. Stakeholders' participation should enhance performance of services and lead to the achievements of four main objectives of effectiveness, efficiency, empowerment and equity.

2.4.1.1 Effectiveness

Schubeler *et al.,* (1996) defined effectiveness in service outcome as the degree to which stated objectives are achieved. Stakeholders' direct or indirect involvement may result in a better match between what users want and what providers offer (Schubeler, 1996). Solid Waste services are considered effective if there is safe removal of all the wastes generated. Effective solid waste collection produces health related, economic and environmental benefits, among others (Klundert and Anschutz, 1995).

For households, effectiveness is related to the extent to which service delivery corresponds to the real needs and demands of society. Solid waste management by

stakeholders are considered effective if they increase access to, reliability and quantity of waste collection, so that people have ease of access to waste collection, total collection of all the waste generated and safe disposal of the waste.

2.4.1.2 Efficiency

According to Johnson (1994), efficiency is the measure of work achieved relative to the energy expended. This physical concept has been appropriated for analysis of capitalist economies by relating the volume of output to input, usually measured in monetary terms. This concept is applied to all productive and non-productive activities within a capitalist economy as a means of evaluating performance and providing targets for its improvement.

Project efficiency measures the relationship between a given output and its cost and inputs (Narayan, 1995). Also project efficiency might mean the achievement of a high performance by cost reduction, doing more with less (Schubeler, et al., 1996). For solid waste management programmes by service providers, cost and inputs are very important for sustainability of actions.

Stakeholders' service is efficient when the cost of service provision in relation to collection is minimal and when the benefits of clean streets are balanced by all users paying a minimum level of cost to keep them that way. Thus, efficiency is related to the ability to implement a programme well. It is to achieve the desired result with the minimum use of resources, time and effort and thus measures the competence of the system.

2.4.1.3 Empowerment

Empowerment is essentially a political concept that is concerned with a more equitable sharing of power and resources with those who previously lacked power. The issue of empowerment is of central importance to participation if participation is seen as an end, (Schubeler, 1996). In this case any activity that leads to increased access and control over resources and to acquisition of new skills and confidence, so that people are enabled to initiate action on their own behalf and acquire leadership, is an empowering activity.

More commonly, participation is considered to be a means for achieving other objectives, such as involvement of stakeholders whose main motive is to earn an income or self-help by CBOS to clean the environment. In this view, Schubeler (1996) suggests that the issue of empowerment may be played down or even ignored; participation is therefore seen as a matter of practical advantage and expediency.

2.4.1.4 Equity

A major purpose of participation by stakeholders and development assistance is a more equitable distribution of the benefits of development, in this case, solid waste management. It is well established that development gains tend to be captured by those already better off (Narayan, 1995). The primary goal of participation is to reach people that are without access to public provided service. Stakeholders' participation may lead to less capture by the elites and to more equitable access.

Solid waste management service by stakeholder is equitable if the poor are targeted with a high capture of low income areas vis-à-vis high income areas. But with profit motivation by providers, the low income areas may not be well covered as the low income earners generate less valuable wastes.

2.4.2 Determinants of performance of Participatory Action

Several factors, which can be divided into three broad categories, affect the success of collective action (Bromley, 1986, Oakerson, 1986, and Wade, 1980). These concern characteristics of the resource, of the service user, and the management responsible for the service. The interaction of people, stakeholders and agencies determine outcomes, and the attributes of the resource determine the boundaries, which in turn influence the nature of interaction.

Oakerson (1986), provides an analytically useful framework for understanding the conditions under which collective action works. Physical and technical attributes, especially those related to degree of jointness, excludability, and differentiation, set the parameters within which groups and agencies must operate. Within these parameters, the most important factors are the rules and decision-making arrangements which affect behavioural interactions and service outcomes. Decision-making arrangement determines who decides what in relation to whom (Narayan, 1995). Three types of rules determine the success of collective action and are: the condition that establishes the ability of a group to act collectively to make decision common to the group, operational rules of groups regarding use, and the external

decision-making arrangement that affects the ability of the stakeholders to act. These categories comprise institutional rules, economic arrangements and technical capacity.

The environment created by these rules and decisions influence perceived costs and benefits of stakeholders, and thus, either limits or enhances their behaviour and choices. Successful outcome is dependent on the degree to which stakeholders are monitored and held accountable to certain standards of behaviour and successfully sanctioned. If stakeholders are not held accountable to a certain standard of behavior, service delivery may not respond to users need.

2.5 REVIEW OF SOLID WASTE MANAGEMENT IN DEVELOPED AND DEVELOPING COUNTRIES

Solid waste management is proper handling and disposal of solid waste for human health and environmental cleanliness. It involves the storage, collection, transportation and disposal of waste which is generated in the homes, commercial premises and institutions (Snel and Ali, 1999). This comprises of an extremely complex set of operations which has to take place on an enormous scale. Based on available literature of waste management practices in Africa and developing countries, the following sections describe strategies developed for solid waste management.

2.5.1 Waste Management Strategy

There is no single solution to the issue of what to do with solid waste. Every community or region has its own unique profile regarding solid waste. The attitudes of people in different regions of each country vary regarding waste management practice. The

diversity of communities and waste is one reason why no single approach to waste management has been accepted as the best method. The general strategies are reviewed below.

2.5.1.1 Administration

In several cities, municipalities or local government boards have the sole responsibility for waste management. However in some cities like Nairobi, Bamako, Guinea and South Africa, cost recovery by municipalities through retained user fees and taxes have shown some promise. Private enterprises play important roles in vastly improving solid waste management services in many countries. In addition, some cooperatives and community organisations provides solid waste management services from pre-collection to recycling and re-composting in Guinea. Generally, administration of waste management in African countries is executed through three levels of responsibility (UNEP-IETC 1998).

Level A

At the highest level is the Ministry of Environment or its equivalent. In some countries the responsibility for solid waste management rests with the ministry of Health, the Ministry of Works or the Ministry of Planning and Development. The ministry is responsible for overseeing solid waste management at the national level. It controls the allocation for solid waste capital investments by city-waste authorities. In many cases this ministry is charged with setting standards for solid waste management based on laws enacted by the legislature. Often, the central government ministry, such as the ministry of environment, is charged with other responsibilities like, wildlife

conservation, and land and or water resource management. These may carry a higher national priority than solid waste management since they often directly generate income. When combined with limited staff and budget constraints, solid waste management may not receive due attention or financial allocation from the ministerial level.

Level B

Under the national ministry are the various municipal agencies responsible for planning and urban affairs in the country's major cities. These generally take the form of district governates, such as the governate of Cairo, the communaut Urbaines in Dakar, the Governorat de District in Bamako, and the Urban or Municipal governments in Ibadan and Harare. The planning and design of solid waste management services is carried out by the agencies. They receive annual operating budget from the central ministry and usually do not charge a fee for the services. They are generally not empowered to levy taxes. There are some notable exceptions. For example, in Conakry, Guinea and Lagos, Nigeria, Municipal agencies raise revenue through direct user fees. The Municipal agency is also charged with implementing the solid waste management plan in its respective city.

Level C

The actual execution of day-to-day solid waste management operations is carried out by a combination of official municipal workers and fee based contractors from the private sector. The latter provides collection services. In Cairo, the Zabbaleen operate as a cooperative and use trucks, plastics pelletizers, and rag pullers in their collection and

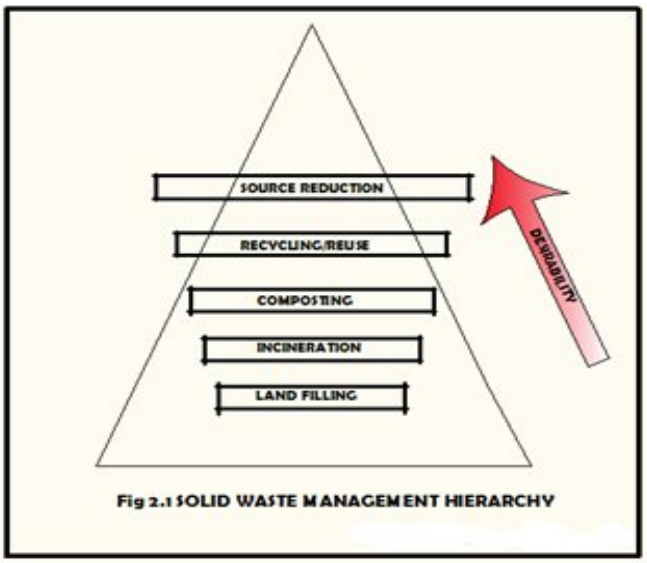
recycling operations (Myllyla, 2001). In Cote d'Ivoire, Ghana, South Africa and Tanzania, private operators provide SW collection in all or parts of their major cities. Cooperatives and community groups are also involved in collection, recycling and composting of solid waste. For example, in Cotonou, Benin, Community groups participate in the collection process of contracts with the municipal agency (Keita, 2001).

2.5.1.2 Solid Waste Management Practices

Solid waste management practices vary from country to country in Africa. In Uganda, environmental policy making remains largely a function of the central government, but implementation of policies and legislation is passed to the districts. Decentralisation process is supported under the World Bank- Financed Environment Management Projects launched in 1996. In Accra, the capital of Ghana, the World Bank facilitated regional MELISSA initiative (Managing Environment Locally in Sub Saharan Africa), co-financed by the European Union, Sweden and Norway helped create the basis for privatising the management of solid waste (Palcznaski, 2002).

A number of African countries have been implementing integrated waste management (IWM). Defined by Tchobanoglous, Thiesen and Vigil (1993), IWM is the selection and application of appropriate techniques, technologies, and management programmes to achieve specific waste management objectives and goals. It refers to the complementary use of a variety of practices to safely and effectively handle municipal solid waste. Many countries have prioritised these waste management activities into the so-called waste management hierarchy, which varies between an operational policy guideline and

an injunction that is part of a national environmental law that ranks solid waste management options according to the environmental benefits (Fig. 2.1).



Source: Rosario and Scheinberg, 2004

All waste system elements are looked upon as stages in the movement or flow of materials from the mining stage via processing, production and consumption stage towards final treatment and disposal. A waste management system is a combination of several stages in the management of the flow of materials within the city and region. A waste management plan is part of an integrated materials management strategy, in which the city makes deliberate normative decisions about how materials should flow. The waste elements then become specific tactics to deal with specific materials after consumption.

An important component of IWM is to encourage producers to produce environmentally friendly goods and to produce less waste in the production cycle. It also mandates

producers to take more responsibility for the waste they produce. For example, in many developed countries, legislation on producer's responsibility has created awareness for waste minimisation. However in developing countries like Nigeria, there is little enlightenment programmes at sensitising people at waste prevention method.

The next favourable option is waste reduction, which suggests using less to begin with and reusing more, thereby saving material production, resource cost, and energy. Waste recycling is considered to be a viable waste reduction strategy followed by composting and incineration. The least desirable option is land filling. Understanding the inter-relationships among various waste activities makes it possible to create IWM plan where individual components complement one another.

For each of these process elements, there is a dependence upon how effective each preceding element has been. This is of great importance when considering each element in the sequence. If there is no effort applied in the prime processes, then the secondary processes such as incineration or land filling must be capable of accepting and processing all of the components of the waste materials. This, not only affects the quantity of municipal solid waste to be processed, but also affects its combustion characteristics, and composition. At present time, IWM is getting more recognition than ever in Africa.

Although majority of large cities have administered waste management practices at different levels of sophistication, in some African countries there is no official solid waste management policy. For example, in many Nigerian towns and cities, there is no

door – to – door solid waste collection programme. Solid waste is disposed in the natural streams and rivers and in the surrounding bush or marshland. Traditionally, organic waste is also used for feeding domestic animals and as fertilizer in gardening. In many cases, solid waste disposal points are spontaneously created along the most accessible roads. Often times, fire is used to burn heaps of waste. This creates toxic smoke, which is detrimental to health and environmental quality.

2.5.2 Stakeholders Solid Waste Participatory Practices

Solid waste participatory practices refer to the way stakeholders handle collection and transportation, transfer, recovery and recycling, and disposal of solid waste. Most of the practices reveal stakeholders behaviour and not necessarily the proper means of waste handling. A brief review of waste handling practices of stakeholders in Africa based on available literature is given below.

2.5.2.1 Solid Waste Collection and Transportation

Solid waste collection is separated into two parts, primary collection and secondary collection. Primary collection is the transportation of waste from the waste generation source, especially houses, shops and parks, to collection points, while secondary collection is the transportation from collection points to waste disposal and treatment sites.

Most major cities in Africa have an established municipal collection system. Collection is carried out by human and animal – drawn carts (Wheelbarrows, Push carts), open-back trucks, compactor trucks, and trailers). However, “collection rates across the

continent are low from 20 percent to 80 percent" (Palcznaski, 2002, P. 12). The common feature of municipal agencies is the ineffectiveness, under – equipment and poor maintenance, inadequate funding and poor staffing. Often, collection services are limited to highly visible areas, the wealthy, and businesses willing to pay for the services.

Because large areas of the cities are inaccessible to large vehicles, pre-collection is the first step in the waste management chain. Pre-collection is carried out by community groups in some areas not served directly by municipal vehicles. This is often carried out by small communal organisations or micro-enterprises that employ jobless youths, women, and sometimes even small children. For example, in Cotonou, Benin, such groups are authorised to pre-collect waste and deposit it in communal bins for later removal by the municipality. Collection from skips, a few transfer stations, and door – to – door in high income areas had been modeled on the North American and European systems. These typically deteriorated after a few years because of the unsuitability of the vehicles and lack of maintenance of budgets.

Private operators provide service on a fee basis to households and commercial establishments. In Cairo, the Zabbaleen has traditionally specialised in SW collection and now operates as a cooperative to perform this service (Myllyla 2001). This type of cooperative is not common in other Africa cities. Since the mid-1970s, international aid has promoted initiatives to improve the coverage of solid waste collection services in Africa. In cities such as Dakar and Cotonou, local initiatives have focused on service to formally neglected peri-urban areas.

Refuse collection has always been a problematic issue in Africa. As a result different types of agencies are created to resolve solid waste problems. For example, in the case of Lagos, Nigeria, Olanrewaju (2000) reported the last military administration effort to combat the problem of waste collection led to the creation of a waste management agency known as the Lagos Waste Management Authority (LAWMA). As LAWMA's performance continued to decline, the post military Tinubu administration initiated an Operation Drain and Waste Clearing targeted at removing heaps of solid waste at different locations. Launched in July 1999, the policy is now complemented by an innovative Private Sector Participation (PSP) in solid waste clearing and collection by private contractors.

2.5.2.2 Waste Transfer

Waste transfer stations are defined as temporary medium time disposal sites before haulage to the final disposal site (Palcznaski, 2002). Waste transfer stations are not common in municipal waste management in African cities. One such facility, operated by the city of Abidjan, Cote d'Ivoire is no longer functional. In almost all cases, the point of disposal of the urban waste is located on the perimeter of the city, within easy reach of vehicles and collection crews. The collection vehicles are generally of the 6-7m^3 capacity and go directly from their point of last pick up to the disposal site.

2.5.2.3 Final Disposal

Final disposal site is basically the place for neither reusable nor recyclable waste. But actually there are many valuable wastes and it attracts a lot of scavengers and waste

pickers to recover valuable wastes. Generally, there are three methods of disposal of solid waste. These are incineration, recovery and recycling and land disposal in the various items discussed below

Incineration

Incineration which is the process of converting waste to energy presently does not play significant roles in municipal waste management in Africa. It is seen as an inappropriate technology for Africa (Palcznaski, 2002). This is due to the limited infrastructure, human, mechanical and institutional resources in these countries. The high content of inert, in the waste stream, suggests that incineration is an inappropriate technology for Africans.

Even though there are medical waste incinerators in most African countries, however, many such facilities have no environmental controls and often comprise nothing more than combustion of medical and chemical wastes in an oven or open pit. Johannesburg has five high – tech commercial incineration facilities.

Waste Recovery and Recycling

Waste recovery is the process of reusing waste materials. Waste recovery and recycling are often undertaken as a survival strategy by scavengers and recycling businesses. (Cointreau and de Kadt, 1991). By reducing the total amount of solid waste headed for the landfill (or left lying to decompose in the streets), re-use, recycling and composting are land saving and pollution reducing strategies. Waste reuse also plays a valuable resource conserving role: by recycling materials, further exploitation of scarce natural

resources is minimised, thus containing the spreading ecological footprints of the city. There are different forms in which waste recovery is done.

Firstly, waste reuse is associated with resource recovery and starts at the household level especially in low income areas. This begins with the reuse of plastic bags, bottles, paper, cardboard and cans for domestic purposes, thereby extending their useful life. The rate of reuse in this instance is high, and the materials enter the waste stream only when it is no longer fit for domestic use. In high income areas, recovery is carried out by domestic servants and or children. Rather than reusing the materials directly, the wastes are sold to middlemen or commercial centres.

However, the extents to which these transactions occur depend on the availability of marketable end uses for the materials. While such industries may be found in some major cities, they are largely absent in secondary cities and in rural areas. Glass bottles are usually returned to the point of sale for direct use by the beverage industry. In the majority of cities, the glass content of the waste stream would not be sufficient to support a glass recycling industry. Instead, the bottles that are not used for the beverages are diverted from the waste stream and used as containers in homes. Other glass items are discarded with the rest of the solid waste stream.

Where there is a market, plastics are recycled by waste pickers. The materials are then sold to local plastic product manufacturers. The recycling of solid and organic waste is one approach that has positive ramifications in creating informal employment and offering environmentally sound solution to waste management problems.

Secondly, composting is a controlled natural process of decomposition of organic waste materials. It reduces the cost of waste disposal, minimize nuisance potential and produce a clean and readily marketable finished product. Composting help in increasing the recovery rate of recyclable materials. Palcznaski, (2002) reported the failure of several projects initiated across the continent. Often the technology is not directly applicable, as it fails to adequately consider local factors such as the waste characteristics, seasonal variations in climate, and the status of waste management in political institutions.

However, there are some NGO's promoted practice in backyard composting efforts in Benin, Cameroon, Egypt, Ghana, Kenya, Nigeria, South Africa and Zimbabwe. But the practice does not have significant impact on solid waste management at the city level (Hoornweg, Thomas and Otten, 1999). This may be an overlooked opportunity when the typical African waste stream is high in organic material with potentially high yields of compost.

In the suburbs of larger South African cities such as Durban, Johannesburg, and Pretoria, there are community compositing centres. Residents drop off their garden waste and it is composted and resold for household-sized gardens. In peri-urban areas in Congo, Benin, Cameroon and Egypt, CBOs and economic interest enterprises also promote composting of Municipal solid waste. These projects are generally highly labour-intensive with a low capital investment. The compost produced is largely for self-consumption or for sale to households or businesses such as hotels in the city.

Land Disposal

Land disposal involves haulage of garbage in open area. Such areas range from unsanitary open dumps to properly operated sanitary landfills.

Firstly, the overwhelming majority of land disposals in Africa are a poor method of waste disposal because they cause environmental problems. The facilities are generally located at the perimeter of major urban centres in open lots, wetland areas, or next to surface water sources. Though many municipalities have statutory requirements for the construction and maintenance of landfills, these are generally not enforced. In all instances the open dumps are owned and operated by the same public agency that is charged with enforcing the standards.

Secondly, sanitary landfills provide for environmentally sound disposal of waste which cannot be reduced, recycled, composted, incinerated or processed in some other manner. The landfill site is lined with an impermeable material such as clay or plastic, and soil is used to surround and contain the waste materials. Municipal solid waste and at times certain industrial and agricultural wastes are spread in layers and compacted by heavy bulldozers to reduce the volume. At least once every 24 hours, a layer of soil of a minimum of 15cm (6 inch.) in thickness is spread on top of the compacted waste and is itself compacted before more waste is added.

Africa has the lowest level of attention to sanitary landfills than other regions of the world. Nevertheless, some countries in Africa are taking important steps to improve waste disposal practices. Under the World Bank financed project, Kampala city, Uganda

has constructed a landfill, and under the World Bank's Urban Environmental Sanitation Project, Ghana built its first properly sited, designed and constructed landfills in three of its major cities.

2.5.3 Case Studies of Stakeholders Initiatives in Municipal Solid Waste Management in Developing Countries

There is an increasing takeover of municipal functions in a number of activities by formal and informal private companies, community-based organisations and non-governmental organisations. The following section gives an overview of initiatives in solid waste management in developing countries.

2.5.3.1 Privatisation of Services

More and more municipalities are convinced of the need for privatisation and community involvement. Various forms of public-private partnership (PPP) are implemented in South East Asia, South America and to a much lesser extent in Africa. Cointreau-Levine (1994) gives a good overview of formal private sector involvement and the variety of institutional arrangements, such as contracting concession, franchise, open competition, and the like, which can be deployed. It also discussed the many factors which need to be analysed; such as cost recovery, efficiency, public accountability, economics of scale in the decision to privatise. A number of examples of privatisation of solid waste are presented below.

Jakarta is one of several cities that began experimentation with the privatisation of waste collection in the second half of the 1980s. In 1988, Jakarta officials experimented

with private contract for waste collection in 261 sub-districts (10 percent of the city's waste generating areas), which comprised middle – to – high income residents (Cointreau-Levine, 1994).

South Korea, in the same period, privatised waste treatment and disposal. A successful combination of public and private sector activity for hazardous waste disposal shifted the balance towards private sector operation. A public corporation built and operated two state-of-the-art hazardous waste treatment and disposal facilities. In a later stage the ministry was able to license and monitor the development of at least six privately owned and operated facilities (Cointreau-Levine, 1994)

Keys to successful privatisation include creating contestable markets, establishing an appropriate regulatory framework and operational standards for contractors, and strengthening local government capacity to negotiate contracts and monitor performance. The focus must be on competition, transparency, and accountability (Bartone, Leite and Triche, 1991).

The informal private sector and community groups are also gradually being seen as partners for municipalities in developing countries. In Indonesia, cities work with community leaders of low income neighbourhoods to organise community efforts for the self-delivery of waste to a communal depot or to hire and manage the neighbourhoods' workers who provide door-to-door pushcart collection. In Ciudad Juarez, Mexico, the city gave a concession to operate the city landfill to a cooperative of dumpsite waste pickers (Cointreau-Levine, 1994). In Curitiba, Brazil, the inaccessibility

of low-income areas by trucks was solved by involving the community to take the waste to central collection points and by exchanging food and service coupons for the materials. This is funded out of the prevented costs of collection.

2.5.3.2 Formal Private Sector Activities

In countries where local authorities are not able to adequately address the solid waste problem, private companies sometimes fill the gap. This is especially the case in Africa and Latin American where municipalities are often unable to fulfill their service mandates. There are a number of formal private sector activities.

The case of Cooperative Des Femmes Pour L'Education La Sante Familiale ET L'Assainissement (COFESFA) illustrates how private waste collection enterprises fill the gap in solid waste management. In Bamako, the failure of the municipal department (DSUVA) to perform its function led to the involvement of the private sector. In 1991, COFESFA, an NGO consisting of young unemployed university women, got a contract from the governate of the district to handle the collection of garbage in the area called Medina-Coura. Meanwhile the government of Mali (with assistance of the World Bank) established an intermediate agency: Agence d'Execution deTravaux d'Interest Public Pour I'Emploi (AGETIPE), which can bypass bureaucratic government procedures. It was able to pay competitive salaries to a relatively small number of well motivated staff to control private sector operations. Through this agency, COFESFA received a second contract for the area of Dijikoroni – Para (Miles, 1994).

Another institutional arrangement of the Group de Intert Economic que (GIE) Baseya, a private enterprise started solid waste collection in the Hamdallye area in Bamako in 1992 with the approval of the local authorities. This collected fees directly from the residents of the service area. GIE started with sensitising the community about their task and the fee they expected from each household. A respected senior person from each group of households collects the fees and hands the money over to the collection crew. It generated additional income by selling the compost made from the biodegradable fraction, and by selling seedlings from the tree nursery.

COFESFA and GIE Baseya are not the only private initiatives that have taken off in Bamako. In 1992 at least ten units were active in several neighbourhoods. Nevertheless, the municipality could not adequately monitor and control the activities of contractors, or to provide secondary waste collection and adequate disposal services. This is a good example of how privatisation cannot compensate for the lack of an overall municipal waste management strategy or for the failure to have a complete overview and retain accountability.

2.5.3.3 Informal Private Sector Activities

In some cases, waste pickers and recyclers have been able to get official recognition from municipalities by organising themselves and institutionalising their activities. These initiatives are gradually formalising the informal activities that arose as survival strategies. The resulting businesses, especially in the recycling sector are crossing over and becoming more and more ‘formal’. Most of them now act in the grey area between the formal and informal sectors.

Probably, the best known example of institutionalised informal private sector activities are the Zabbaleen in Cairo. This collects about 2,700 metric tonnes of household waste per day, which constitute nearly 50 percent of Cairo's daily total of 6,000 tonnes (Myllyla, 2001). With some outside assistance, they have managed to organise themselves and to extend and upgrade services branching out from collecting waste to setting up and operating recycling and composting businesses. The Zabbaleen have also received formal recognition from the municipal government. Evidences from South – America and South East Asia also suggest that the organisation of the informal sector is indeed a key factor for success and integration in the municipal waste management system.

In Columbia, approximately 1 percent of the population or more than 50,000 families earn their living from urban rubbish (Pacheco, 1992). A marginalised section of population, waste pickers have been organising themselves into locally based cooperatives since 1986, at the national level. With the assistance of a NGO and the University of Bagota, a National Association of Recyclers (ANR) was formed. Currently, 84 joint groups of recyclers exist, subdivided into 7 regional groupings. Since ANR was set up in 1990, it has represented and protected the interest and rights of all recyclers in the country and promoted national policies in the interests of the union backed up by a new legal framework, which oblige the inclusion of the operation in the organised waste pickers union.

To encourage waste separation, the municipality of Quito, Ecuador initiated a project involving micro enterprises. The micro enterprises provided separate collection on

different days of organic, recyclable and non-recyclable waste. The task of the households was to separate their waste according to these categories and to offer it on the appropriate day. The revenues from the sale of recyclable materials went to funds to support neighbourhood improvements (Hernandez, et al, 1999).

The Self Employed Women's Association (SEWA), in India, has managed to improve the living conditions of women paper pickers, by organising them into cooperatives and by searching for easily accessible raw materials in bulk quantity (Bentley, 1988). In recent years, SEWA has expanded its efforts to include alternative income-generating schemes, and programmes for the education and training of the children of the paper pickers.

In Brazil, the organisation of scavengers and waste pickers into cooperatives contributes towards increasing the flow of recyclables and reducing costs, which is currently a major stumbling block to initiating curbside recycling programmes (CEMPRE, 1994).

2.5.3.4 Self-Help Projects by Community Based Organisation

Even when they exist, urban waste collection systems tend to bypass low – income areas. Even in middle and upper income areas, collection services tend to be inadequate. Community based organisations have come to solve these and other problems. In this model of partnership, the initiative comes from the residents themselves.

In South America, a number of CBOs in low-income areas are struggling to get the basic services that meet their needs. Vila Reis is a typical low-income area of Sao

Paulo, with many immigrants from the North-East of Brazil. Its local neighbourhood committee ('Associaco dos Morades de Vila Reis') organized the residents to put pressure on the politicians to improve living conditions and services in the neighbourhood. Their success in waste activities depended mainly on the political colour of the Mayor of Sao Paulo and the resulting cooperation between the municipality and the university.

Many, perhaps most of the community-based self-help projects are initiated by women (Ahmed, 1994). Traditional divisions of labour generally assign women the responsibility for running the household, for domestic food production and for taking care of the children. Therefore most of the women who come in contact with the waste materials, have the greatest interest in a clean and relatively odour – free area and are the most concerned with unsanitary circumstances. The case of Karachi administration women welfare society (KAWWS) in Karachi, Pakistan illustrates how upper income women took such initiative. In 1998, housewives who were dissatisfied with the inadequate services delivered to their middle and upper income area, (the KAECHS-housing project south of Karachi) took the initiative to arrange for a private garbage collection service in their area. They approached the local politicians for support, started a public awareness campaign on the public health and garbage among the residents, and established the KAWWS to deal with these and related issues. The women then arranged their own van to pick up the wastes, despite the fact that taxes supposedly covering this service have already been paid by all the residents. Home-composting or a small composting enterprise in the nearby park was run by some of the waste pickers in

the area. Karachi has a significant number of similar initiatives due to the inadequate, highly centralised administrative system of public service (Ahmed, 1994).

2.5.3.5 Non-Governmental Organisation Activities

Many NGOs are involved with the issue of waste management. These organisations promote environmental health (for example, the need for clean cities), social goals (such as the involvement of street children or working conditions of women and children in particular, generally considered as the most vulnerable group), or a combination of these two.

One of the great NGOs' success stories in waste management is the Balikatan Women's Movement in Manila, the Philippines (CAPS, 1991). Currently, more than 18,000 households separate their waste into wet (animal and food wastes) and dry fractions. Government agencies collect the wet garbage daily, while the dry garbage is bought by collectors who sort and sell the valuable components. The success of the programme can be attributed to an integration of the informal sector that benefits financially, an education campaign focusing on environmental issues, and the support and participation of the junk shop dealers, the community and local government (CAPS, 1991)

NGOs in cities are increasingly recognising the need for collaboration. In Bangalore (India), the role of many NGOs and CBOs in initiating projects has nevertheless failed to have a major impact on the overall solid waste situation in the city. Most projects started as experiments, and have to date remained small-scaled, sporadic and localised.

Although NGOs have an important role in aspects of waste management, their role in potential partnerships should not extend to taking on statutory responsibilities from the municipality. Roles need to be clearly defined, as is the case of Asociacion Centroamericana para la Economia, la Salud y el Ambiente (ACEPESA) in Costa Rica. ACEPESA is a local NGO involved in the development of innovative projects in the field of employment generation and the improvement of working conditions. ACEPESA has carried out a pilot project in San Jose in the District of Hatillo, Area 1, 2 and 3. The municipal government entered into a contract with ACEPESA, giving ACEPESA the responsibility to establish a group of micro-enterprises involved in waste collection and to provide the training. The enterprises were registered as 'foundations' that is, not as profit organisations. The International Labour Organisation (ILO) Promico project supported the micro-enterprises, while an Austrian NGO supplied some basic financing. The citizens paid taxes and fees to the municipal government which in turn contracts with and pays the micro-enterprises. The micro-enterprises divided the tasks and contracted their own work force. They were allowed to employ retired civil servants. The pilot project led to a 'reduction in operational cost of 25 percent but also proved that the entrepreneurs could do the jobs with less labourers.

2.5.4 Lessons from the Case Studies

Sustainable waste management systems are frequently beyond the reach of a developing country's municipal government acting alone. The examples given reinforce the conclusions that the various actors as defined in the previous section already play an extensive role in solid waste management. Neither the municipalities, nor the formal

and informal private sectors, NGOs, and the community can solve the waste problems alone.

The most successful initiatives occur where a mixture of public, private and community involvement has come to being, either through evolution or by deliberate design. The intervention of a NGO or a CBO can often facilitate the development of a partnership which the partners themselves could not manage to arrange. These types of organisation can thus have a crucial role in catalysing partnerships or the institutionalisation of informal sector activities. An important aspect of forming partnerships is the recognition that some form of external stimulus, generally a combination of initiatives from NGOs, local consultancy firms, or universities, is necessary for informal sector activities to achieve formal recognition by the municipality. Left to themselves, low-income groups are unlikely to initiate seeking recognition or institutionalisation of their activities with informal waste management structures.

In general, successful community improvements and smoothly functioning inter-sectoral partnerships depend on the parallel provision of infrastructure and municipal services, including reliable secondary waste collection services. This is one more example of how the whole system depends on the overarching role of the municipal government for coordination and responsibility.

2.6 SOLID WASTE MANAGEMENT POLICIES, LAWS AND REGULATIONS IN NIGERIA

The review of the National context of solid waste management takes the case of Nigeria to examine the historical evolution of government policies on environment and specifically, solid waste management. It examined the role of national government's policy making and legal frameworks. It also includes a discussion on the role of the different branches of the state and the institutional arrangement for solid waste management.

2.6.1 Solid Waste Management in Nigerian Cities

Solid waste generators are responsible for its management at the point of generation. This involves proper storage in covered containers and disposal at recommended collection points. The responsibility for collection and disposal is that of the local government councils. However, there is a steady increase in the rate at which solid wastes are generated in Nigerian cities. Onibokun and Kumuyi (1999), and Ajadike (2001) attributed this to rapid population growth and urbanisation, coupled with high consumption rates. These have put enormous pressure on the ability of the public sector to collect all the wastes generated.

Currently, the level of solid waste collection in Nigerian cities averages between 30-50 percent of waste quantities generated (UNSN, 2001). As a result, a large proportion of the solid waste generated remains uncollected. Large parts of the cities, particularly, the low income areas receive little or no attention of the public sector. The fundamental deficiency of the solid waste management is attributed to government's failure to

assume basic responsibility in raising sufficient funds to provide acceptable levels of service (Onibokun and Kumuyi, 1999; Ajadike, 2001). While all the waste generated in developed countries are collected, in the developing countries, most of the waste produced are not collected (Cointreau, 2006). For cities to be relatively clean, at least 75 percent of the waste should be collected (UNDP, 2005). Accordingly, for health reasons waste in tropical regions should be collected regularly (Snel and Ali 1999). And according to Uchegbu, the collection should be as soon as they are generated (Uchegbu 2002 P.105)

With the very low levels of collection in Nigeria, solid waste management has become one of the most pressing challenges in urban centres. In the words of Aina, "of the environmental problems facing the nation, the most obvious and most embarrassing and the one which has consistently been employed as a blackmail on us as environmentalists is the municipal solid waste disposal problem" (Aina, 1994). The uncollected wastes accumulate at roadsides, and are burned by residents, or disposed in undesignated dumps, which serve as blight within neighbourhoods and risk to public health.

2.6.2 History of Waste Management in Nigerian Cities

The history of urban management (including waste management) in Nigerian cities is "closely tied to that of the local governments, which went through four evolutionary periods" (Onibokun and Kumuyi, 1999, p.59). These are highlighted below;

2.6.2.1 The Pre-colonial Period

During the pre-colonial era, access to social services was governed by a democratic system of communal tenure under which all members of society had equal access rights. The official policy then was an inalienable right of every member of the community to have access rights to services. As the urban communities were fairly simple, there were no formal laws regulating solid waste management (Urban Development Bank of Nigeria; UDBN 1999). The indigenous system of administration was appropriate for the rudimentary management of these communities. The inhabitants of these communities lived by a system of well-defined rules and functional differentiations. Public places were swept in rotation by groups of women; household and other refuse were deposited in surrounding bushes. However, the native physical planning methods were inadequate to handle the extent and rate of further developments.

2.6.2.2 The Colonial Period

At the turn of the 19th century, British colonial administration introduced a series of complex laws and policies whose purpose was to regulate the indigenous people's relations with their environment. The public health Act of 1909 laid the foundation for improved health management. The colonial administration placed a lot of emphasis on environmental sanitation (FMOE, 2000). This period saw the introduction of sanitary inspectors, who went from house to house to ensure those houses and their surroundings were clean and applied appropriate sanctions for recalcitrant residents.

The township Ordinance of 1917 classified townships into three categories and set up different municipal arrangements for first order cities and other orders of cities. The

Town and Country Planning Act of 1947 recognised the need for a separate establishment to complement the local government councils in the south and native administration in the north, to handle town and country planning functions. Despite these measures and the creation of the GRAs, the major shortcoming of the colonial era was treatment of Nigeria as primarily a rural country and urban centres as accidents of area development. Therefore no effort was made to solve the emerging urban problems, particularly, of sanitation.

2.6.2.3 The Post Independence Period

When Nigeria gained independence in 1960, most basic aspects of the policies and laws governing the environment remained virtually intact. However, a few laws were enacted, among which was the State Environmental Sanitation Edicts of 1980s, and 1990s, which mandated Urban Local Government Authorities with the overall responsibility of environmental management (for example, Kaduna State of Nigeria, 1991 and 1984). The sanitation edicts promoted good health by empowering health workers to carry out inspections of public eating houses to ensure that health, hygiene and safety of workers and clients was achieved. The edicts aimed at preventing and minimising disease transmission resulting from unhygienic food handling practices and dirty environment.

Apart from emphasising the role of the public sector, these edicts do not have clauses concerning the roles and relationships between and among the other stakeholders (local communities, the formal and informal private sector) and how they impacted on the

management of the environment. The important landmarks of this period are the 1976 Local Government Reforms and the 2005 Federal Policy Guidelines.

First is the 1976 Local Government Reforms**.** The local government edict of 1976 established a unified and common local government system (single tier local government councils) expected to function as an effective third tier of government. The local government councils were to exercise exclusive constitutional function of solid waste management. The 1976 local government edict was later entrenched in the 1979 and 1999 constitutions of the Federal Republic of Nigeria (FGN, 1999 and 1979). Second is the 2005 Federal Ministry of Environmental Policy Guidelines on solid waste management in Nigeria**.** The 2005 solid waste management policy guidelines set out the details of the objectives of the National Environmental Sanitation (NES) policy. The Federal Ministry of Environment serves as the overall body, charged with the management of environmental issues. The Ministry is empowered to issue guidelines and prescribe measures and standards for the management and conservation of natural resources and the environment. The guidelines on solid waste management recommended for effective, efficient and sustainable waste management strategies require that stakeholders be involved in solid waste management and spelt out the roles expected of all stakeholders.

The central government is required to collaborate with the states and local governments in the management of solid wastes. The policy contains important provisions on the control of pollution and mechanisms for establishment of environmental standards.

Environmental Impact Assessment (EIA), standards for the control of pollution arising out of solid waste disposal are prescribed.

One of the key prerequisites of ensuring environmental quality is the ability to enforce the law. A variety of mechanisms to ensure that the guidelines are enforced are provided. They include awareness raising, licensing and registration of activities, permits, and the use of economic and social incentives like reward for best practices and replication of best practices and lastly, the application of criminal law in cases where the above fails by the local and mobile courts to try offenders and impose sanctions (FMOE, 2005).

2.6.3 Current Policies on Solid Waste Management in Nigeria

Realising that the old and outdated policies would not match the country's current social and economic trends and with the increasing national and global awareness, the government of Nigeria has taken urgent steps towards rationalising the management of solid waste. Emerging from a situation in the 1980s of virtual breakdown of both physical and institutional structures, major efforts were made to establish a new framework for solid waste management. There was the redefinition of the role of government. The central government is saddled with creating enabling environment for action by local governments and communities and the private sector is encouraged to develop a serious concern about waste management.

The Role of the Federal Government

Under the new system, the constitution limits the responsibilities of the Federal Government in urban management to setting broad guidelines and national policies for the lower levels. Such broad policies also include, by convention, setting up national standards (building codes, subdivision regulations, environmental quality protection, etc) to guide urban planning and management.

Worried about the increasing deterioration of the environment relating to urbanisation and public health, the Federal Government of Nigeria pursued its mandate to setup the Federal Environmental Protection Agency (FEPA) in 1988. FEPA's mandate is to "promote cooperation between federal and state ministries, local government councils, statutory bodies or research agencies on matters and facilities relating to environmental protection and to encourage states and local government councils to create their own state Environmental Protection Agency (EPA), for the purpose of maintaining good environmental quality" (FEPA Decree,1989). In 1989 the National Policy on Environment (NPE) was formally launched. FEPA documents emphasised sanitation and waste management "as part of an integrated, holistic, and systematic view of environmental issues" (FEPA, 1999a p.5). The NPE emphasised the overall goal of achieving sustainable development (FEPA, 1989, p.6).

The Federal Government has also taken other positive measures to improve environmental management through the following:

i. The National Urban Development Policy of 1989

ii. The Urban and Regional Planning Decree No. 88 of 1992.

iii. The Environmental Impact Assessment Decree No. 96 of 1992

Similarly, since its establishment, FEPA has led to the enactment of the following important laws on environmental management.

i. The Hazardous Wastes Criminal Provision Decree 42 of 1988.

ii. The Pollution Abatement in Industries and Facilities Generating Waste Regulation S.1.9 of

1991, and

iii. The Management of Solid and Hazardous Wastes Regulation S. l. 15 of 1991.

iv. The National Effluents Limitation Regulation S.1.8 of 1999.

To complement the efforts of FEPA, State Environmental Protection Commission (EPC) was established for each state in 1989. Edict No. 18 describes the tasks and responsibilities of the EPC. The important ones concerning solid waste management are to:

i. advise the state government on environmental policies and priorities;

ii. Formulate and enforce policies, statutory rules and regulations on waste collection and disposal;

iii. Render advisory services and support to all local governments;

iv. Prepare master plans on solid-waste collection and disposal;

v. Monitor discharges and the environmental impact of these discharges;

vi. Enforce applicable laws on activities related to the environment and

vii. Establish environmental criteria, guidelines, specifications or standards for environmental protection.

So, clearly the policy documents do contain some necessary components to cater for effective solid waste management, although to date they have not been effectively implemented.

The Role of the State and Local Governments

The Department of Local Government Affairs in the State Governor's Office monitors the activities of local governments and passes directives and instructions to them as may be determined by state legislation. However, the local government has full constitutional responsibility for management of sewerage and solid waste disposal. Nevertheless, as from the middle of 1980s, for a number of reasons, most local governments could not perform many of the functions imposed on them by the constitution. Waste management did not feature among the few functions the local governments performed. As a consequence, in many parts of the country, the state governments have had to intervene in solid waste management from time to time. But such interventions have not been permanent, so the responsibility for waste management has shifted several times from the municipal and local government to the state governments and vice-versa

2.6.4 Institutional Arrangements for Solid Waste Management in Nigeria

The following section discusses the legal mandates of the key public institutions involved in solid waste management in Nigeria and identifies the main areas of overlapping roles and responsibilities. Figure 2.2 summarises the institutional arrangement for solid waste management in Nigeria.

i. The Ministry of Environment (ME), through FEPA is primarily in charge of setting up (develop and publish) national guidelines for solid waste management in Nigeria, environmental quality standards (and related penalties and fines), and ensuring compliance for pollution control. It also provides guidelines for the preparation of environmental impact assessment, audits, inspections and environmental licenses and permits for engineered landfill sites as articulated in the Act adopting the National Environmental Policy of the Federal Republic of Nigeria. Section 34 of the Act creating the EPA also called for the creation of an Environmental Administrative Court, which, up till today has not been established.

ii. The Ministry of Health and Social Welfare (MH), has through its Division of Environmental and Occupational Health, the mandate to assess the environmental health of the population. This grants the division the power to conduct sanitary inspections, evaluate compliance with the Public Health Law. Nonetheless, no hazardous health care waste (HHCW) management guidelines or standards have been established by the Ministry.

iii. The Ministry of Lands (ML), has responsibility to evaluate Urban Sanitation projects, and provide guidance for the geotechnical investigation of engineered landfill sites.

iv. The Ministry of Works, Housing and Urban Development (MWHUD) is in principle responsible for the installation of the entire infrastructure required for solid

waste management delivery services, including waste collection and transfer stations, and the construction of engineered landfill sites.

v. The Local governments have the responsibility of ensuring clean and sanitary environmental conditions within their jurisdictions. They are thus responsible for sanitation activities including the cleaning, collection and disposal of generated SW. They receive budgetary allocation directly and are supposed to charge residents ~ rates for solid waste collection. The local governments are in charge of waste disposal sites, and are supposed to prohibit littering, and require residents to clean the front, around and sidewalk of their properties. They can also enter into contract with the private sector and civil society for the construction, management of operation and maintenance.

vi The State Government (SG), through the Department of Local Government Affairs in the State Governor's Office monitors the activities of the local governments. The state now performs its role through State Environmental Protection Agency. It also develops its laws and regulations at the state level. In some state capitals, autonomous municipal agencies implement solid waste management.

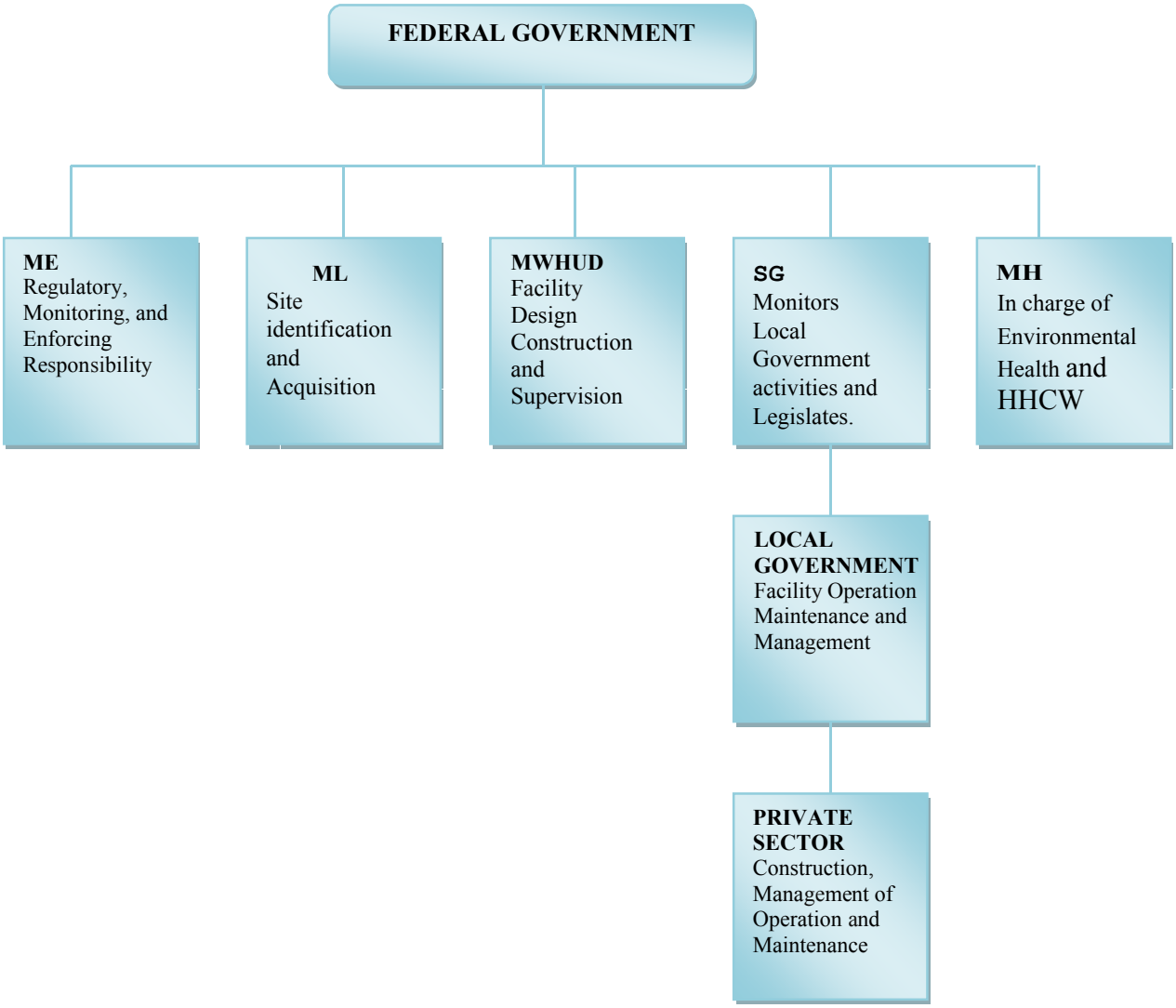


Fig.2.2: Institutional Arrangements for Solid Waste Management in Nigeria

Source: Adapted and modified from FEPA (1999).

The overview of the legal mandate and institutional framework demonstrates clearly the overlap and imprecise division of responsibilities between the various public authorities, as the one between the EPA, the MH and the local governments on the monitoring role and the ML and the MWHUD on their respective responsibilities for preparing engineered landfill sites.

2.7 SUMMARY

This chapter describes the conceptual framework and overview of stakeholders' participation in solid waste management. The major highlights are about solid waste management at the global, African, and national levels. At the global level, the waste management hierarchy was presented. This waste hierarchy draws attention to the technical as well as the social aspects of solid waste management. The former deals with safer methods for waste management while in the latter; the focus is on consumption habits and patterns. It has been discovered that while the waste hierarchy dominates the agenda in cities of developed countries, it receives little attention in cities of Africa and developing countries. These countries still grapple with technical tasks and participatory approaches for waste collection, transportation and disposal.

Under the national context, the focus is on the role of government and legislation. The allocation of functions and roles to different tiers of government was examined. The major problems identified include overlap and imprecise division of responsibilities between the various authorities.

CHAPTER THREE

METHODOLOGY

3.1 INTRODUCTION

Using the conceptual framework developed in chapter one, this methodology aims at investigating the contribution of stakeholders to solid waste management and to determine the factors responsible for the performance of stakeholders' participation. The methodology describes in some details the process of gathering and analysing the general background data on respondents and solid waste generation characteristics and practices. At the same time, in this section, the performance evaluation indicators and determinants for assessment are identified for use in the study

3.2 THE RESEARCH DESIGN

The research involves field surveys of solid waste generation characteristics and solid waste management framework. It addresses households with respect to sources of municipal solid waste generation and practices. The survey also addresses the stakeholders with respect to the variables included in the conceptual model. The aim is to determine the context and constraints to participation of stakeholders, the performance of stakeholders and highlight the factors that influence the performance (Fig 3.1).

To achieve the goals of the study, the following surveys were carried out:

i. Solid waste institutional management framework survey.

ii. The stakeholder survey.

The solid waste institutional management framework survey covers the function and capacity as well as the structure of solid waste management in Zaria. The stakeholder survey covers the role and capacity of stakeholders in the solid waste management regime in Zaria.

The assessment of the performance outcomes of stakeholders, focused on effectiveness indicators with respect to elements of solid waste management such as solid waste collection and disposal. The assessment of the determinants focused on relationships and processes of decision making. Figure 3.1 gives a summary of the research design in the general context of the study.

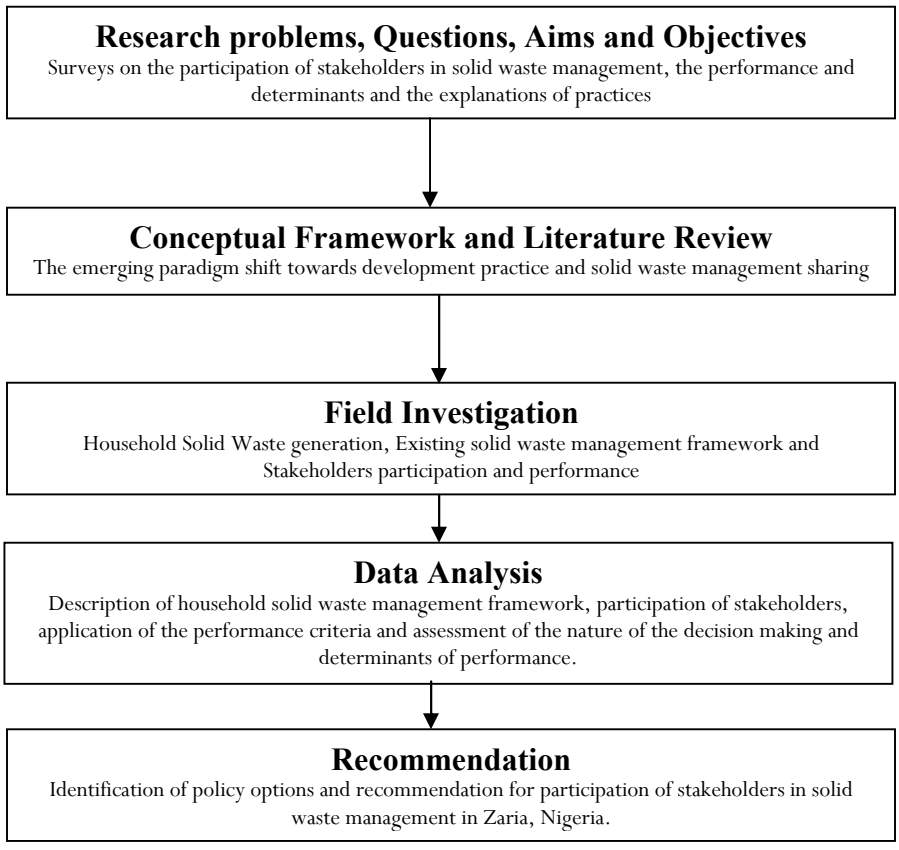


Fig 3.1: The Research Design

3.3 MEASURING THE VARIABLES

The study variables are derived from the review of participation and solid waste stakeholders, and generators of solid waste, and strategies for participation. The survey also provides data on the existing solid waste management framework in Zaria, the context and constraints within which the stakeholders operate the relationships and processes of decision making, and outcome of stakeholders' participation.

3.3.1 Background Data and Description of Households Waste Generation Situation.

The survey is designed to generate background data from households in connection with solid waste status. The questionnaire was designed to collect data on solid waste characteristics and disposal, payment and demand assessment (Table 3.1 and Appendix I).

Data on the waste generation rate and composition were obtained by weighing of waste. Five households out of the eighteen sampled respondents were selected from each of the sampled neighbourhoods for the data. Each of the sampled households was visited every day for one week to obtain the weight of waste generated. The type of waste generated by each household was analysed to determine the amount of waste generated per person per day.

Table 3.1 Structure of Solid Waste Service Users Survey

S/No.	Subject	Questionnaire
1.	Household, housing characteristics	Age, income, household size and type of housing tenure, occupation and business activities.
2.	Solid waste generation and practices	Type of waste, rate and quantity of generation, place of storage, method of disposal, waste separation and handling.
3.	Payment for waste collection	Rate of payment and frequency
4.	Identification of Stakeholders patronized	Type of stakeholder, waste collection arrangement
5.	Demand assessment	How much willing to pay for better services and preference for providers

3.3.2 Context and Constraints for Participation in Solid Waste Management

The survey was designed to generate background data on the existing solid waste management framework in the town as part of the assessment of solid waste services. It addressed the policy, administration, legal, institutional and financial and decision-making processes in solid waste management in Zaria (Appendix II).

The approach is that of assessment of the institutional aspects of the solid waste management framework. The evaluation indicators as set by Schubeler et al (1996) were adopted to provide a general impression of the institutional structures, arrangements for solid waste management as well as organizational procedures and the capacity of responsible institutions. For this purpose, data was sought from Kaduna State

Environmental Protection Agency (KEPA), Kaduna State Urban Planning and Development Agency (KASUPDA), and the records of the Public Health Departments (PHDs) of the two local governments' authorities, national environmental laws, and discussions with the management staff in the aspects shown in Table 3.2.

Table 3.2 Indicators of Institutional Measurements Used for Assessment of the Solid Waste Management framework

S/N	Indicators for Assessment	Source of Data
1.	Rules, standards and responsibilities for solid waste management	Regulations for solid waste management by KEPA, FMOE
2.	Organizational structure of the institutions responsible for solid waste management	PHDs of Local Government Authorities KEPA, KASUPDA
3.	Procedures and methods employed for planning and management	PHDs of Local Government Authorities KEPA, KASUPDA
4.	Capacities of institutions responsible for solid waste management with respect to personnel, equipment, and funding	PHDs of local government authorities
5.	Private sector involvement and participation of communities and households	PHDs of local government authorities, private sector CBOS and user groups

In addition, observations, opinion survey and interviews were conducted to verify the data collection.

3.3.3 Stakeholders Participation in Solid Waste Management in Zaria.

The survey was designed to generate data from solid waste service providers, in connection with the activities. The interview schedule in appendix IIIA, IIIB and IV asked questions on the level of solid waste collection and disposal practices, and related

to those elements, the contexts and constraints to stakeholders participation. Table 3.3 shows the structure of the stakeholder's survey.

The survey was designed to generate data from the stakeholder, in connection with collaboration and decisions making arrangement for solid waste management in Zaria. The issues include the type of structures for decision making, who is involved in decision making and how decisions are made. In addition, sources of resources and existence of mechanisms for coordination was considered.

Table 3.3 Elements of the Stakeholders Survey

S/NO	Subject	Indicators for Assessment
1	Stakeholders characteristics	Mode of operation, charge per kg of waste, place of operation, number of clients, facilities and equipment for solid waste collection, operation cost
2	Solid waste management Practices	Frequency of waste collection and disposal, place of disposal, quantity of waste collection on a daily basis
3	Relationships and Process of Decision-making	Type of assistance from the LGA and other stakeholders, frequency of assistance, cost of contribution. Involvement in decision making, sources of resources and method of allocation, mechanism for involvement and coordination.
4	Contexts and constraints to \participation	Registration with KEPA or LGA; Criteria for registration, Rate of payment for registration. Appropriate level of payment for effective solid waste management; Supervision and enforcement by responsible agencies

3.3.4 Stakeholders Performance Outcomes

Stakeholders' performance outcome for this study used Effectiveness measures (see Table 3.4 for a summary of the outcome variables that are included).

Effectiveness related outcomes covered five performance variables. Ease of access to stakeholders' solid waste collection services, frequency of waste collection, solid waste collection coverage, rate of waste collection and safe disposal of waste are the variables used for the assessment.

Table 3.4 Criteria for the Assessment of Stakeholders Performance Outcomes

Outcomes	Variables
Effectiveness	• Ease of access to solid waste collection services • Rate of solid waste collection • Rate of waste Disposal • Solid waste collection coverage • Frequency of solid waste collection

3.3.5 Determinants of outcomes.

Certain characteristics affect performance outcome directly and indirectly through participation. Table 3.5 lists these determinants of outcomes. There are three variables identified which serves as direct determinants. These primarily focus on general stakeholders technical characteristics. The second set of indirect variables is grouped into two sub-categories; Users socio-economic characteristics, and institutional management characteristics.

Table 3.5 Direct and indirect Determinants of outcomes

Determinants	Variables
1. Technical Characteristic	• Adequacy of facilities and Equipment. • Adequacy of capital. • Appropriate skills.
2. Users characteristics	• Average number of users per stakeholder. • Level of payment by users. • Use of other method of solid waste service.
3. Management Characteristics	• Support from Local Government. • Monitoring and by supervision. • Sanctioning of sub-standard performance.

3.4 DATA COLLECTION

3.4.1 Study Population and Sampling Framework

The Zaria Urban Area population is estimated at about 770,635. With an average household size of 9 people, there are 85,626 households in Zaria. In order to achieve spatial spread in the information collection, cluster sampling method was adopted. Each of the four administrative districts of Zaria walled city, Tudun Wada, Sabon Gari and Samaru was divided into a set of four clusters roughly coinciding with the existing neighbourhood structure of the urban area. This gave rise to sixteen sampling areas from which sampling of households were drawn (Fig 3.2).

The main stakeholders for this study include the local government councils (LGCs), CBOs, formal private collectors and informal private operators. There are 2 LGCs, 15

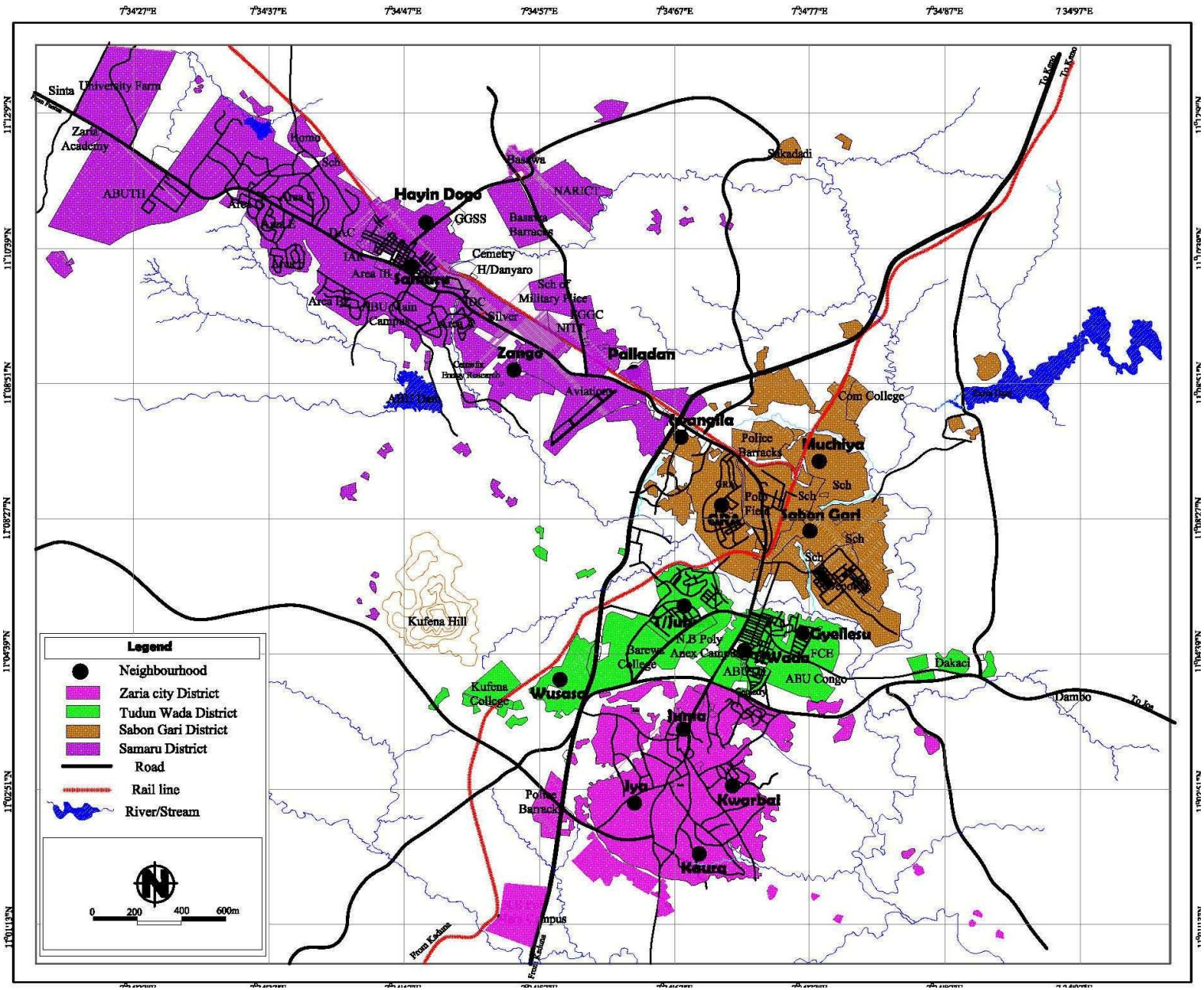


Fig. 3.2: ZARIA URBAN AREA: Existing Neighbourhoods.
Source: Field Survey, 2009.

CBOs, 6 formal private collectors and an estimate of 979 informal private operators associated with solid waste management in Zaria.

The multiple stage cluster sampling is found to be suitable for this study for a number of considerations.

i The need for a fairly even spread of sampled compounds and other beneficiaries across the entire urban area necessitated its fragmentation into units, that purposively cover different parts of the urban area.

ii The likelihood of variability among the sixteen neighbourhoods identified makes it imperative to using this sample design.

iii The desire to ensure validity in information.

3.4.2 Sample Size and Sampling Technique

For the household survey, one street block from each of the neighbourhoods was selected for administration of questionnaire. After determining the street blocks, every compound in the chosen streets was selected for interview to meet the specifications for cluster sampling (Okoko, 2000). There are averages of eighteen compounds in street blocks in the study area. In the compounds, one household head was interviewed. In multiple households, household heads that were available at the time of interview were selected. A total of 288 households were sampled.

The sample size was such that equal numbers of households were taken from all the sectors of Zaria. The selection of equal number of households was to provide a

manageable number of samples and a uniform spread throughout the urban area. This was considered adequate in view of the fair representation that cluster sampling afford.

For the stakeholder's survey, 100 percent coverage was utilised. Purposive sampling of Local government councils, CBOs, KEPA and formal private collectors was undertaken. The directors of the two PHDs of Zaria and Sabon Gari Local Government Authorities, six managers of private sector participants, fifteen chairmen of CBOs were interviewed. With the informal private operators, data was collected at strategic dump sites. A one to one interview with the operators at the time of visit was conducted. One hundred and fifty informal waste collectors were interviewed.

The survey utilised ten field assistants trained by the researcher to administer the questionnaire. They worked in pairs, one each for the four districts for the user's survey. The other pair interviewed the CBOs, the formal and informal private sectors. The structure of the sampling design is shown in Table 3.6

Table 3.6: Structure of the Sampling Design

S/ No	Districts (first stage Clusters)	Neighbourhoods (second Stage Clusters	Compounds (third stage clusters)
1	Samaru	1. Samaru 2. Hayin Dogo 3. Zango 4. Pallandan	Random selection of compounds in each neighbourhood to identify 18 compounds, for the administration of questionnaire. (288 samples). 100 percent coverage of the service providers.
2.	Saban Gari	5. Kwangila 6. GRA 7. Muchiya 8. Sabon Gari	
3.	Tudun Wada	9. Gyallesu 10. Tudun Wada 11. Tudun Jukun 12. Wusasa	
4.	Zaria Walled City	13. Iya 14. Juma 15. Kaura 16. Kwarbai	

3.5 DATA ANALYSIS

3.5.1 Data Analysis Goals

The research sought to make its contribution to the issues raised in the problem statement by testing significance of performance outcomes of stakeholders' solid waste management service delivery. It examined from the perspective of users and agencies, the extent to which the outcomes of stakeholders' participation in solid waste management in Zaria, Nigeria, meets the expectation for effective management in the elements of solid waste management and to give explanations for the practices.

Using data from the solid waste management users and stakeholder surveys, analyses were conducted to achieve the following objectives;

i. Description of the framework and stakeholders in solid waste management to establish the context and constraints to participation by stakeholders, and relationship and processes of decision-making.
ii. Assessment of the performance of stakeholder's participation to establish the outcomes and draw out inferences
iii. Assessment of determinants of solid waste management outcomes in Zaria to establish explanations for the performance

3.5.2 Data Analysis Methods and Approaches

Statistical tests were performed by application of non-parametric technique of chi-square to allow for inferential analysis to be made.

3.5.2.1 The Goals of Statistical Analysis.

The objectives of the statistical analysis are;

i. To establish the characteristics of the household data set in relation to percentages and the extent to which they represent the sampled population.

ii. To establish the performance of solid waste management by the stakeholder in Zaria.

iii. To establish the association between performance and determinants and the strength of the association.

3.5.2.2 The Statistical Tools and Procedure

The statistical tools and procedure utilised include;

i. Descriptive analysis

Statistical tests have been performed to analyse the characteristics of the data set. The primary reason for the descriptive analysis is to establish the characteristics of the data. This is critical for valid inferences.

ii. Test of Significant Differences

The Chi-square test was used to test significant differences between the variables of stakeholders' performance at different levels. The chi-square test is adequate for confirmation of the differences in the performance in order to establish effectiveness of stakeholders or not.

iii. Test of Independence.

Chi-Square contingency and contingency coefficient tests were used to establish dependence between stakeholders' performance and determinants and strength of the association.

3.6 LIMITATIONS TO THE STUDY

3.6.1 Data Sourcing

This study encountered some problems at the point of data gathering. Some of the problems faced relate to dearth of secondary sources. There is lack of data on solid waste management in general both within and outside academic circles. Another area of problems relates to the obsolete nature of data at the local government authorities. Regular solid waste management by the local government ceased since 1991. As a result the information on the state of solid waste management is not current. The information transmission from the authorities is disjointed as most of the officials are newly employed. In addition, the officials are not forthcoming with information requirement. The question of allocation of resources for solid waste management is a thorny one. The local government officials failed to divulge the information on budget allocation for solid waste management. However to go around this, the researcher was able to get an estimate of the amount required by the two local government authorities to adequately manage solid waste in the town.

3.6.2 Data Validity

There is a problem of validity of data in social research. However Mathison (1988) thinks a major way to increase the validity of data is by triangulation. This advocates the

combinations of different methods of data collection. “This can mean using several kinds of methods or data, including using both quantitative and qualitative approaches” (Patton 2001; 247). Engaging multiple methods such as observation, interviews and discussions leads to more valid, reliable and diverse construction of realities.

One crucial approach to ensuring data validity in this study involved data collection from as many sources as possible to enable the study establishes a general pattern. An example of the relevance of using multiple sources of data concerns the issue of frequency of waste collection by the stakeholders in the town. The use of questionnaire and interviews with users and stakeholders corroborated the information. Through observation, photography and discussion, the researcher was able to confirm the practices.

3.7 SUMMARY

This chapter describes the variables measured, data collection and analytical methods. The analytical model has been used to determine the type of data requirements for this study. The model draws attention to four categories of data requirement for this study. This is linked to the context and constraints within which stakeholders operate and the practices of stakeholders, performance outcome, and relationships and process of decision making.

Under the context and constraints for stakeholders’ participation, the variables addressed policy, legal and institutional frameworks for stakeholders’ participation. The data was sourced from KEPA, Local Government Authorities, KASUPDA and

FMOE. The section of the practices of stakeholders addressed the various stakeholders' solid waste management and relationships. The outcome of stakeholders' solid waste management set out measures for evaluation of effectiveness. It covers accessibility, rate of solid waste collection and safe disposal, collection coverage and frequency of collection.

Under the data collection and analytical methods, the cluster method of sampling was utilized for households. The coverage of the stakeholders is set at 100 per cent due to the small-size. The data analysis method was set with the objectives to establish the characteristics of the data set, significance in the performance of solid waste management by the stakeholder, and dependence and strength of the association between performance and determinants of outcome.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 INTRODUCTION

This chapter presents the results of the field survey on solid waste management in the Zaria. The framework and the solid waste management practices of stakeholders are highlighted. This is to bring out the context and constraints for the participation of stakeholders and the problems limiting effective solid waste management. It also examines the role of the different institutions and stakeholders. Finally, the chapter examines the practices of the different stakeholders in Zaria. This provides opportunities to draw attention to the practical problems confronting the sector in the urban area.

4.2 DOMESTIC SOLID WASTE GENERATION AND COMPOSITION

Domestic Solid wastes are the by-products of housekeeping activities and consumption (NEST, 1991). This includes papers, leaves, food stuff, cans, and packaging materials. The volumes of waste generated is primarily a function of the people's consumption pattern and, thus of the socio-economical characteristics (Schubeler et al; 1996). Domestic waste composition has been found to differ from country to country and from one socio-economic area to another due to differences in consumables available to the different households.

The objective of this section is to ascertain the amount and composition of solid waste generated in the study area.

4.2.1 Rate of Solid Waste Generation in Zaria

This study made estimates of daily and yearly volumes of domestic solid waste generation in Zaria. Determined by districts, the average rate of solid waste generation in Zaria is 0.29kg per capita per day. The per capita waste generation is highest in Sabon Gari and Tudun wada districts with 0.31kg. The least rate is in Samaru and Zaria districts with 0.27kg and 0.28kg respectively (Table 4.1). Using the average per capita rate of waste generation for the town, the daily and annual volumes of domestic waste generation is about 228,010kg and 83,223,651kg respectively.

Table 4.1 Per Capita and Rates of Domestic Waste Generation for Zaria

District	Rate of waste Generation				
	Average per Capita per kg/Day	Average for The LGA	Population	Daily Generation (kg)	Annual Generation (kg)
Samaru	0.27	0.29	318,059	92,237.1	33,666,542
Sabon Gari	0.31				
Tudun Wada	0.31	0.30	452,576	135,772.9	49,557,109
Walled city	0.28				
Zaria (Total)			770,635	228,010	83,223,651

Source: Field Survey, 2009

The average rate of waste generation for Nigerian cities is 0.45kg per capita per day (UDBN, 1999). The highest rate of 0.77 kg per capita per day is recorded for Asaba while the lowest rate of 0.25kg per capita per day is for Jos (NEST, 1991). Studies carried out by Matagi (2002) in Kampala also revealed that the average waste generated per person per day was 0.55kg.

4.2.2 Types of Municipal Solid Waste Generated in Zaria

Municipal solid wastes are categorized into commercial, institutional, residential, market and industrial (Table 4.2). These are related to foodstuffs, vegetables and grass, glass, textiles and papers (UNEP, 2009; Ogwuleka, 2009; USEP, 2003 and Cointreau, 1982). Municipal solid waste in Zaria is generally composed of food and animal wastes, leaves, grass, plastics and polyethylene, metal, paper and cardboard, rags, ash, bones and miscellaneous. The waste composition shows a very high level of biodegradable (organic) materials in the waste stream (Table 4.3).

Table 4.2: Types and Quantity of Waste Generation in Zaria.

Type of Waste	Quantity (tonnes/day)	Percentage
Commercial	19,121	4
Residential (Domestic)	288,010	49
Institutional	44,219	10
Market	89,343	19
Industrial	63,337	14
Hazardous/Hospital	21,115	4
Total	525,145	100

Source: Field Survey, 2009

The table shows that the total quantity of the municipal solid waste generation in Zaria is 525,145 kg per day. Out of this level, residential waste contributes 49 percent, constituting

about half of the total generation in Zaria. Market and commercial waste makes 23 percent while hazardous and hospital contribute the least level of 4 percent.

Table 4.3 Composition of Solid Waste in Zaria

Type of Waste	Composition of Waste by Districts				Average Total (%)
	Samaru (%)	Sabon Gari (%)	Tudun Wada (%)	Walled city (%)	
Vegetable /putrescible	46	40	47	48	45.2
Paper and Carton	15	15	20	21	17.8
Ash/Dust	12	14	12	10	12
Metal	8	9	6	5	7
Plastic	8	10	7	7	8
Glass	8	9	6	6	7.2
Miscellaneous/Rubber	3	3	2	3	2.8

Source: Field Survey, 2009

The organic waste composition which includes vegetable, paper and carton, ash and dust ranges from 69 percent to 79 percent. Sabon Gari district has the least of 69 percent, while Samaru district has 73 percent and the walled city district has the highest level of 79 percent. The proportion of non-biodegradable wastes which includes plastics, metals, glass and miscellaneous is low and range from 21 percent for the Walled City District to 31 percent for the Sabon Gari district. This level is similar to what obtains in developing countries cities but below what is observed in developed countries where inorganic waste ranges from 55 percent to 69 percent of the total waste stream (Cointreau, 2006, Hoornweg et al, 1999).

The composition of domestic solid waste depends to a large extent on the level of industrialization and income of the population that contributes to the waste stream. UNEP (1983) found that solid waste from the cities of Accra (Ghana) and Freetown (Sierra Leone) were composed of 85 percent and 60 percent of vegetable and putrescible matter as compared to industrialized cities of Berlin (Germany), London (Britain) and Washington (USA) which had 16 percent, 17.6 percent and 27.4 percent organic, respectively. The differences in waste composition can also arise due to differences in waste separation, sorting and identification practices (UNEP, 1983). However, due to low level of industrialization and socio-economic differentiation in Zaria, there are no differences in the composition of waste generated among the different districts.

The very high level of organic wastes in the waste streams can be attributed to the fact that Zaria, like many other cities in developing countries, depends largely on fresh foods. For instance, Martin (2000) observed that much of generated solid waste in Third world cities contain about 70-80 percent unprocessed fresh food that ends up contributing to a high amount of organic waste. The resulting content gives a high moisture level in the waste. As such, the waste generated has low caloric value. These characteristics cannot sustain incineration without addition of fuel. But the high organic content means that the waste has high potential for compost making. Indeed, farmers obtain compost manure from waste dumps.

One emerging trend globally is the increasing level of polyethylene and plastic materials in the waste stream. In Zaria, the high level of plastics and polyethylene in the waste stream reflect the increasing importance of these materials for production of household items and

as packaging. Post consumption plastic has very limited value, and is responsible for environmental problems in the form of litter, emission of toxic pollutants during burning and contamination from chemical additives.

4.3 FRAMEWORK FOR SOLID WASTE MANAGEMENT IN ZARIA URBAN AREA

This section examines the legal, institutional, and organisational components of solid waste management frameworks in Zaria. The aim is to highlight the responsibilities and arrangement for solid waste management and the problems that limit the success of the current management strategy in the urban area.

4.3.1 The Legal and Regulatory Framework

The responsibility for solid waste management derives from the Public Health Act of 1909, the Township Ordinance No. 29 of 1917, the Town and country planning ordinance of 1946 and the Nigerian constitution (UDBN, 1999 and FGN, 1999). To meet this responsibility, the Kaduna State Government drafted a number of bylaws relating to solid waste management. The most important are the Kaduna State Environmental Sanitation Edicts of 1984 that was amended in 1991, the Kaduna State Task Force Committee on Environmental Sanitation Edict, No.12 of 1986 and the Kaduna State Government Regulation No. 1 of 1998 (KEPA, 1998).

The 1998 solid waste management regulation gives considerable responsibilities to the local government authorities with respect to waste collection and disposal. The regulation requires the local authorities, among other things to evacuate refuse and junks from any public or private places (S 4 i, ii, iii) Also, local authorities are required to provide and

maintain public dustbins and receptacles for the temporary deposit of refuse. The local governments are also empowered to ensure that residents keep various activities premises and surrounding clean (Sections 1-4).

The rules impose the following requirements:

i. Section 3(i) requires the occupier of any building to provide a covered dustbin to store refuse. Dustbins are to be maintained to the satisfaction of the sanitary inspectors. Section 3(iv) requires every occupier of any premises to remove daily or at regular interval waste to authorized places

ii. The section empowers the authority to issue permit to any person to deposit refuse or waste on designated refuse disposal sites and may charge such fees as it deems necessary for the permit.

iii. Section 4(i) requires the authorities to provide refuse disposal sites and provide properly and securely covered motor vehicle for the transportation of any refuse from the designated disposal site to the ultimate or final disposal site. The rule also prohibits the throwing or burning of waste.

iv. Section 14 prescribes for the authority to enforce penalty for contraventions of the regulation. This shall be a sentence to a fine of not more than one hundred thousand naira (₦100, 000.00) for individual or 5 years imprisonment or to both such fine and imprisonment.

The regulation also made adequate provision for contracting the collection of household waste to any business or individuals.

Section 5(i) requires the business to obtain a license from the LGA where the person intends to operate. This requires the business to be registered with KEPA and under the company's and allied matters Decree of 1990.

Section 6 requires KEPA to enforce, monitor and ensure that the private sector complies with standards of solid waste management with respect to collection and registration.

Section 7 Covers the technical aspect of operation and requires the person transporting the wastes to cover the vehicles in such a way that the waste do not escape from the transporting vehicle, to litter the highway or any street.

4.3.2 Institutional Framework

So many actors intervene in, or have impact on, the management of solid waste in Zaria. These are KEPA, Local Government, Formal Private Sector, Informal Private Sector, the Communities and households (Fig. 4.1). However, only three of these actors have responsibilities recognized in the legal document (KEPA, 1998 and FMOE, 2000). These are KEPA, Local Government and households. The responsibilities of the other stakeholders are not defined.

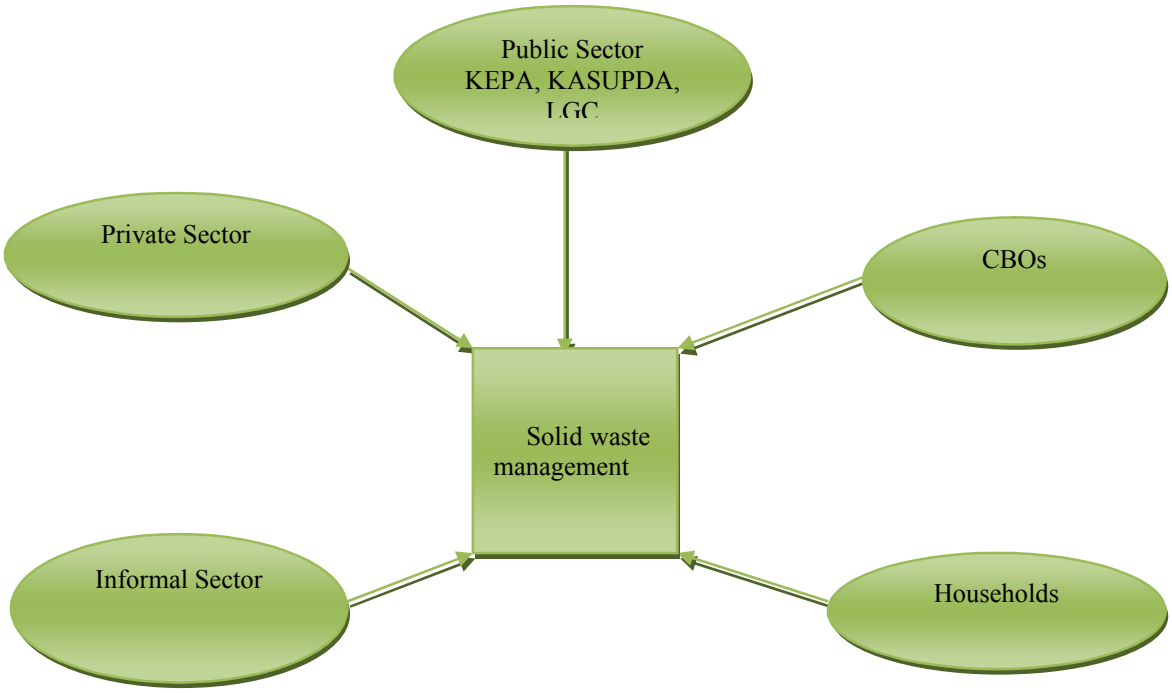


Figure 4.1: **The main Actors in Solid Waste Management in Zaria**
Source: Field Survey, 2009

KEPA: KEPA represent the state, and is responsible for regulatory and monitoring activities, which sometimes necessitates the enactment of legislations. KEPA was at one time responsible for direct solid waste management in Kaduna Metropolis. In the more recent guideline by the ministry of Environment, (FMOE, 2000, p.15), the state governments are to be responsible for:

- Imposing recycling responsibilities on industries and businesses
- The supervision and enforcement of bye-laws;
- The promotion of environmental matters within individual states;
- The provision of land for waste management infrastructure; and
- Assisting in capacity building

In addition to the responsibility listed above KEPA also now manages contracts between local government authorities and private sector operators in solid waste management.

Local Government: Local governments represent the lowest tier of government, and are constitutionally empowered to handle solid waste management (FGN, 1999 pg 151). In Zaria, the Local Government Authorities solid waste management responsibility is undertaken by the Public Health Department (Fig. 4.2). The functions as specified by UDBN (1998, p.148) include the following:

- The identification of strategic and convenient sites for the placement of bins or erecting refuse depots;
- Collaboration with other agencies to collect and dispose refuse of all kinds;
- The provision of support services in other aspects of environmental sanitation;
- Monitoring the spread of disease and epidemic and to facilitate appropriate remedies; and
- The maintenance of government equipment and facilities for waste management

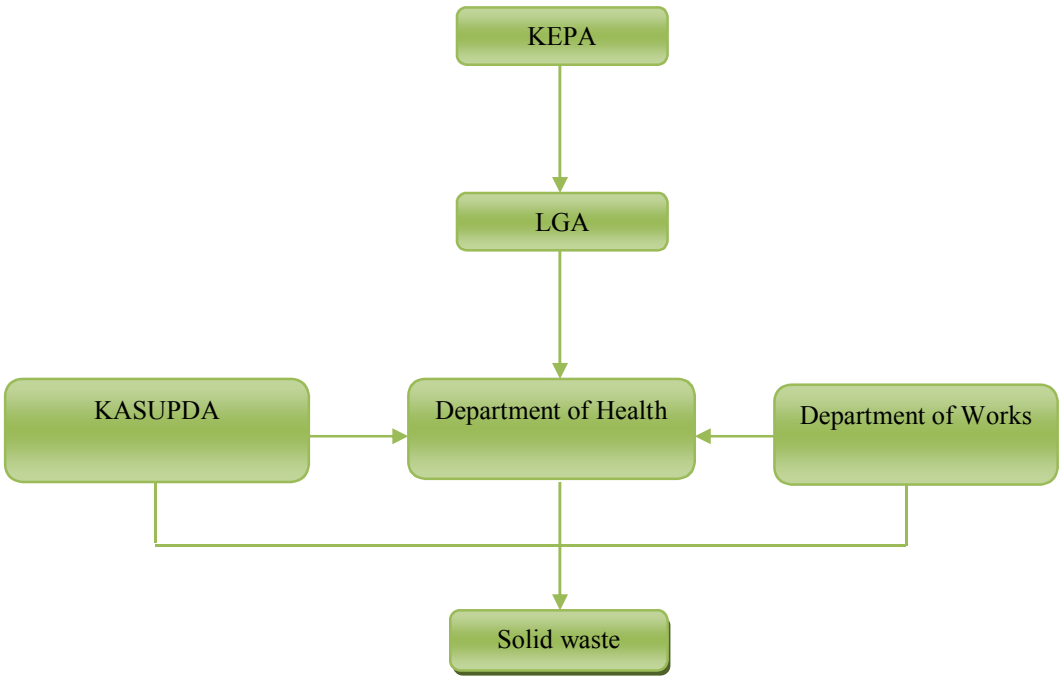


Fig: 4.2 Institutional Arrangements for Solid Waste Management by Local Government Authorities in Zaria

Source: Zaria and Sabon Gari Local Government Authorities

The two Local Government Authorities in Zaria have at one time provided and maintained communal depots and collected household solid waste for disposal on a regular basis. Now, solid waste collection from communal depots and disposal is very irregular. The LGAs now contract with private firms and collect waste from areas of high visibility and serve abatement notices on communities to undertake communal solid waste collection in the communities.

The department of works is responsible for matters related to vehicles, plants, and equipment, as well as purely engineering issues, such as roads leading to disposal sites while KASUPDA is responsible for setting out temporary disposal points and land for waste collection and disposal.

It is noteworthy that the private sector, CBOs and the informal sector are not included in the solid waste management set up. Neither is there any linkage between the two local government authorities as each operates its system independently. Even the traditional authorities that are important to urban administration in the northern part part of the country are not included. The households also have no influence in the system. Effective solid waste management is dependent upon an appropriate distribution of responsibilities, inter-local government authorities' co-operation and inclusion of other stakeholders in the institutional set-up.

Formal Private Collectors: The formal private collectors are a recent addition to actors in solid waste management in Zaria. The collectors are engaged in waste collection,

transportation and disposal for profit. The private collectors came on the scene because of the need of commercial institutions like banks, hotels, and so on for regular waste collection. The private collectors are made up of several registered small enterprises and only six are registered with KEPA. All of the operators have minimal interaction with the LGCs though they utilize the authorities' disposal facilities.

Informal Operators: The informal operators have been into solid waste management in Zaria for quite some time. There are numerous members of the informal operators involved in Zaria, and thus, very difficult to estimate the number involved. The sector operates without registration of their activities and there is no formal recognition. The activities of these actors receive attention of the public agencies when there is a visit from dignitaries. However, most of the time there is no monitoring of their activities. This sector operates as individuals who engage in primary waste collection, disposal and value – adding and secondary activities on a small-scale. Their main motive is to generate income as most of the participants do not have other means of livelihood. The recovery network is not adequately equipped, however, there seems to be specialization in recovery network as there are collectors, junk buyers and recyclers.

Community Sector: Community based organisations operate within specific neighbourhoods across the town. A large number of CBOs are found in Zaria, fifteen of which are environmental CBOs. The CBOs activities are sometimes undertaken in collaboration with and supported by the local governments. The CBOs solid waste management undertaken activities are undertaken with the direct goal of environmental

cleanliness. As such, public enlightenment, awareness campaigns, clearing of drainage and refuse, and burning of waste dumps and their main activities.

Households: The households have no influence in the system. They are not consulted by the public sector with regard to solid waste management. The Local Government Authorities see their role in relation to the households as one of creating awareness but do not see the households as effective participants in the system of solid waste management. However, households undertake their own solid waste activities with respect to storage and collection. Some of them engage private collectors and informal operators to collect their waste at an agreed price.

4.3.3 Organisational framework for Solid Waste Management by the Local Government

According to the Director of Public Health, Zaria Local Government Area, solid waste management is the responsibility of the health department of the local authority. The health department is divided into three sub-departments: curative services, preventive services, and social welfare services. The prevention services sub-department is further divided into five sections; Disease control, Cleansing and Sanitation, Building, Food and Water, and Inspectorate (Fig 4.3). The Cleansing and sanitation Department is the executing body for domestic waste collection, disposal, street sweeping, grass cutting, and with the assistance of the works department, clearing of the drains.

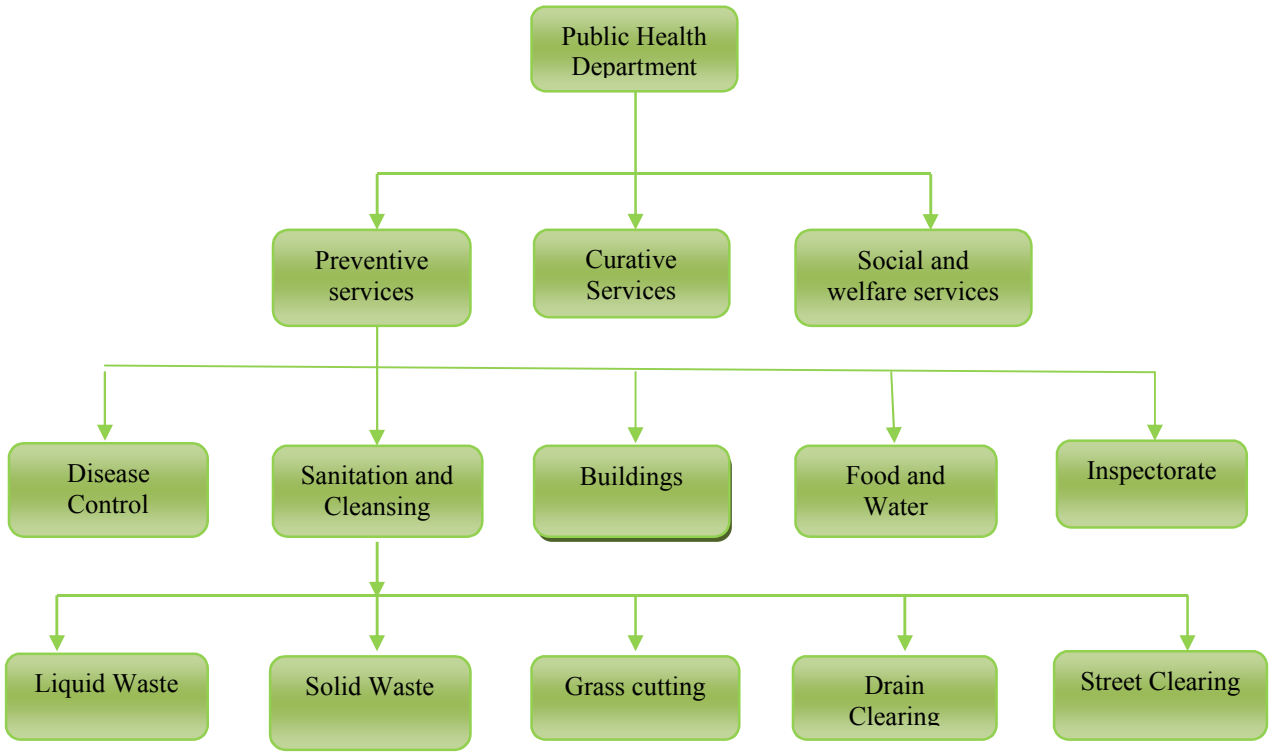


Fig. 4.3: Solid Waste Management Structure of the Zaria Health Departments
Source: Sabon Gari and Zaria Local Government Authorities

The public health department is structured on the basis of health districts. There are thirteen health districts in Zaria town (Fig 4.4). Each of the city's district health offices undertakes the department activities in the respective zone. These health offices are headed by health officers who oversee the department activities.

This organisational setup for solid waste management in Zaria is very inadequate for effective solid waste collection and disposal. It is clear that solid waste management is given relatively little weight in the department of public health organizational set up as it is tucked down into a section of a sub-department of the health department. To see solid waste management as a health issue is perhaps to take a narrow focus, as it subsumes other aspects of solid waste generation and management like the socio-economic characteristics

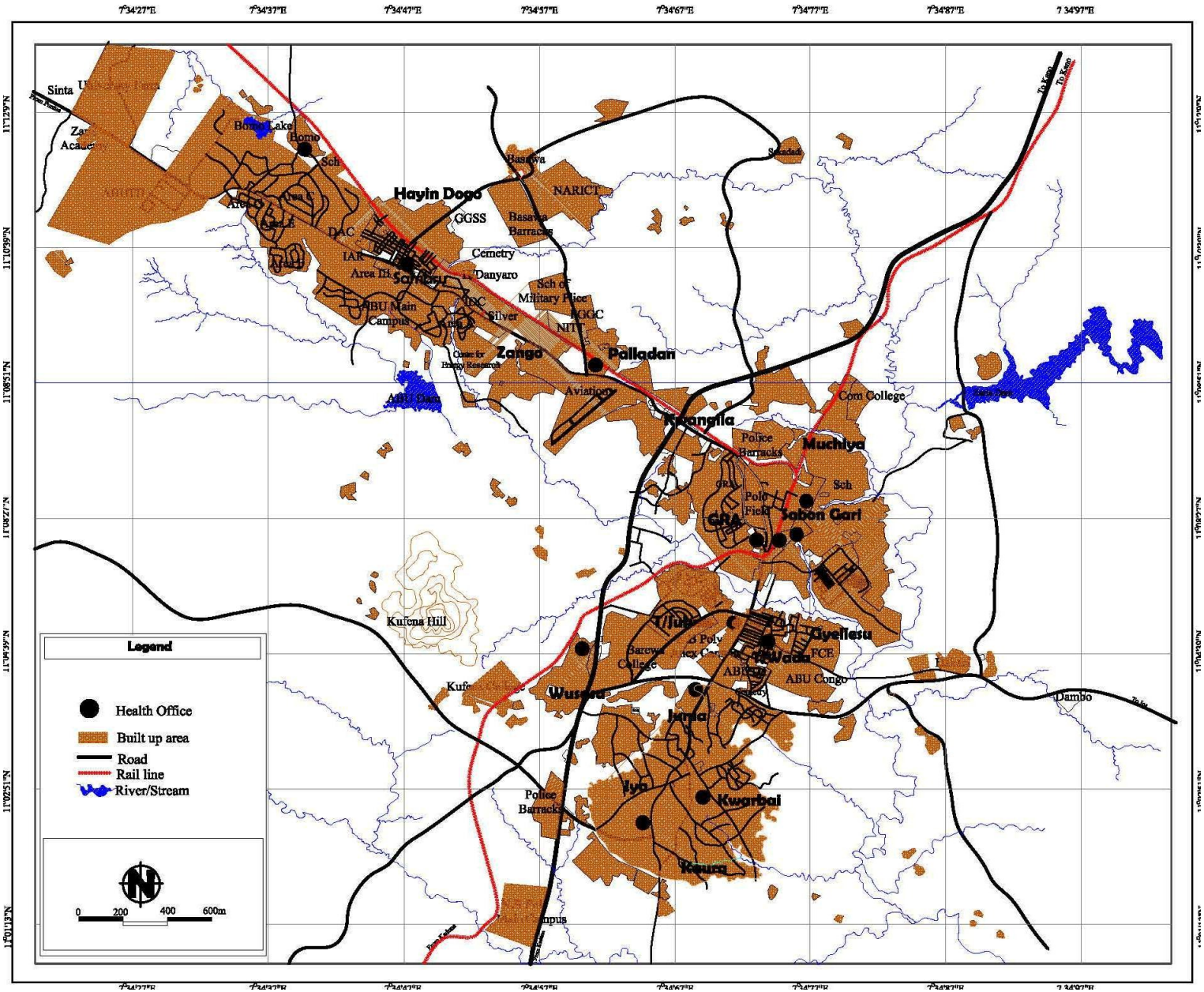


Fig. 4.4: ZARIA URBAN AREA: Health Offices.
Source: Field Survey, 2009.

of waste generators, recycling, waste treatment and sanitary disposal. There is need for a holistic approach to solid waste management in which the issues such as adequate information system, interaction between the different health offices and other aspects of solid waste management are considered.

4.4 STAKEHOLDERS AND SOLID WASTE MANAGEMENT PRACTICES

Human activities create waste, and it is the way these wastes are handled, (stored, collected, transported and disposed) that poses risk to the environment and public health. Typically, very little of the solid waste generated in Zaria is collected. However, many stakeholders are involved. The rise in the involvement of Community Sector and groups in service delivery has led to an advocacy for stakeholder's participation globally. These stakeholders have different motives and interests for participation as shown in Chapter Two. This has implications for the mode of operation and arrangement for service delivery. For instance, even collected waste is often disposed of in uncontrolled dumpsites. This section discusses the solid waste management status and waste handling practices of stakeholders in Zaria. It considered primary solid waste management at the household level, and secondary waste (collection and disposal) handling by the stakeholders at the urban level.

4.4.1 Household Solid Waste Handling Practices

Proper handling at the households' level constitutes the first step to effective management. According to the 1998 solid waste management guideline, solid waste generators bear the responsibility for storage of wastes in closed-fitted receptacles (KEPA, 1998). This extends to waste sorting through the use of separate receptacles for degradable and non-degradable materials. These are the important issues for proper organization of solid waste at the

household level. However, peoples' attitudes towards waste is a determinant of the waste handling: interest in waste reduction and minimization, involvement in separation of wastes, the extent to individuals and households refrain from indiscriminate dumping and littering, and the effective demand for waste collection services, as may be indicated by the interest in, and willingness to pay for collection services. This section, thus examines solid waste handling, and the level of demand for services by households.

4.4.1.1 Waste Storage by Households

Though, no special arrangements are made for waste storage in the study area, over 96 percent of the respondents in Zaria indicated the use of waste storage facilities in their homes. About 4 percent do not use storage facilities. These groups of respondents throw wastes directly onto the streets, drains, and open spaces (Table 4.4). While the result shows a high level of waste storage in the study area, none of the respondents use the standard close-fitted receptacles. The rule requires that dust bins are to be maintained to the satisfaction of the sanitary officers and penalty enforced for contraventions of the regulation.

Table 4.4 Waste Storage at Sources of Generation

Storage Facilities	District				Total sample	% proportion
	Samaru	Sabon Gari	Tudun Wada	Zaria		
Drum	13	12	21	16	62	21.5
Plastics	35	50	41	50	176	61.1
Carton	7	9	8	4	28	9.7
Polyethylene	10	-	2	-	12	4.2
Open space	7	1	0	2	10	3.5
Grand total					288	100

Source Field survey, 2009

Various alternative items are used as storage facilities. This includes polyethylene bags, old drums, baskets and plastic containers. Drums and plastics constitute 21.5 and 61.1 percent respectively of storage materials. However there are differences among the districts in the use of storage facilities. Drums and plastics containers constitute 21 percent and 41 percent of the materials utilised in Tudun Wada district while it is 12 percent and 50 percent respectively in Sabon Gari district. Polyethylene is an important storage container in Samaru (10 percent) compared to other districts. These storage containers usually get filled up quickly and spill over to the surrounding with little sentences and penalty imposition by the local authority in the study area.

4.4.1.2 Waste Separation

While waste separation is essential for proper handling of waste in any set up, there is practically no waste separation in the study area as all the various components of waste are stored together in one receptacle. In order to facilitate separation of waste, households are supposed to use different containers for biodegradable and non-biodegradable solid waste. However, respondents pick out the valuable wastes for re-use and utilise one storage container for all types of solid waste. This condition makes the work of scavengers and recyclers difficult and exposes them to health hazards. As shown in a number of studies, non-separation of solid waste at sources of generation expose waste workers to health risks as they sort through to recover valuables before disposal (Cointreau, 2006; Myllyla, 2001).

4.4.1.3 Solid Waste Disposal by Households

Because solid waste collection at the household level is not regular, households utilize different methods to dispose of the generated waste instead of proper management as Table 4.5 shows. This disposal includes burning, throwing on the streets and open spaces, and burying. Expectedly, burning of wastes constitutes the common method of waste disposal employed in Zaria (Plate I), with Zaria walled district accounting for the highest level of waste burning. This is followed by Sabon Gari, Tudun Wada and Samaru districts with 57 percent, 56 percent and 28 percent respectively. Overall, burning is undertaken by 70 percent of the respondents. Other methods utilized include burying, throwing into the streets and gutters, and open spaces account for 3, 5 and 1 percent respectively. Only 21 percent of the respondents dump waste at the approved communal depots. The disposal method utilised goes to prove the view of Schubeler et al (1996) that disposal is not normally a priority demand of service users, so long as the quality of the living environment is not affected by dumpsites.

Table 4.5 Method of Solid Waste Disposal by Households

Disposal methods	District				Total	% proportion
	Samaru	Sabon Gari	Tudun Wada	Zaria walled		
Communal Depots	25	14	13	8	60	21
Gutter/Street	10	-	3	2	15	5
Burning	28	57	56	61	202	70
Burying	6	1	0	1	8	3
Pits/open spaces	3	0	0	0	3	1
Grand total					288	100

Source: Field Survey, 2009



Plate I: Burning of waste at Angwan Kanawa, Sabon Gari,

The limited number of officially designed communal depots and non-regular collection of solid waste could be responsible for the high incidence of use of other methods of waste disposal in the study area. This has severe repercussions on the environment. For instance, dumping of waste in open spaces, gutters and along roads block drains and reduce the width of the road. In addition, as solid waste is usually burned within the neighbourhoods, it causes pollution and creates environmental and health hazards to the population.

4.4.1.4 Payment by Households for Solid Waste Collection

Households that are unable to move the wastes to collection points utilise informal and formal private sectors for waste collection. For the service rendered, households pay the waste collectors an agreed sum of money. The pay ranges between N100.00 to N500.00 per month. As Table 4.6 shows, many households, about 84 percent of the respondents pay between N100 to N200 per month for solid waste collection. Very few – 10 percent pay

above N200 per month for collection while 6 percent of the respondents do not pay anything because they do not engage the services of collectors.

Table 4.6 Payment for Solid Waste Collection

Amount (₦) Per Month	District				Total sample	% proportion
	Samaru	Sabon Gari	Tudun Wada	Zaria Walled City		
No payment	7	2	3	5	17	5.9
100-200	65	55	57	56	242	84.0
201-300	1	3	2	1	7	2.4
301 and above	0	12	10	0	22	7.7
Grand total					288	100

Source Field survey, 2009

The spatial distribution pattern of respondents who make payments is similar. Samaru and Zaria walled districts do not have respondents who pay more than N300 per month. However, Sabon Gari and Tudun Wada districts have respondents who pay above N300 per month for solid waste collection. Even though this level of payment is not sufficient to maintain an efficient solid waste management system, it shows that a majority of the respondents will pay for the services if commercial charges are implemented.

In order to investigate the viability of the private sector activities, household heads were asked if they are willing to pay higher amount for solid waste collection and disposal should the service be improved. About 84 percent of the respondents are willing to pay if services are improved and regular while the remaining 16 percent are not willing. The respondents who are not willing think that solid waste management is a public sector responsibility, and want government to continue to maintain the responsibility for management.

4.4.2 Public Sector Solid Waste Management Practices.

The health departments of the two Local Government Authorities are to collect and dispose the wastes generated in Zaria. To do this, the authorities require staff, finance, equipment and infrastructure.

4.4.2.1 Staff and Responsibilities

The health departments of the two local government authorities employed a total of 207 staff for solid waste management. The staff constituents total 130 for Sabon Gari and 77 for Zaria local Government councils (Table 4.7). Among the staff are Health Officers, Environmental Technicians, Labourers and Drivers. The staffs are in four categories.

Table 4.7 Solid Waste Management Personnel and Units

Unit	Sabon Gari LGA		Zaria LGA	
	No. of Staff	%	No. of Staff	%
Health inspection	7	15.4	6	7.8
Waste collection	61	46.9	35	45.5
Road Sweepers	57	43.8	32	41.5
Drivers	5	3.9	4	5.2
Total	130	100.0	77	100.0

Source: Sabon Gari and Zaria LGC Health Departments, 2009

The labourers (waste collectors and road sweepers) make up the highest number of workers with 47 percent and 44 percent for Sabon Gari and 46 percent and 42 percent for Zaria LGC respectively. The section is grossly understaffed as many of the labourers are casual workers. The directors of health of the LGCs indicate that between 300 and 400 staff are required for effective performance in the urban area. In addition, the workforce is poorly educated. There is a large discrepancy between the job requirements and the actual

qualifications of the staff as over 82 percent of the workers are with primary and non formal education (see Table 4.8). The calibre of staff, particularly at the technical level is very inadequate. There are no environment managers and Planners at the Local Government level.

Table 4.8 Staff Qualification

Designation	Number	%	Qualification
Health officers	2	1.0	Degree
Assistant Health officer	13	6.3	Diploma
Environmental Technicians	13	6.3	Certificate
Labourers	170	82.1	Non-formal/primary
Drivers	9	4.3	School certificate
Total	207	100	

Source: Sabon Gari and Zaria LGA Health Departments, 2009.

The local government authorities have not been able to attract the right staff. As Onibokun (1999) observed, this is partly due to the fact that people generally hold the administration at the local government level in low esteem. Another major reason for this inadequacy is funds. An efficient solid waste service requires considerable capital to purchase or maintain vehicles, lay and maintain the necessary infrastructure, pay workers, and enforce regulations.

4.4.2.2 Financial Resources

The local government authorities derive their funding from the federation allocation. By 2008, the estimate of financial allocation to the health department of Sabon Gari LGC was N12 million per annum. That of Zaria LGC was N12.3 million per annum. There is no separate allocation for solid waste management as Table 4.9 shows. Though, this financial

allocation shows increase over the years, it has not reflected at improvement in the services delivery

Table 4.9 Financial Allocation tor Health Departments between 2004 -2009

Years	Allocation (Nm per Annum)	
	Sabon Gari LGA	Zaria LGA
2004	9	8.8
2005	10.1	9.2
2006	10.6	11
2007	10.8	11.5
2008	11.2	12.1
2009	12	13

Source: Sabon Gari and Zaria Health Departments, 2009.

The LGCs do not operate user charges and have no records of local revenue collection. While the Federation allocation remains the principal source of revenue for the LGCs, the responsibility for operation and maintenance remains at the local government level. The capacities of the Local Government council to generate resources are severely hampered because the nature and means for local taxes and revenue collection are not adequate. There is the need to promote user charges and the responsiveness of the agency that supplies solid waste service to meet users need. While it ensure that funds collected are actually applied to waste management, user charges that target the delivery services is better than general tax levied on citizens.

4.4.2.3 Equipment for Solid Waste Management

Solid waste management requires appropriate equipment for collection, loading and transportation of the wastes. These include tippers, pay loaders, tractors etc. Table 4.10

gives a breakdown of the equipment and requirements for effective solid waste management in Zaria. Currently, none of the local government health departments has vehicles and equipment of good working condition. The vehicles and equipment were purchased in the 1970s and 1980s. All the equipment have broken down as they have exceeded the normal working life span.

Table 4.10: Waste Collection and Disposal Equipment

Type of equipment	Sabon Gari LGA		Zaria LGA	
	No. Available	No. Required	No. Available	No. Required
Tippers	-	2	-	2
Pay Loaders	-	1	-	1
Bulldozer	-	2	-	2
Closed top non				
Compacting trucks	1	3	-	3
Skips	10	13	-	15
Shovels	8	30	7	41
Wheel barrows	7	25	3	50
Diggers	14	30	11	66
Rakes	12	80	10	100
Cutlasses	24	100	18	150
Brooms	61	100	53	150

Source: Sabon Gari and Zaria LG Health Departments, 2009

The departments only have few wheel barrows, rakes, cutlasses and other supporting equipment. Due to non-availability of essential equipment for solid waste management, the health departments do not engage in day-to-day solid waste collection and disposal activities as a matter of responsibility.

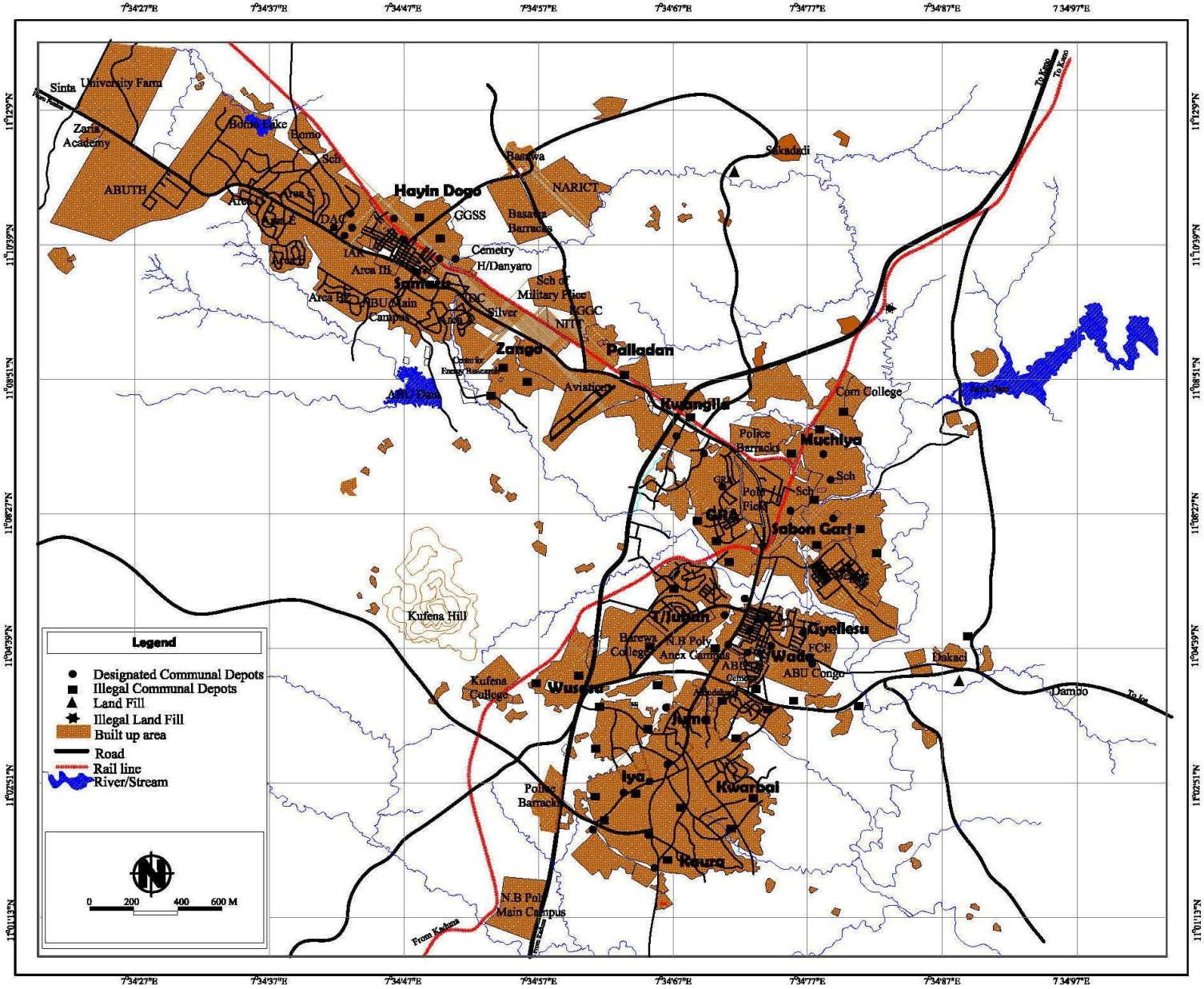


Fig. 4.5: ZARIA URBAN AREA: Solid Waste Management Infrastructure.
Source: Field Survey, 2009.

4.4.2.4 Infrastructure for Solid Waste Management

Solid waste collection infrastructure in Zaria is in form of communal depots. These are designated across the urban area to serve as collection points for the wastes from the households before transportation to the final disposal sites. Altogether, there are twenty four officially designated communal depots in Zaria as Figure 4.5 shows. There are no incineration points for solid waste storage in Zaria. Neither are there transfer stations as the wastes are supposed to be taken directly from the collection points to the disposal sites.

These collection points are grossly inadequate and unevenly distributed in the area. The collection points are not well organized as they are not fenced or regularly attended to. But these have become dumping grounds as evacuations are irregular. Reliable collection depends on the proper design and location of collection points for transfer and subsequent haulage of wastes to disposal sites. No additional communal depots have been created since 1991 even though Zaria has expanded extensively. New layouts and communities like Zango, Dogorawa, and Hanwa Extension that developed after the mid-1980s totally lack official communal depots as Figure 4.5 shows. Instead, illegal dumpsites are created across the residential sectors.

There are two officially designated final disposal sites for Zaria. One is at Sakadadi for Sabon Gari LGC and the other is at Dakace for Zaria LGC. These disposal sites are not sanitary landfills but rather open dump disposal facilities. All categories of waste are dumped without treatment and sorting. In addition, disposal at these points are not monitored, as dumping takes place at several points away from the disposal sites. Some of

the dumps within the urban area are more extensive than the disposal sites (Plates II and III).



Plate II: Solid Waste Disposal site at Sakadadi



Plate III: Dumpsite in Tudun Wada. Some of the dumps within the urban area are more extensive than the disposal sites

Solid Waste Collection and Management by the Public Sector

Solid waste collection and disposal by the Health Departments in Zaria is not regular. Currently, solid waste collection is intermittently undertaken from communal depots. House – to – house collection was officially stopped in 1991 due to financial constraints. Before the 1990s, the urban area was divided into thirteen (13) zones for solid waste collection (Fig 4.4). Collection crews were assigned shifts to cover the various zones. Collection is now mostly carried out in highly visible areas, and areas inhabited by influential people. Sometimes, local politicians mobilize the Department for solid waste collection to score political points. This was the case with Hayin Dogo dumpsite (Plate IV). Immediately after the Local Government election in 2008, the dumpsite was cleared by the Local Government (Plate V). However, shortly after the clearance, the situation deteriorated as there was no follow up. The drums for waste storage have also disappeared.



Plate IV: Dumpsite on Rail Reservation in Hayin Dogo, Samaru. This is a major undesignated disposal site in Samaru.



Plate V: Another angle of the same site as Plate IV. Attempt by Sabon Gari Local Government to contain the waste in 2008.

In many areas that are not visible and accessible, particularly the densely populated neighborhoods or expansive public land such as the railway station dump near Kasuwan mata are left un-serviced (Plate VI). The only means of collection or reduction of waste dump level is mainly by burning and manure collectors.



Plate VI: Dumping of waste on public Land. A section of the railway station, Sabon Gari. Part of *kasuwan mata* is on the rail right-of-way.

Once the waste is collected, it is supposed to be taken to the officially designated disposal sites. However, due to the inadequate official collection facilities, other stakeholders that collect take the waste to farm lands, or open spaces located at the fringes and within neighborhoods. The estimate of secondary collection by the two Local Government councils is about 8,950kg daily.

4.4.3 The Formal Private Collectors Waste Collection and Disposal Practices

The Formal Private Collectors are made up of six small enterprises with two formally registered that operate mainly in GRA, Sabon Gari and some commercial areas in Zaria. KEPA requires the formal private collectors to possess office accommodation, a minimum of certain level of equipment, financial capability and registration with Corporate Affairs Commission to be qualified for registration. Table 4.11 shows some of the characteristics of two registered private collectors. The collectors pay a waste collection registration fee of N5, 000 per annum to KEPA. No particular part of the town is allocated to any contractor, and they have freedom to make arrangements for solid waste collection and charge clients' collection fees.

Table 4.11 Formal Private Collectors Services and Resources for Solid Waste Management

Organization	Area of Operation	Services provided	Quantity Collected/month	Staff (Regular)	Monthly Operation cost	Equipment
Urban Solution	GRA, PZ, Hotels Banks, Commercial Units, Schools	Collection, Transportation Disposal	9,400kg	Admin-2 Supervisors – 3 Labourers	N22,000	Pick up -1 (hired) Hand glove and rain boot – 12 pairs Shovel – 12 Rake – 4 Respirator mask-12
WADICO	Private households, restaurants, hotels, banks and shops in GRA and PZ	Collection Transportation Disposal	3,200kg	Admin – 2	16,000	Pick-up – 1 (Hired) Hand gloves – 4 pairs Rake-4 Respirator mask – 8

Source: Field survey, 2009

The private waste collectors undertake door to door collection services arrangement on a weekly basis and, charge clients an agreed sum of money of ₦10 per kilogram. These collectors make use of pick-up vans for transportation of waste to the LG disposal facilities. Due to the long gap between collections, storage containers get over-filled before the collection takes place. Sometimes, the waste is burnt before the collectors come to evacuate (Plate VII). The burning contributes a lot of ashes to the waste streams.



Plate VII: A Dumpsite in GRA with burnt waste.

The total quantity of waste collection by each of the operators varies. However, the mean weekly volume of waste collection per operator is 6,300kg. This transforms to a mean daily collection of 900kg per operator and the total daily volume of collection of 5,400kg. The pick-up vans that are used for transportation are not specialized for waste collection. The waste is transported in the open pick-ups without cover. This is found to be responsible for littering of waste along the path to disposal points. The collectors undertake unsanitary open dumping of all the components of waste at the disposal sites.

4.4.4 Informal Operators Solid Waste Collection and Disposal Practices

The informal operators of solid waste collection activities are done informally without registration. The operators undertake two form of solid waste collection. Firstly, are young boys who engage in primary collection, which involves house-to-house collection of waste

from sources of generation to communal depots. Secondly, are adults who undertake secondary collection of waste from the dumpsites for onward disposal.

For primary collection, clients are charged between N20 – 40 per collection. Because the waste transportation equipment are small and cannot accommodate much waste, facilities get filled up very fast, forcing the operators to make several trips to dump sites. Table 4.12 gives details of the waste collection equipment used by the informal operators for primary collection. More than half of the informal operators use wheelbarrows to collect waste, while 33 percent and 11 percent use carton and push cart respectively (Plate VIII), and they require little capital to operate. There is little variation between the districts in the use of collection facilities. However, push carts are more utilized in Samara and Zaria walled districts as they constitute 17 and 13 percents respectively of the facilities utilized.

Table 4.12: Solid Waste Collection Equipment Utilized by the Informal Operators

District	Equipment used for collection (%)		
	Wheel barrow	Carton/Sack	Push Cart
Samaru	54.00	29.00	17.00
Sabon Gari	67.00	25.00	8.00
Tudun Wada	47.00	46.00	7.00
Zaria Walled	58.00	33.00	13.00
Zaria (Average)	56.00	33.00	11.00

Source Field Survey, 2009

Cartons are very important in Tudun Wada and Zaria walled district, representing 46 and 33 percent respectively.



Plate VIII: The use of Wheelbarrows and Push carts for solid waste collection by the informal operators

There are about nine hundred and seventy nine (979) informal waste operators engaged in primary collection in Zaria urban area. On the average, daily quantity of waste collection by each operator is 50kg and average earning per day is N500. The total daily volume of collection varies among the neighborhoods and depends on the number of operators available as Table 4.13 depicts

Table 4.13: Estimate of Volume of Primary Waste Collection by the Informal Operators from Households

District	No of operators	Total daily collection(kg)
Samaru	216	10800
Sabon Gari	340	17000
Tudun Wada	241	12050
Walled city	182	9100
Total	979	48,950

Source: field survey, 2009

Wastes collected by the informal operators are usually not separated at the household level. Often, because there are no organized communal depots in the study area, the operators dispose the wastes within the urban limits in unsanitary form in open spaces, drains and roads (Plate IX). Biodegradable and non-biodegradable, as well as hazardous wastes are disposed at these places (Plates X), while the recyclable components are sold to junk collectors (Plate XI).



Plate IX: Unsanitary disposal of waste by Informal Operators within living quarters in Samaru



Plate X: Mixed disposal at dumpsite. Recyclable components have been picked and compost is being harvested

Another group of informal collectors are mainly connected to secondary collection. These are made up of individuals and groups who collect decomposed waste from dumpsites to the farms and gardens. The compost from decomposed wastes or dumpsites in the urban area is collected in bags, wheelbarrows and trucks to fertilize farms (Plate XII). Some of these collectors enter into agreement with farmers to transport the collected compost to their farms. The farmers then pay the collectors an agreed amount.

The informal operators are the most important with regard to secondary solid waste collection in Zaria. For instance, an individual can collect as much as 200kg per day. An



Plate XI: Sorted recyclable materials from dumpsites, homes, and workshops

Estimate of 63,400kg is collected by this sector daily. They are more active in collection activities during the dry season as the compost are utilised for irrigation farming and shortly before the main cropping season starts. Members of this group of collectors are estimated to be about 317 distributed across the district.



Plate XII: Collection of composts from Dumpsite

4.4.5 Community – Based Organizations Solid Waste Collection and Disposal Practices

There are fifteen CBOs that undertake activities related to solid waste management in Zaria. Saabon Gari, Tudun Wada and Zaria walled districts have very active environmental CBOs than Samaru district. These CBOs contribute cash and kind materials for their operations. As the table reveals, level of capital is minimal as the annual membership dues

is very little. Some of the CBOs like Gamji Development Association, Gangare community Development Association and Sabon Gari Community Development Association, all in Sabon Gari Local Government Area have received aids from the local government for their operations.

The activities of CBOs in solid waste management are in the area of public enlightenment through awareness campaigns on clearing of drainage and refuse, (Table 4.14). Waste collection practices by CBOs are mainly that of evacuation of refuse dumps in the neighborhoods. There is no CBO that is involved in waste collection at the source of generation. Their collection of solid waste is at very irregular intervals and many of them collect waste occasionally between two to three times in a year. The major equipment of CBOs includes wheelbarrows, head pans and push trucks for transportation of the waste. These facilities are not specialized for waste collection as they do not have containment. However, some of the CBOs like Sabon Gari Community Development Association hire trucks for transportation and take the waste to the landfills. The level of secondary waste collection by this sector is not substantial as collection is about 10,500kg per CBO on days of activities. This gives an estimate of 157,500kg for the fifteen CBOs. For an estimated five collection per annum, the daily level of waste collection by CBOs is 2,157.5kg. However, some of the collected wastes are re-dumped at different locations in the urban area.

Table 4.14 Community Based Organisations Solid Waste Management Characteristics

Neighborhood	CBO	No. of Registered Members	Annual Membership Dues (N)	Total Contribution	SW project executed	Equipment for Wastes Collection
Samaru/ Hayin Dogo	Gamji Development Association	125	200	25,00	Clearance of Refuse Dump/Environmental Awareness	Wheel Barrows, Baskets, Head Pans, Cartons
Kwangila	Gangare Community Development Association	56	200	11,200	Clearance of Refuse Dump	"
	Angwan Nashuka Community Development Association	500	200	100,000	Clearance of Refuse Dump	"
Muchiya	Chikaji Community Development Association	680	300	136,000	Clearance of Refuse Dump/ Construction of incinerator	"
Sabon Gari	Sabon Gari Community Development Association	500	200	100,000	Construction of incinerator /Environmental awareness	" and trucks
Gyllesu	Gyallesu Development Association	32	500	16,000	Clearance of Refuse Dump Environmental awareness	"
	Gangare Development Association	38	500	19,00	Environmental awareness	"
Tudun Wada	Pampo Youth Forum	30	500	15,000	Environmental awareness	"
	Waje Development Association	50	500	25,000	Environmental awareness	"
Iya	Kofar Doka Youth Development Association	31	600	18,600	Environmental awareness	"
Kaura	Chediya Community Development Association	34	600	10,400	Environmental awareness	"
	Kusfa Community Development Association	44	600	26400	Environmental awareness	"
	Angwan Karfe Community Development Association	50	600	30,000	Environmental awareness	"
Kwarbai	Kwarbai Development Association	56	600	33,600	Environmental awareness	"
	Ban zazzau Development Association	42	600	25,200	Environmental awareness	"

Source: Field Survey, 2009

4.5 SUMMARY

This chapter presents a brief overview of solid waste management in Zaria, highlighting the major issues at the urban level, which cut across legal, institutional, organizational and social. Under the legal context, focus is on policy instruments specifying the role and functions of the various stakeholders in solid waste management. The roles allocated to the various stakeholders are documented. The institutional aspect examines the set-up for solid waste management at the urban level. The major issues with the set-up identified include lack of recognition of other stakeholders. Under the formal organizational set-up, solid waste management is given a very narrow focus as a sanitation issue. This subsumes other aspects of socio-economic characteristics of waste sources, recycling, treatment and sanitary disposal.

Under the social context, the study focus was on the characteristics and practices of the stakeholder. The practices of the different stakeholders were examined. The major problems identified include inadequate equipment, resources and improper practices. This chapter set the stage for the assessment of the performance of stakeholders and determinants to derive explanations for the performance explanations for the subsequent chapter.

CHAPTER FIVE

ASSESSMENT OF PERFORMANCE AND DETERMINANTS OF PERFORMANCE OF STAKEHOLDERS SOLID WASTE MANAGEMENT

5.1 INTRODUCTION

The performance of stakeholders in solid waste management is a common agenda for participation. In Zaria, the participation of stakeholders in solid waste management can be seen as a means to an end; to ensure effective outcome in solid waste management. To this end, the cooperation of the stakeholders is needed in the areas of proper waste handling practices.

This chapter addresses the research questions which seek to identify the performance and determinants of performance of stakeholders in solid waste management in Zaria. The issues are structured around the solid waste management practices of stakeholders against the performance objective of effectiveness and the determinants of performance. The effectiveness evaluation targeted the stakeholder waste handling practices and discusses the performance of the providers and social practices of the households. The determinants examine the technical, users and management characteristics and demonstrate the relationships with performance of stakeholders.

5.2 ASSESSMENT OF THE PERFORMANCE OF STAKEHOLDERS

This section evaluates the outcome of solid waste management by the stakeholders against performance objective of effectiveness. This is to establish whether solid waste management practices by stakeholders have produced good results and to establish shortcomings. Effectiveness of solid waste management practices is measured by the ease

of access to services by households, rate of secondary waste collection, frequency of waste collection, solid waste collection coverage and safe disposal of waste by stakeholders.

5.2.1 Ease of Access to Stakeholders Solid Waste Collection Services

The stakeholder modes of solid waste collection determine whether the service is easily accessible to households or not. This includes the house-to-house and communal depots collections. To ensure convenience in solid waste collection, the house-to-house collection system is undertaken in developed countries. In Zaria, the stakeholders undertake two type of collection system. Some of the informal operators and formal private collectors operate the house-to-house collection in Zaria (Table 5.1). The LGAs, CBOs and some of the informal operators' solid waste collection only take place at communal depots

Table 5.1 Method of Solid Waste Collection by Stakeholders

Stakeholders	Method of Collection		
	House-to-house	Communal Depot	Total
Informal Operator	129 (74.6%)	21 (12.1%)	150 (86.7%)
Formal Collectors	6 (3.5%)	0 (0%)	6 (3.5%)
CBOs	0 (0%)	15 (8.6%)	15 (8.6%)
LGAs	0 (0%)	2 (1.2%)	2 (1.2%)
Total	135 (78.1%)	38 (21.9%)	173 (100%)

Source Field Survey, 2009

The data of Table 5.1 establishes that the community solid waste Collection Services providers (the informal Operators and formal collectors) are more easily accessible to households than the CBOs. For instance, 129 of the 150 informal operators, that is, 74.6

percent and all the 6 formal collectors that is 3.5 percent undertake house-to-house collection while none of the CBOs and 2 public sectors, that is1.2 percent collects waste from house-to-house. Thus, 78.1% percent of the stakeholder services are accessible to the households. Only less than 21.9 percent of the stakeholder cannot be easily accessed by the households.

5.2.2 Rate of Secondary Collection by Stakeholders

Rate of waste collection measures the quantity of waste collected as a percentage of the total amount generated. The daily quantity of domestic waste generation in Zaria is 228010kg as Table 5.2 indicates. However, from the records of the stakeholders, the daily total volume of collection in Zaria is 92,546.5kg.

Table 5.2 Rate of Daily Domestic Waste Generation and Collection in Zaria Urban Area

Stakeholders	Daily Collection (Kg)	Daily Amount Uncollected (kg)	Daily Amount Generated (kg)	% of Daily Collection
Informal Operators	63,400	148,102.5	228,010	35
Formal Operators	5,400			
CBOs	2,157.5			
L.G	8,950			
Total	79,907.5			

Source: Field Survey, 2009

The performance of stakeholders on rate of waste collection is on the low rating. About 79,907.5kg out of 228,010kg generated is collected. This constitutes 35 percent of the waste generated. The LGAs and the informal collectors collect 8,950kg and 63,400kg respectively. CBOs collect only 2,471kg of solid waste (the least). The formal collectors collect 5,400kg. The informal collectors' performance is higher than all the other stakeholders combined. This sector constitutes the most important in total waste collection while the CBOs are the least significant. The average volume of waste collection by the

informal operators can be linked to the value that stakeholders have for compost as if generates income from this source.

The volume of uncollected waste is still high; about 148,102.5kg daily, representing 65 percent of wastes generated. The level of uncollected waste is evidenced by the mounds of accumulated solid waste across the urban area. Similar conditions have been attested to by Cointreau (2006), Onibokun, (1999) and Omuta, (1988) in other towns of Nigeria and those of developing countries. This can be linked to the low level of organized solid waste collection in the study area. There is long gap between primary deposit and secondary collection by the LGAs and informal collectors. Very often, most of the wastes generated are scavenged by the people and animals, burned at the point of generation or left to degrade. But in cities of developed countries the two figures of solid waste generation and collection are usually much the same (Cointreau, 2006). In these countries, most of the wastes are disposed of formally as soon as they are generated.

In Zaria like most cities in Nigeria, the uncollected wastes remain on the street or road corners, open spaces and vacant plots. This cause significant environmental damages as the waste pollutes the environment on a continuous basis. A more efficient waste collection would require a more concerted effort to adequately collect the waste as soon as it is generated.

5.2.3 Frequency of Secondary Collection of Waste by Stakeholders

Solid waste requires immediate collection as soon as it is generated (Snel, 1999. This is particularly important in the tropics where the organic content in the waste stream is very

high. The stakeholder survey reveals that the formal private collectors collect waste once a week. All the other stakeholders collect waste at longer intervals of more than a week (Table 5.3). There is no daily secondary collection in the study area.

Table 5.3 Frequency of Secondary Collection of Waste

Stakeholders	Frequency of Collection		
	More than one week and above	Once a week	Total
Informal Operators	23 (50.0%)	0 (00.0%)	23 (50.00%)
Formal Collectors	0 (0%)	6 (13.0%)	6 (13.00%)
CBOs	15 (32.7%)	0 (00.0%)	15(32.70%)
LGAs	2 (4.3%)	0 (00.0%)	2 (40.30%)
Total	40 (87%)	6 (13%)	46 (100%)

Source: Field Survey, 2009

The performance of the stakeholders on the frequency of waste collected is very low. Only approximately 13 percent of the stakeholders, that is, the formal collectors collect waste at short intervals and this is even longer than expected under very humid condition where the wastes decompose very fast. The remaining 87 percent, specifically, informal operators, CBOs and the Local Government Authorities do not undertake regular collection. As noted by Mugagga (2006) where collection fails, people usually resort to dumping. This could be responsible for littering which leads to unhygienic conditions observed in several points across the urban area as seen in Plate XIII.



Plate XIII: Littering of Waste on Public Land

Even though stakeholders can provide solid waste collection, transfer and disposal services, their involvement does not in itself guarantee effectiveness. For instance in the case of the private sector, what is required is for competitive bidding to be ensured so that those with adequate technical and organization capacity are allowed to participate. In addition, the stakeholders' performance can only be ensured if there is effective regulation, and adequate management of the private partners through clear specification, monitoring and control.

5.2.4 Secondary Solid Waste Collection Coverage by Stakeholders

Solid waste collection coverage measures the number of people that are served as a percentage of the total population. Table 5.4 indicates the extent of coverage of the

population by the stakeholders. As an environmental problem, solid waste management displays characteristics of an open access resource, and thus may be managed by governments, communal groups, private individuals or corporations or not managed at all (Furedy, 1989). Due to the need to generate income by most of the stakeholders, the coverage seems to be tailored to the value derived from the waste.

Table 5.4: Coverage of Collection Services by Stakeholders

Stakeholders	Coverage of Collection		Total
	Extensive	Limited	
Informal Operators	23 (50.0%)	0 (00.0%)	23 (50.00%)
Formal Collectors	0 (00.0%)	6 (13.0%)	6 (13.00%)
CBOs	5(11.0%)	10 (21.7%)	15 (32.7%)
LGAs	0 (00.0%)	2 (4.3%)	2 (4.3%)
Total	28 (61.00%)	18 (39.00%)	46 (100%)

Source Field Survey, 2009

The table shows that 28 of the 46, that is 61 percent of stakeholders of collection services is extensive involving 23 or 50 percent informal operators, and 5 or 11 percent of CBOs. The LGAs collection service is very limited as it focuses only on visible parts of the urban area. The informal small scale operators seem to collect waste across the urban areas as long as the dumps are available for compost. It represents the most important stakeholder in the collection coverage in the study area. All the formal collectors and LGAs have limited coverage.

5.2.5 Safe Disposal of Waste by Stakeholders

Safe disposal of solid waste involves waste treatment and sanitary disposal. However, solid waste treatment takes place at the final stages of the management system and is related to disposal, and partly an alternative to it. Waste treatment close to the source of generation lowers the risk of contamination and prevents environmental problems at the point of waste

disposal. There are different methods of waste treatment and safe disposal. This includes waste sorting, composting and sanitary land filling. Waste sorting and composting can be done close to source of generation. However, survey data revealed the lack of involvement in waste separation in the study area. The entire waste constituents are disposal together and there is no organised programme for waste composting.

A total of 78 percent of the stakeholders dumps waste illegally within the urban limit. The highest culprit is the informal operators, constituting 74.6 percent of the total stakeholders. Only 22 percent of the stakeholders take wastes to the official disposal sites as Table 5.5 shows. All the informal operators dispose the solid waste they collect illegally within the urban limit. The formal collectors are the only sector that disposes the waste collected promptly to disposal points. This constitutes just 3.5 percent of the waste disposed. Some of the other stakeholders do not undertake prompt disposal as has been shown in Table 5.5. However out of the remaining 96.5 percent dumped illegally, only 33 percent is later collected by secondary collection of the informal operators. This reach the final disposal sites subsequently as is demonstrated in fig 5.1.

Table 5.5: Place of Disposal Utilized by Stakeholders

Stakeholders	Place of Disposal		
	Within urban limit	Landfill	Total
Informal Operators	129 (74.6%)	21 (12.1%)	150 (86.7)
Formal Collectors	0 (00.0%)	6 (3.5%)	6 (3.5%)
CBO's	6 (3.5%)	9 (5.2%)	15 (8.7%)
LGAs	0 (00.0%)	2 (1.1%)	2 (1.1%)
Total	135 (78.1%)	38 (21.9%)	173 (100.0%)

Source: Field survey, 2009

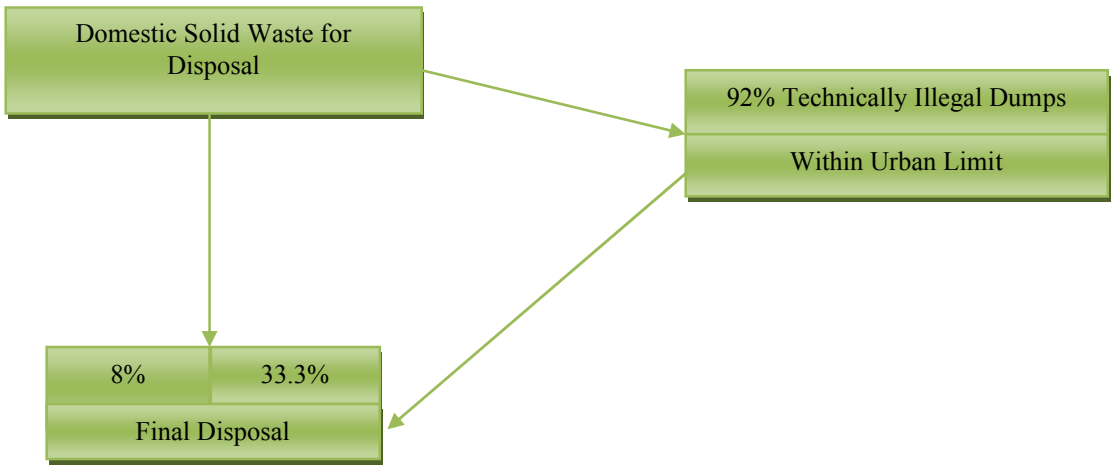


Fig 5.1: Flow of Domestic Waste from Source to Final Destination
Source: Field Survey, 2009

Due to inadequate routine secondary collection of waste, the dumpsites serve as the final destination for most of the waste generated in Zaria. In an extensive study of such problems, Omuta (1988), Oyaigbevwen (1988) and Cointreau (2006) have shown how failure of secondary collection resulting to open dumping and unscientific disposal is particularly harmful to health. It contaminates drinking water from both underground and surface supplies, pollutes air, and land, cause environmental deterioration and leads to direct contact diseases. Although no data is available about the economic cost of the poor solid waste services in the study area, it is likely to be severe as observed by Cointreau (2006) and Myllyla (2001).

5.2.6 Significance of Performance

The chi-square contingency procedure was used to assess whether there is a significant difference in the stakeholders' performance outcome among the districts in Zaria as table 5.6 depict.

Table 5.6: Assessment of the Significance of Stakeholders Performance

District	Performance				Total
	Easy Access	Frequent Collection	Extensive Collection Coverage	Safe Disposal	
Samaru	34 (31.9)	8 (9.4)	7 (6.6)	8 (8.5)	57
Sabon Gari	40 (33.0)	16 (13.7)	11 (9.6)	16(13.1)	83
Tudun Wada	38 (33.0)	9 (9.7)	5 (6.8)	7 (9.3)	59
Walled City	23 (23.5)	7 (6.9)	5 (4.8)	7 (6.6)	42
	135	40	28	38	241

Source: Field Survey

Test Statistics:
$\alpha = 0.05$
df= (4-1) (4-1)
Calculated x^2 value = 4.38
Critical x^2 value = 16.92

Since the calculated x^2 value of 4.38 is less than the critical x^2 value of 16.92 therefore, there is no significant difference in the solid waste management performance by stakeholders in Zaria. Therefore, stakeholders' performance in solid waste management in Zaria is not effective.

5.3 DETERMINANTS OF PERFORMANCE OF STAKEHOLDERS' SOLID WASTE MANAGEMENT IN ZARIA

The following section describes the determinants of stakeholders' performance. It sets to ascertain the association between outcome of stakeholders' solid waste management and the characteristics of technical, users and agencies' management style. It reports the basic

result of the Chi-square Test of Independence in the relationship between the determinants and performance outcome and contingency coefficient to establish the strength of the association. The level of significance for the test is set at 0.05. Further analysis utilises contingency coefficient to test for strength of relationship where dependency has been established to exist. The empirical results of the significances and contingency coefficient are given in Tables 5.7-5.8.

5.3.1 Technical Characteristics as Determinants of Performance

Three variables that affect performance are isolated for analysis. This focuses generally on the technical characteristics of stakeholders services. The result of the test is given in Table 5.7.

Table 5.7 Technical Determinants of Performance

Performance	Determinants		
	Facilities and Equipment	Level of Capital	Appropriate Skills
Ease of Access	***9.90 (.23)	****50.05 (.48)	0.60
Safe Disposal	****19.09 (.32)	2.98	0.64
Extent of coverage	****35.03 (.41)	0.78	2.97
Frequency of collection	****61.49 (.51)	****40.32 (.44)	****13.34 (.27)
Rate of collection	****59.05 (.50)	*4.59 (.16)	0.90

Source: Field Survey, 2009.

Level of significance = 0.06. Critical $X^2 = 3.84$.
Values above critical level mean that performance is dependent on technical characteristics. Values less than critical level means that performance is independent of technical characteristics

* = significant at 0.05, ** = significant at 0.01, *** = significant at 0.005,
**** =significant at 0.001.
( ) Figures in parenthesis are chi-square value of contingency coefficient

5.3.1.1 Facilities and Equipment

The table shows that the impact of facilities and equipment on performance of stakeholders is highest for all the indicators of performance. There is a very high significant value of 0.001 for safe disposal, extent of coverage, frequency of collection and rate of collection. The contingency coefficient values are (.32), (.41), (.51) and (.51) respectively; showing a good level of association between the variables. Even though the impact of facilities and equipment on ease of access is low compared to other indicators, its impact is still high, with a significant value of 0.005 and a contingency coefficient of (.23). As it is, facilities and equipment are the critical technical determinants of performance of stakeholders' services in Zaria.

5.3.1.2 Level of Capital

The table shows that level of capital of the stakeholders has the highest impact on access to the solid waste services of the stakeholders, than on frequency of collection and relatively low on the rate of collection. This high value given by the level of capital could be on the account of the highly significant value of 0.001 between ease of access, frequency of collection and capital. The contingency coefficient value of (.48) and (.44) for ease of access and frequency of collection respectively indicates high levels of association. However, the relationship with rate of collection is very low. There is no relationship between level of capital and safe disposal, extent of coverage as chi-square values are not significant. Improvement in the level of capital of the stakeholders will certainly raise their performance.

5.3.1.2 Appropriate Skills

The skills of stakeholders are the least important of all technical characteristics as determinants of performance of stakeholders' solid waste services. Ease of access, safe disposal, extent of coverage and rate of collection show no significant chi-square values. However, frequency of collection is highly related to appropriate skills with significant chi-square value at 0.001 and contingency coefficient value of (.27).

The low impact of relationship of skills to the general performance of stakeholders is not far-fetched, as solid waste management does not require highly technical knowledge to be effectively undertaken. The level of knowledge and skills associated with solid waste collection and disposal are not complicated. Thus, the association with frequency of collection may be coincidental rather than the rule.

5.3.2 Users Characteristics as Determinants of Performance

Three variables of users' characteristics are analysed. They are shown in Table 5.8 below.

5.3.2.1 Adequate Number of Users per Stakeholder

Adequate number of users per stakeholder has as very high impact on ease of access, extent of coverage and rate of collection with each having a highly significant value of 0.001 (Table 5.8). This high level of impact is also reflected by the contingency coefficient of above average values. The contingency coefficient is (.53), (.52) and (.55) for ease of access, extent of coverage and rate of collection respectively. These reflect strong associations between the number of users per stakeholder and the performance in those

variables. However, the impact on safe disposal and frequency of collection is very low and not significant.

Table 5.8: Users Characteristics as Determinants of Performance

Performance	Determinants		
	Adequate number of users per stakeholder	Level of payments	Use of alternative method of solid waste service
Ease of Access	****68.17 (.53)	**6.93 (.19)	****38.77 (.43)
Safe Disposal	0.08	***8.16 (.21)	****32.71 (.40)
Extent of coverage	****62.74 (0.52)	****44.32 (.45)	****53.69 (..49)
Frequency of collection	1.72	****16.66 (0.29)	****34.24 (.41)
Rate of collection	****72.26 (.55)	****50.32 (0.48)	***8.70) (..22)

Source: Field Survey, 2009.

Level of significance = 0.06. Critical $X^2 = 3.84$.
Values above critical level mean that performance is dependent on users characteristics.
Values less than critical level means that performance is independent of users' characteristics
* = significant at 0.05, ** = significant at 0.01, *** = significant at 0.005,
**** =significant at 0.001.
( ) Figures in parenthesis are chi-square value of contingency coefficient

5.3.2.2 Level of Payment by Users

Level of payment of users has more impact on the performance of stakeholders than that of the number of users per stakeholders. Table 5.8 shows the impacts in their order of precedence. Rate of collection, extent of coverage, frequency of collection, all have significance of 0.001 and contingency coefficient values of (.48), (.45) and (.29) respectively. The impacts on other variables of performance such as safe disposal and ease

of access are low with significance of 0.005 and 0.01 and contingency coefficient of (.21) and (.19) respectively.

5.3.2.3 Use of Alternative Methods of Solid Waste

The use of alternative methods of solid waste services by users has more impact on the performance of stakeholders than all the other variables of users' characteristics. Use of alternative methods of solid waste services by users has high impact on ease of access, safe disposal, and extent of coverage and frequency of collection. They all have high significance of 0.001 (Table 5.8). This level of impact is reflected on the contingency coefficients of (.49), (.43), (.41) and (.40) for extent of coverage, ease of access, frequency of collection and safe disposal respectively. The rate of collection is the only variable of performance that is weakly associated with use of alternative methods of solid waste services by users, having a significance of 0.005 and contingency coefficient of (.22).

The results reflect close associations between the use of alternative methods of solid waste services by users and performance of stakeholders. So any reduction in the level of use or total stoppage of other methods of solid waste services utilization will increase the performance of stakeholders.

5.3.3 Management Characteristics as Determinants of Performance

Three variables of management characteristics are analysed to show the impact on performance as shown in Table 5.9.

5.3.3.1 Support from Government

Support from government is a very important determinant of ease of access to stakeholders' solid waste services. There is a high significance of 0.001 and a good association with a contingency coefficient value of (.51). In the same vein, safe disposal, frequency of collection and rate of collection are determined by support from government with significant level of 0.001 and contingent coefficients of (.47), (.30) and (.56). The rate of collection is the variable that is more impacted upon by support from government than all determinants. This is linked to the fact that government supports in the study comes in the supply of higher capacity vehicles for waste collection than the ones that stakeholders utilize. Thus, all the stakeholders that have access to this support are found to have high rate of solid waste collection.

However, the impact of support from government is less on extent of coverage of services. There is a low significance of 0.05 and a contingency coefficient of (.16), reflecting a very weak association.

Table 5.9: Management Determinants of Performance

Performance	Determinants		
	Support from government	Monitoring and Supervision	Sanctioning sub-standard performance
Ease of Access	****62.53 (.51)	0.36	****11.27 (.25)
Safe Disposal	****48.29 (.47)	*5.85 (.17)	***9.64 (.23)
Extent of coverage	*4.54 (.16)	****19.47 (.31)	*4.53 (.15)
Frequency of collection	****17.05 (.30)	***9.81 (.23)	***8.35 (.21)
Rate of collection	****79.85 (.56)	***8.19 (.21)	*5.68 (.17)

Source: Field Survey, 2009.

Level of significance = 0.06. Critical $X^2 = 3.84$.
Values above critical level mean that performance is dependent on agency management characteristics.
Values less than critical level means that performance is independent of agency management characteristics
* = significant at 0.05, ** = significant at 0.01, *** = significant at 0.005,
**** =significant at 0.001.
( ) Figures in parenthesis are chi-square value of contingency coefficient

5.3.3.2 Monitoring and supervision

Monitoring and supervision is the least variable of management characteristics that determine performance of stakeholders. There is no significant relationship between monitoring and supervision and ease of access to stakeholders' services. This could be due to the fact that stakeholders mode of operation could not be changed whether there is monitoring and supervision or not. The impact on safe disposal is weak as the significance of 0.05 is low and reflected in a weak contingency coefficient of (.17). The impact is higher with respect to frequency of collection and rate of collection as both have a significance of 0.005 but a weak association with contingency coefficient of (.23) and (.21)

respectively. The major impact of monitoring and supervision is on extent of coverage with a significance of 0.001. However, the extent of association is weak as is reflected by the contingency coefficient of just (.31).

5.3.3.3 Sanctioning of Sub-Standard Performance

Sanctioning of sub-standard performance has high impact on ease of access to stakeholders' services. It has a significance of 0.001 but a weak association as the contingency coefficient is (.25). This is followed by safe disposal and frequency of collection as both have significance of 0.005 and a weak association with contingency of coefficients of (.23) and (.21) respectively. The impact of sanctioning of sub-standard performance by the agency is weak on extent of coverage and rate of collection. The significance for both is 0.05 and the association is weak as the contingency coefficient is (.15) and (.17) for extent of coverage and rate of collection respectively.

5.4 EXPLANATIONS FOR THE SOLID WASTE MANAGEMENT PRACTICES OF STAKEHOLDER

The participation of stakeholders is argued to be a more effective and sustainable means of service delivery. However, there are certain general expectations for stakeholders in participation. These include performance of specific functions, an enduring relationship, a shared responsibility for the outcome, and a desire to serve a public interest (Post et al; 2003). This section identifies explanations for the solid waste management practices of stakeholders in Zaria. This is to establish the link between the stakeholder solid waste management and the characteristics of the legal, institutional, technical and socio-cultural context of solid waste management. Generally, stakeholders' solid waste management in

Zaria has been established to be poor with respect to the household and neighbourhood waste management practices of the stakeholders.

5.4.1 Legal Explanations

The Kaduna State Environmental Sanitation Edicts and Bye-laws were passed to require occupiers of premises to maintain standard dustbins to keep solid waste, and to compel the local government authorities to collect and dispose solid waste. However, these bye-laws are mainly limited to regulating environmental sanitation and a terse provision prohibiting people from burning waste, throwing or depositing solid waste on streets or open spaces that are not designated as collection points (Kaduna State Environmental Sanitation Edicts, 1984, 1991). The focus on sanitation issue is narrow as it subsumes other aspects of solid waste management like recycling, waste treatment and land filling. The edicts and policy regulations merely lay standards and introduced permit systems for solid waste management including landfills. Unlike other activities with environmental implications like mineral exploitation and constructional works, the regulations do not impose obligations on operators to manage and remedy contamination in a sustainable use manner.

While the local governments are required by the Sanitation Edicts to ensure generators of solid waste carry out certain activities with regards to the types of storage facilities and where to deposit waste, the two local governments in Zaria have not enforced these rules and by-laws. The lack of enforcement of legislation backing stakeholders' solid waste collection and recycling is a common problem in Zaria. In addition, law to oblige waste generators to separate waste at source or prohibit free discharge of solid waste indiscriminately are not enforced. Existing legislative and regulatory tools are inadequate

for coordinating and managing collaborative activities between the local government and stakeholders. For instance, there is no regulatory structure at the local government area level for monitoring stakeholders' activities. In addition, the formal and official aspects of relationship requiring bureaucratic processes and protocol to be followed in the public sector are a threat to the CBOs and informal sector operators. These sectors are used to working under unregimented conditions where decisions are made on a daily basis.

Another legal explanation relate to payment conflict in the guidelines for the use of permit by service providers. For instance, the section 5 of the 1998 guideline gives residents the right to contract with the private sector for solid waste collection while section 3 recognizes it as an offence for someone to collect, transport, remove or dispose solid waste at a fee or other considerations without a valid permit. This clause stands out to be a hindrance to solid waste management by the stakeholders. As described in section 4.4, many of the formal collectors and of the informal and CBOs activities are not supervised by KEPA and LGAs. This is responsible for illegal and haphazard dumping of waste across the urban area.

5.4.2 Institutional Explanations.

A pre-condition for a successful management of the environment requires an establishment of effective institution and linkage among all institutions and agencies interested in solid waste management. There is no organization responsible for coordination of all the stakeholders in solid waste management in Zaria. The local government authorities do not have any linkage in the solid waste management process, yet environmental problems associated with poor solid waste management have no boundaries. Contemporary views

advocate for mutual understanding and cooperation among the tiers of government, and with stakeholders in the conduct of business for the overall benefit of the people. There are inadequacies in the ways the institution for solid waste management function in Zaria, since there is no collaboration between the institutional agencies and the other stakeholders. In particular, the stakeholders act in an independent manner. For this reason, it is always difficult to know which stakeholder is doing what in solid waste management. While the LG is the institution with responsibility for solid waste management, it is KEPA that grants solid waste management licenses to private enterprises. This condition tends to lead to strife, distrust and role conflict among the institutions for solid waste management. Beside the duplication and usurpation of functions, the absence of any forum to facilitate the interaction of officials from the LGAs, KASUPDA and KEPA is another factor. This condition does not leave room for much impact on solid waste management. For instance, the LGAs do not support community efforts with counterpart funding as is required for community executed projects.

The responsibilities of other stakeholders are not well defined. Currently the LG, which is supposed to be at the top of the chain in solid waste management, appears to have abdicated its responsibility to the private and community sectors. But even at this, there is no effort to mobilize the communities and their traditional rules. Instead, the LGCs see their role in relation to the communities and households as one of creating awareness for proper solid waste management but do not see households and communities as effective participants in the system. There is a general mutual distrust between the LGAs and the communities. Some leaders of CBOs suggested that the LGCs perceive their activities as a challenge to their responsibilities and authorities.

5.4.3 Technical Explanations

As noted in section 4.2.4, solid waste management institutions are grossly understaffed in terms of both quantity and quality. About 207 personnel are currently employed, but the interview with the Directors of Public Health of both local government authorities indicates that between 300 and 400 staffs are needed for effective performance. In addition, the caliber of staff at the public and stakeholders levels particularly at the technical level is very inadequate. Technical personnel comprise design, operation and construction engineers, environmental planners and technicians, and sundry of other staff. The limited number of personnel and quality of staff to monitor and supervise stakeholders in solid waste management activities and those of the stakeholders with some level of technical knowledge is a limitation. In aspect of solid waste disposal, wastes from households are deposited at any available open space illegally and in unsanitary manner. This is linked to social habits and point to the need for strict enforcement of the provisions to ensure compliance.

One of the major explanations is linked to the model of administration at the local government level. As Onibokun and Kumuyi (1999) observed, in Nigeria, people generally hold the administration at the local government level in low esteem. Because the style of administration at the LG level often lacks consultation and responsiveness to the needs of people, the public is emphatic in denouncing the local government for abdicating its responsibilities. Whereas the actual responsibility lies with the local government authorities, the management of solid waste in Zaria is dominated by the informal private sector, CBOs and private sector organizations. As such, the public is reluctant to

cooperate with the local government level in execution of solid waste management progorammes.

The poor practices in solid waste management by stakeholder are reflected by various technical and infrastructural problems. As noted in chapter four, the local government authorities in Zaria have inadequate and inappropriate solid waste management equipment. The few existing equipment are obsolete and have broken down. There has not been any purchase of equipment since the local governments were created in 1991. In addition, the stakeholders have very little experience in the sector, and work with insufficient solid waste management equipment. This is responsible for limited volume of waste collection across the urban area. Also, the equipment is not adapted to long distance movement and this could be responsible for waste dumping in undesignated areas. Solid waste management infrastructure like collection points and disposal sites are not evenly located in the two LGAs. The primary collection points are not organized. A reliable primary waste collection depends on the design and location of communal depots for transfer and subsequent haulage of the waste to the disposal sites. New settlements and communities that developed after the mid-1980s are totally lacking in waste collection depots (see Figure 4.3). Due to this inadequacy, residents, the informal private sector and CBOs resort to dumping of waste at any available open space.

5.4.4 Socio-Cultural Explanations

The desire to get households or individuals more involved in service delivery is now a common agenda of city governments. This development can be attributed to emphasis on public participation in service delivery. However cooperation of the public is a necessary

ingredient for good participation. But many of the respondents do not believe that they should bear any responsibility for waste collection and disposal. The public considers this as a social service and the responsibility of the local governments.

In the Kaduna state sanitation edict (1998), there is an indication to get the people to participate in solid waste management. To this end, the cooperation of the people is needed in solid waste proper handling practices, use of standard receptacles, and payment for services. However, cooperation has not been achieved in Zaria. People generally have an attitude of nonchalance towards local governments and their staff. According to a recent study in Zaria, Stare (2005) observed that the local government officials, the chairmen and counselors are held with suspicion, and considered to be alienated from the interest of the masses. The public do not see the officials as being relevant to their survival as their impact had not been felt in any way with respect to meeting the needs of the populace (Onibokun and Kumuyi, 1999).

Apart from the taxes deducted at sources under the Pay-As-You-Earn (PAYE) system, people rarely pay other forms of taxes. This situation aggravates the financial problem of the local governments and increases their dependence on the federal government allocation for their financial support. The two local governments have made little efforts to mobilize or educate the people on the need to maintain environmental cleanliness or pay for solid waste services. Because these authorities depend heavily on allocations from the federal government, the councilors behave as if they are not accountable to the people or need their support or cooperation. Even community-based organizations and traditional rulers that are supposed to be carried along in solid waste management are only minimally involved.

Some of the explanations are linked to attitudinal factors. For instance, some of the issues for environmental protection in solid waste management include waste separation. However, people do not see any direct advantage and benefits for environmental protection. The informal private and formal private sectors go into solid waste management to generate income and make profit. They are therefore, not necessarily interested in environmental protection. This explains why waste are dumped indiscriminately

5.5 SUMMARY

This chapter assessed the performance of stakeholders with respect to effectiveness measures. The performance does not meet with expectations with regards to the level of waste collection and safe disposal. There is no organized solid waste management activities and symbiotic relationship among the stakeholders. This goes to suggest that there is failure in institutional functions as there is no enforcement of regulations and coordination of the stakeholders' solid waste management activities.

Several possible explanations for the status of solid waste management have been documented. This includes legal and institutional factors which treat solid waste management as sanitation matter, and give little attention to effective institutional linkages among all the stakeholders involved. Others are related to technical factors. The caliber of staff at the local government level does not give room for effective performance of the function. On the part of the other stakeholders, lack of experience and necessary equipment for solid waste management are associated with poor performance.

CHAPTER SIX

SUMMARY, RECOMMENDATIONS AND CONCLUSION

6.1 INTRODUCTION

This chapter summarises the research findings in relation to the research questions. The summary is aimed at highlighting the issue of stakeholder's participation and performance in solid waste management and determinants in Zaria. The implications of the findings provide the basis for the proffered policy options and further research directions.

6.2 SUMMARY OF FINDINGS

This study started with the main objectives of assessing the participation of stakeholders in solid waste management, by analysing the performance and determinants of the performance in Zaria.

6.2.1 Framework for Solid Waste Management Zaria Urban Area

This study has assessed the legal, institutional and organizational framework for solid waste management in Zaria. The responsibility for solid waste management derives from sanitation edicts and KEPA regulations. These regulations only recognised the local government council and KEPA with respect to municipal solid waste management, policy guideline formulations and enforcement of standards respectively. However, so many stakeholders that are now involved in solid waste management in Zaria are not included in the institutional arrangement. As a result, there are no procedures and processes for collaboration, coordination and supervision of institutional activities. Due to the foregoing, there is a general disposition of the stakeholders to pursuing solid waste management in an

independent and fragmented manner without cooperation with other stakeholders that perform similar functions.

6.2.2. Stakeholders Solid Waste Management Practices

There are four stakeholders directly involved in solid waste management in Zaria. They are associated with primary solid waste management at the generation and secondary collection in solid waste at urban level.

Solid waste handling practices at the household level is the responsibility of generators. In Zaria, households utilise improper handling practices. This includes the use of sub-standard storage facilities that do not have coverage and long storage before disposal. There is no waste separation in the study area as all the components of waste are stored together in one receptacle. The wastes are disposed improperly through burning, burying and indiscriminate dumping in unauthorized places.

Solid waste management practices by the public sector are associated with poor performance. To a considerable extent, the public solid waste management system is typical of what is reported in Nigerian cities. Solid waste collection is irregular and mostly undertaken in highly visible areas, and there is no planning regarding how the waste generated is to be collected. Since there is no follow up in waste collection, waste accumulates very quickly. The low performance of the public sector owes to so many factors that are related to the management structure as presently constituted.

Waste collection and the disposal by the formal and informal sectors, and CBOs are in response to the low performance of the public sector. The stakeholders are engaged by the household for collection of waste at a price while the CBOs generally are involved in environmental cleaning and sanitation. This has no doubt considerably improved the collection, especially of compost and recyclable materials but the level of collection is a small ratio of the level of generation. Just like the public sector services, these stakeholders are associated with improper solid waste handling practices. Solid waste collection is irregular and associated with long interval between generation and collection. Even when collection is undertaken, there is improper disposal as both hazardous and non-hazardous wastes are dumped in unauthorized spaces. This mode of operation is not favorable for easy extraction of recyclable materials.

6.2.3 Performance of Stakeholders in Solid Waste Management in Zaria

Measures of effective service delivery outcome were used to assess the performance of stakeholders in solid waste management in Zaria. The effectiveness of solid waste management measures include ease of access to services by households, rate of waste collection, frequency of waste collection, solid waste collection aerial coverage and safe disposal.

The method of collection adopted by stakeholders was used to assess the accessibility of collection service. The house-to-house collection system operated by most of the informal and formal collectors is more accessible to households than the communal deport method of CBOs and LGCs. More than 78 percent of the stakeholders' collection services are

accessible to the households, while only 21.9 percent of the stakeholders cannot be easily accessed by households.

Regarding the rate of secondary collection of waste by stakeholders, the volume of waste collection is low (35 percent) compared to the volume generated. This is evidenced by mounds of uncollected waste that have accumulated across the urban area. The informal sector collection is more than the other stakeholders. For instance, the formal sector collection of 63,400kg is about 79.3 percent of the 79,907.5kg collection by all the stakeholders. The CBOs collection rate is the least. The level of collection is linked to the unorganized and haphazard solid waste activities in the study area. Very often, most of the wastes are scavenged, burned or left to degrade.

The result of the study revealed a long gap in the frequency of waste collection by the stakeholders and there is no daily secondary collection of waste in Zaria. All the CBOs and local government councils' solid waste collection are at long intervals, and some of the communal depots may not be cleared in a period of one year. Only the informal and formal collector; that is about 60 percent of the stakeholders collects waste at a frequency of once a week. Even this frequency is long for a humid weather condition in the study area. Because of the failure of regular collection in the study area, residents result to open dumping and littering.

Furthermore, safe disposal involving sanitary land filling is completely lacking in the study area. All the disposal points in Zaria are open dump facilities. Even then, these disposal facilities are not well utilized by stakeholders for disposal as only few of the stakeholders,

that is, formal and LGCs dump waste at the disposal facilities. About 75 percent of unsafe disposal is accounted for by the informal and CBOs. Only 21.9 percent of the waste disposal in Zaria can be said to be safe.

Finally, waste collection coverage by stakeholders is relatively extensive among the informal operators than the CBOs, LGCs and formal collectors. Out of the 61 percent of extensive secondary collection coverage by stakeholders, informal operators account for 50 percent. The collection of compost as fertilizer by the informal operator was found to be responsible for the high coverage by the sector. The sectors coverage is tailored to the availability of compost across the urban area. The other stakeholders, however, have limited coverage.

On the whole, stakeholders perform in solid waste management in Zaria is not effective.

6.2.4 Determinants of Performance

Effort has been made in this study to demonstrate the level of association between outcome of stakeholders' solid waste management and the characteristics of technical, user and agencies management style.

For technical characteristics, facilities and equipment at the disposal of stakeholders was discovered to be the greatest determinants of performance as all the variables of performance are dependent on it. All the variables except ease of access show significance of 0.001 and level of contingency coefficient of (.32) and above. There is no association between the level of disposal and extent of coverage and safe disposal. In the same vein,

there is no association between technical skills of stakeholders and ease of access, safe disposal, extent of coverage, and rate of waste collection. Thus, this study shows that skills of stakeholders are not very important to the performance of stakeholders in operation in solid waste management in Zaria.

Concerning user characteristics, all the variables of outcome are associated with the level of payment and use of alternative methods of solid waste management by users. They show significant values of 0.01 to 0.001 and fairly high level of contingency coefficient. However, the average number of users a stakeholder does not have much impact on the performance of stakeholders. For instance, safe disposal and frequency of waste collection are not associated with the number of users a stakeholder has. So income of households has very minimal impact on the performance of stakeholders in solid waste management.

The analysis shows that the characteristics of management by the agencies responsible for overseeing the service to be important determinant of outcomes. All the variables of outcome are associated with the level of support by government, and except for extend of secondary collection, the significance levels are 0.001. There is also high level of association between them. Monitoring and supervision by authorities and the use of sanctions to deter sub-standard performance except for ease of access. This goes to show that rules and regulations, monitoring and sanctioning are important for compliance to a certain mode of behaviour by stakeholders to be ensured.

6.3 IMPLICATIONS OF THE FINDINGS

The findings in this study show some indications of the assertions concerning the failure of the state are to a large extent valid. The rationale of the failure of the state theory is based on the preposition that those in charge of the state do not have effective control over other group or classes in society. The findings, from the participation of stakeholders in solid waste management, indicate how the relationships between state and communities affect performance outcome. The implication points to the need for alternative structure of the administration to ensure for effective relationship and development.

The issues tend to support Stoker's philosophy that stakeholders' action and their inherent outcome are grounded in the existing structures and situation (Stoker, 1995). Actions, responses and strategies within and between different actors are shaped according to prevailing relations. The implications of this are the need to clearly specify roles and responsibilities for the various stakeholders and to emphasise interaction between the public and private actors, and the actors themselves.

6.4 RECOMMENDATIONS

Based on the findings of this study, the following recommendations are made towards improving the participation and performance of stakeholders in solid waste management in Zaria. These include the questions of public participation, appropriate institutional framework for solid waste management and proposals for improvements of the technical, users and management characteristics.

6.4.1. Public Participation in Solid Waste Management

Throughout the cities of the developing world, the contributions of participation to reduction of cost to government, and the inability of the public sector to provide adequate services is increasingly leading to popular acceptance of participation. In response, United Nations, The World Bank, United Nations Environment Progammes and United Nations (Habitat) have advocated for public sector withdrawal from direct provision of urban services and to focus on the creation of "enabling environment" for stakeholders.

However solid waste management arrangements in Zaria and many urban areas in Nigeria are generally implemented without provision for participation. Households, local and traditional leaders that could help in mobilization of public to adopt scientific methods or pay for solid waste management, are not involved. Also indication from Chapter Four seems to show that payment for solid waste is a difficult issue, but something can be done provided there is political support and the public is involved. It is possible to pay for waste collection and disposal throughout Zaria and other towns in Nigeria, provided there is improvement in service delivery. Various kinds of actors and various forms of partnership and means of payment can be involved. This is a subject for further research.

In order to promote effective solid waste management, there is an urgent need for public mobilisation to increase participation from the public toward waste disposal activities. Participation can extend collection to several more neigbourhoods which lack services. This can be done through:

i. Participation of the public can be achieved at the community level through mobilization and education. CBOs and NGOs are to be involved in enlightenment, mobilization for community programmes and monitoring of solid waste management at the community and household levels. The existing CBOs with new ones and NGOs should be involved in all deliberations and activities connected with all aspect of solid waste management in the communities.

ii. Another step at improving participation in solid waste management will be changing the present lukewarm attitude of the majority of the population towards waste disposal activities. Increased cooperation and participation from the populace, particularly at the community level would have positive impacts.

iii. Education campaigns on sanitation and solid waste management can be developed. Such campaigns should be undertaken by the State and LGCs. The public need to be informed on how waste is to be collected, the ways it is to be stored and delivered to the collection points, and other responsibilities and benefits. They need to be properly educated on the inherent dangers of inadequate attention to proper waste removal and disposal – and unclean environment, pollution, diseases, etc.

iv. The level of consultation needs to be increased so as to obtain people's input into various plans and projects concerned with solid waste management. Notable citizens, traditional rulers and community leaders should be given a position on the institutional set-up for solid waste management in Zaria.

v. Non-Governmental Organizations, CBOs and other stakeholders should be more involved in the planning and execution of solid waste management programmes.

6.4.2 Proposal for a New Institutional Framework for Solid Waste Management in Zaria

It is obvious that much of the problems of poor solid waste management in the study areas and in other urban areas throughout the country are due to weak institutional and organizational capacity of the institutions responsible for the service. Thus, there is need for evolvement of a new institutional framework for solid waste management through which stakeholders like the private, community and informal sector would be involved and interact with formal institutions. The particular form of the institutional framework, and the roles to be performed would be determined by the character of the stakeholders in the urban sector. The details of the framework Zaria urban area are given Fig 6.1 and sections below.

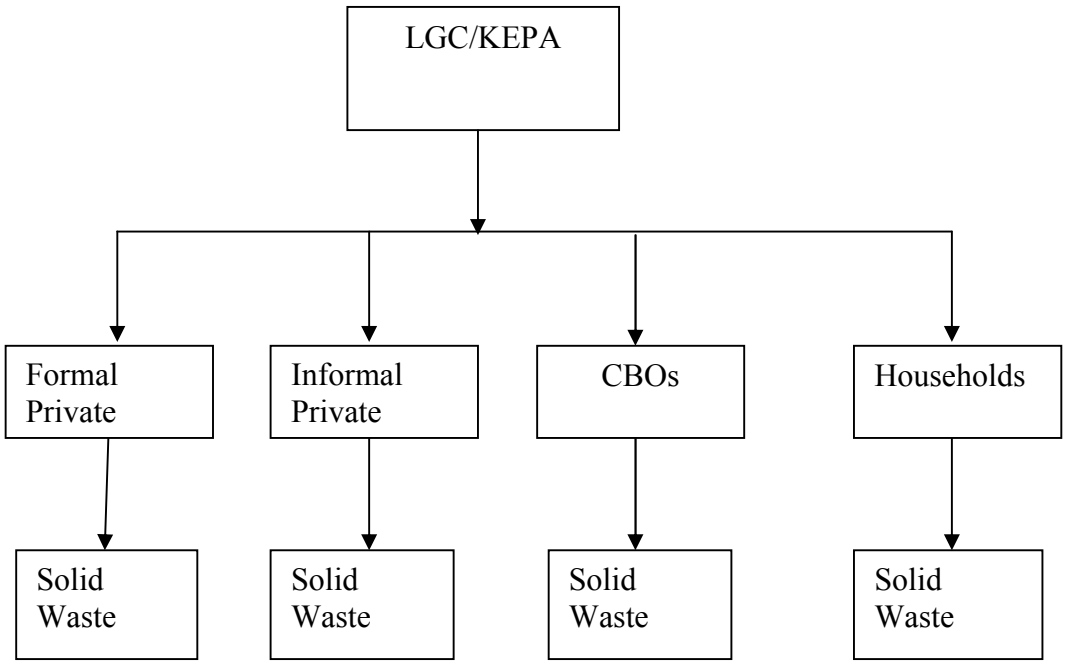


Fig. 6.1: Proposed Institutional Framework for Solid waste Management in Zaria.

6.4.2.1 The Formal Private Sector

The level of private-sector involvement in solid waste management in Zaria has been very low. Yet the increasing role of this sector in the provision of services in urban areas is widely reported by Batley (1996), Rondinelli and Kasarda (1993). With favourable enabling conditions, the sector is to be involved in: collection of waste from households at agreed price, collection of waste from commercial areas through a contract with the LGCs and recycling enterprises.

6.4.2.2 The Informal Private Sector

The gaps left by the formal private and public sectors in the provision of solid waste services, are often filled by the informal private sector. This sector is concerned with primary collection and recycling trade. So much has been explored about the possibility of integrating this sector into formal solid waste management by Wilson *et al* (2005), Doan (1998) and Dedehouanou (1998). This sector should be involved in: pre-collection activities, waste recovery and supply of recovered materials for recycling and street sweeping.

6.4.2.3 The Local Government Councils

Waste management is the constitutional responsibility of the LGCs. The policy recommendation outlines a range of options for tackling solid waste management in Zaria and generally similar urban areas in Nigeria. Local government councils are needed to plan, regulate and harmonise competing uses and address questions of equality. In addition, local governments are to: set rules and regulations for the operations of the partners, appoint contractors or partners for solid waste management, monitor the operations of the

stakeholders and sanction substandard performance. In addition, LGCs are to promote participation of the public through CBOs in solid waste management, assist CBOs with equipment to enhance their activities, undertake public awareness campaigns and set up waste management infrastructures

6.4.2.4 Kaduna Environmental Protection Agency

The agency which represents the state performs the regulatory and monitoring roles. To further its basic aim of protection and sustainable development of the environment in the state. KEPA is to be responsible for the following: impose recycling responsibilities on industries and businesses, supervise and enforce bye-laws, promote environmental matters within the town and assist in capacity building. It is also to collaborate with the LGCs in policy formulation, assist CBOs with solid waste management concern with grants and equipment and conduct public awareness campaigns.

6.4.2.5 Community Based Organizations

Solid waste management by CBOs is undertaken for the direct goal of maintaining environmental cleanliness. These organization works hand in hand with traditional authorities, thus, CBOs are to be involved in: promoting safe solid waste management practices like separation, sorting and use of standard storage facilities, pool resources together to form cooperatives and form cooperatives for composting activities and conduct public awareness and enlightenment campaigns about best practices in solid waste management. CBOs should liaise with traditional rulers to mobilize households for solid waste management, be involved in street sweeping and monitor the waste services offered by private enterprises and LGCs.

6.4.2.6 Individuals and Households

Households as generators of solid waste have responsibility for proper solid waste management at primary level. The success of any solid waste management strategy depends on the cooperation of individuals and households. Individuals and households are to be responsible for the following: sorting of waste at the household level into the component parts, adopt proper storage of waste in covered bins and regularly deposit waste at collection centres. Generators are to pay solid waste collection charges and participate with neighbours in activities to keep the environment clean.

6.4.3 Proposal for Improvement of the Performance of Stakeholders in Solid Waste Management in Zaria

The proposal utilises variables of determinants having prominent impact on many of the variables of performance of stakeholders so as to focus policy on. These are variables having strong association with performance and having contingency coefficient values of (.17) and above. These have been identified in Tables 5.7, 5.8 and 5.9.

6.4.3.1 Proposals for Technical Factors

(i) Facilities and Equipment

Facilities and equipment are the most prominent determinants of performance in Zaria. This variable determines ease of access, safe disposal, and extent of coverage, frequency of collection and rate of collection. The facilities and equipment utilized for solid waste collection in Zaria like wheel barrows are of low in capacity. This makes stakeholders to undertake several trips to dispose of the waste. Those stakeholders that utilize pick-ups and

trucks collects large quantities of waste at once are able to cover many users per round of collection and are able to take the wastes further away from the urban area.

Policy should focus on stakeholders with low capacity facilities for waste collection. Virtually all the informal operators and CBOs are to be targeted. Medium size capacity waste transport vehicles like rolled up trucks and tipper vehicles should be made available rather than expensive compactor trucks for city-wide transportation of secondary waste collection. For the informal operators to benefit there is the need to form cooperatives to derive economics of scale. However, for primary collections greater use can be made of push carts and wheel barrows.

(ii) Level of Capital

All the stakeholders in solid waste management in Zaria have very limited level of capital for operation. The level of capital determines only ease of access, frequency of secondary collection and rate of collection. For the formal collectors who move from house to house and collect waste regularly, substantial level of operating capital is required. To enhance performance of the stakeholders, the focus of policy towards capital should target the CBOs, formal private collectors and the LGCs. There is need for reformation of cooperatives among the stakeholders to pool and access financial resources. This will encourage regular collection of waste, house-to-house collection and increase in the rate of waste collection.

6.4.3.2 Proposals for Users Factors

(I) Adequate Number of Users per Stakeholders

The level of users per stakeholder is a good determinant of ease of access, extent of coverage and rate of collection. There is a very high level of association between them as they all have contingency coefficients from .52 and above. Most of the stakeholders that provide services for a large number of users are easily accessed by the users, have extensive coverage and high rate of waste collection. In Zaria, the informal operators and formal private collectors are stakeholders associated with large number of users.

Policy should focus on encouraging users to patronise the services of stakeholders through educational and enlightenment campaign in the communities on the importance of proper waste collection and the health, environmental and social benefit. Many households that do not have solid waste services and depend only on self-help could be targeted.

(ii) Level of Payment for Services

Amount paid by users is a strong determinant of performance by stakeholders. All the variables of performance are fairly dependent on the level of payment. The more the users pay, the higher the performance. All the users that pay high amount have ease of access, have waste collection at short intervals and prompt disposal of the waste.

The focus of policy on level of payment should emphasize cost recovery of operation and specification for inexpensive, affordable and appropriate technology. Legislation for cost recovery should include appropriate sanction on users for default. Sometimes cost recovery can lead to inequality in service provision as the needs of the poorest communities may not be met. The middle and high income neighbourhoods may invariably be the groups that

will receive good services as they are able to pay for cost-recovery. In order to achieve equity, there should be deliberate policy of cross-subsidisation and public sector provision of services to the poor communities.

(iii) Use of alternative Methods of Solid Waste Services

Use of alternative methods of solid waste service is a strong determinant of performance. About 79 percent of the users utilize other methods of solid waste collection and disposal from the services of stakeholders in Zaria. There is a high level of dependency and contingency coefficients between all the variables of performance and this determinant. Most of the users utilise improper method of waste management like burning, disposal within open spaces and burying. The uses of these other methods impose certain limitations on stakeholders' performance.

Policy should focus on enforcement of rules and regulations regarding appropriate mode of behaviour with regard to waste storage, separation and disposal. The reintroduction of sanitary inspectors should be encouraged. And stakeholders' services delivery should be improved to motivate users to patronise them.

6.4.3.3 Proposals for Management Characteristics of Agencies of Government

(i) Support from Government

Support from government is a determinant of ease of access, safe disposal, and frequency of collection, rate of collection and minimally on the extent of collection coverage. There is a very high level of association as the contingency coefficient values range from .47 to .56 between the variables of performance and support from government. However, the extent

of collection coverage and frequency of collection have weak association with the determinant. Support from government in the area of facilities and equipment for waste collection and transportation increases the rate of collection, regular collection and safe disposal away from the built-up area.

Policy on support from government should target cooperation between the public sector and other stakeholders to collaborate supply capital and facilities for waste transportation. This will improve the rate of collection, safe disposal and frequency of waste collection.

(ii) Monitoring and Supervision

The extent of monitoring and supervision of stakeholders' services determine extent of coverage, frequency of collection, rate of collection and to a very low extent, safe disposal. The strength of association between the variables of performance and determinants are weak as the contingency coefficients are low. This value ranges between .17 and .31. Monitoring and supervision is limited to the visible part of the urban area and supervisory staffs at the public health departments are very few as we discussed in Table 4.7.

Policy should focus at employing more staff for the public health departments, particularly at the supervisory level. It has been generally known that local government staff has one of the lowest level of salaries in Nigeria. In order to stimulate employment at this level, there is need for general increase in salary of staff at the local governments. Also, building the competences of LG and KEPA personnel will be required.

(iii) Sanctioning Sub-standard Performance

The use of sanctions for substandard performance is minimal in Zaria. When used, it is found to be a determinant of ease of access, safe disposal, frequency of collection and to a lesser extent on the extent of secondary collection coverage and rate of collection. Some of the issues of sub-standard performance are associated with lack of waste separation at source of generation, indiscriminate and unsafe disposal.

Policy should focus on the use of incentives to discourage poor performance. Some of the incentives can be in form offer of prizes for best practices, competitions with rewards and the use of media and education of the public on the health, environmental and social benefits of appropriate handling of wastes.

6.5 CONCLUSION

This study began by assessing solid waste management in Zaria urban areas within a framework, showing the stakeholders and their practices, their performances and highlights of the factors that determine the performances. The analysis showed that the presence of stakeholders do not in themselves guarantee good performance in service delivery. Some of the reasons deduced for low performance are related to the context of participation and failure of the public sector to perform its functions.

Stakeholders' actions and the inherent outcome are grounded in the existing structures and situations. In Zaria, informal and formal processes of decision making, interests and relations have been observed to be important for outcome in solid waste management. The

actions, responses and strategies within and between different stakeholders are shaped according to these prevailing relations.

Observation from this study has established that stakeholders' actions are fragmented and ad hoc in nature as the majorities do not undertake regular solid waste collection and disposal. The stakeholders also pursued solid waste management in an independent way without cooperation. Thus the underlying concept of coalition of interests to bring about public purposes in Stoker Regime Theory philosophy (Stoker, 1995) does not emerge. Rather, the stakeholders' actions tend to conform to the pluralist model of Judge (1995) and Polsby (1980). The manners of stakeholders' actions on performance are diverse.

The failure of the public to deliver services to its population has led to intervention from the community sector (both formal, informal and CBOs), that come to bridge this gap. However, the failure of the public sector to clearly define the role and responsibilities, and monitor the stakeholders has led to situation where performance does not meet with expectation. The common notion is that the entrance of stakeholders into urban service delivery is supposed to bring about improvement, but from observation, stakeholders' intervention does not translate to improvement in the case of Zaria.

Due to the aforementioned reasons, one may be tempted to think that participation by stakeholders in service delivery cannot be efficient. This line of argument will not hold in Zaria and in similar cities in Nigeria because the necessary conditions and opportunities for participation are not created. The huge problem of solid waste management shows some

level of failure on the part of institutions, households and stakeholders rather than lack of capacity to perform.

6.6 SUGGESTIONS FOR FURTHER RESEARCH

Much as this study endeavored to cover most of the relevant aspects of the theme, solid waste management is too diverse to be exhausted in a single research. The following suggestions for further research will enrich this field with more knowledge.

It is possible to pay commercial rates for solid waste collection and disposal in Zaria and other towns in Nigeria, involving various kinds of actors and using various forms of partnerships. This study is suggesting for feasibility studies about the possibility of charging economic rates for solid waste management.

Despite highlighting a few issues on recycling activities in Zaria, this study concentrated mainly on domestic solid waste collection and disposal. It is suggesting for empirical studies to assess on the level of recycling activities.

REFERENCES

Ahmed, R. (1994) (Ed.) First APE International Conference on Recycling of Solid Waste: Case Studies, Future Plans and Strategies. *Conference Proceedings,* Karachi, (1994).

Aina, E. (1994). Interview with the former Director General of Federal Environmental Protection Agency (FEPA). *Daily Guardian,* Monday, July 8.

Aina, T.A. (1990). Understanding the role of Community Organization in Environmental and Urban contexts, In: *Environment and Urbanization,* Vol. 2, No. 1. p. 3-6.

Ajadike, J.C. (2001). Urban solid wastes: Problems and management in Nigeria, In: G.E.K. Ofomata and P.O. Phil-Eze (Eds.). *Geographical Perspective on Environmental Problems and Management in Nigeria*. Department of Geography, UNN.

Ali, M. and M. Snel (1999). *Lessons from Community-Based Initiatives in Solid Waste. Task* No. 99. WELL, Study London/Loughborough. WELL/WEDC http://www.iboro.ac.uk,

Amokaye, G.O. (2004). *Environmental Laws and Practice in Nigeria.* University of Lagos Press, Lagos.

Anschutz, J. (1996). *Community-Based Solid Waste Management and Water Supply Projects: Problems and Solutions Compared, A Survey of Literature*. Urban Waste Expertise Programme UNEP Working Document 2 Gouda, The Netherlands, http://www.unep.org

Attahi, K. (1999). Abidjan, Cote D'Ivoire In: Onibokun A.G (Ed.). *Managing the Monster: Urban Waste and Governance in Africa:* Ottawa, Canada: IDRC.

Bartone, C; J, Bernstein, J. Leitmann, J. Eigen (1994). *Towards Environmental Strategies for Cities: Policy Considerations for Urban Environmental Management in Developing Countries*, *Urban Management Programme Policy Paper No. 18*. The World Bank, Washington, D.C.

Bartone, C.L. and J.D. Bernsteein (1993), Improving municipal solid waste management in Third World Countries. In: *Resources Conservation and Recycling, No. 8,* Elsevier Science Publishers.

Bartone, C; L. Leite and T., Triche (1991). Private sector participation in Municipal Solid Waste Service: Experiences in Latin America, *Waste Management and Research:* No. 9.

Batley, R. (1993) Political control of urban planning and management, In: Devas, N and C, Rakodi (eds), *Managing Fast Growing Cities*. Harlow, Longman.

Batley,R. (1996). Public-Private relationships and performance in service provision, *Urban Studies. 33*, Nos. 4-5, p. 723-751.

Beall, J. (1997). Valuing difference and working with diversity ,In: Beall, J., (Ed.). A *City for All*. Zeb Books Ltd., London and New Jersey.

Bentley, E. (1988). *Struggle for Survival: Organizing the Paper Pickers of Ahmedabad. Mahila SEWA Trust*. Ahmedabad, India.

Bernstein, J. (2004). *Social Assessment and Public Participation in Municipal Solid Waste Management: Took Kit.* Urban Environment Thematic Group. The World Bank, Washington, D.C, http//www.worldbank.or/urban/uswm/socialassesstoolkito.pdf

Blowers, A (1997) Pollution and waste-A sustainable burden? In: Blowers, A (ed), *Planning for a Sustainable Environment*. A Report by the Town and Country Planning Association, Earthscan Publications Limited, London.

Bromley, D.W. (1986). The Common Property Challenge, In: Common *Property Resource Management*, A Proceedings of a Conference on common property, April 21 – 26, 1985. Washington D.C. National Academy Press.

Bulle, S. (1999), *Issues and Results of Community Participation in Urban Environment.* UWEP Working Document 11, ENDA/WASTE, Gouda, The Netherlands.

CEMPRE (1994), Training Kit for Scavenger Co-ops. *CEMPRE NEWS, Brazilian Recycling Commitment*, No. 16, Rio de Janeiro, Brazil. www.ccmpre.org.bra, Accessed July 6, 2007

Centre for Advanced Philippine Studies (CAPS) (1991). *A Case study of a Privately-Initiated Solid Waste Collection Management in San Juan, Metro Manila*. World Bank/Metropolitan Environmental Improvement Program (MEIP).

Chambers, R. (1994), The origins and practice of participatory rural appraisal. *World Development;* Vol. 22, No. 7.

Cointreau, S.L. (1982) *Environmental Management of Urban Solid Wastes in Developing Countries: A project Guide*. The World Bank. Urban Development Department, Washington, D.C.

Cointreau – Levine, S. (1994), *Private Sector Participation in Municipal Solid Waste Management in Developing Countries,* Vol 1: The Formal Sector. Urban Management Programme Policy Paper No. 13, World Bank, Washington.

Cointreau, S. (2006), *Occupational and Environment Health Issues of Solid Waste Management: Special Emphasis on Middle- and Lower- Income Countries.* Urban Sector Paper of the World Bank Group, Washington, D.C.

Cointreau, S. and M. de Kadt (1991), Living with garbage: Cities Learn to recycle. *Development Forum,* January-February, 1991.

dalla Torre, C. (1992). *Municipal Solid Waste Management in Developing Countries: Problems and Issues: Need for Future Research,* No. 26, SANDEC Publication, Switzerland.

Dedehouanou, H. (1998). Coping with house waste management in Cotonou, Benin In: *Environment and Urbanization* Vol. 10. No. 2, October, 1998

Desai, V. (1995). *Filling the Gap: An Assessment of the Effectiveness of Urban NGOs,* ODA (UK), Institute of Development Studies, University of Sussex, Sussex, 136 pages.

Devas, N (2002). Urban livelihoods-issues for urban governance and management In: Rakodi, C. and T'Lloyds-Jones (Eds). *Urban Livelihoods: A People-Centred Approach to Reducing Poverty*. London; Earthscan.

Devas, N. (1999). *Who Runs Cities? The Relationship between Urban Governance, Service Delivery and Poverty. Urban Governance, Poverty and Partnerships.* Theme Paper 4 – Working Paper 4 IDD.

Devas, N. and C. Rakodi (1993). The Urban Challenge; In: Devas, N. and C. Rakodi (Eds.) *Managing Fast Growing Cities: New Approaches to Urban Planning and Management in the Developing World*, Longman, Essex, U.K.

Diaz, D.; B.J.L.L. Follegatti and M. Hadijk (1996), Innovative urban environmental management in ILO, Peru. In *Environment and Urbanization* Vol. 8, No. 1, April, p. 21-34.

Dillinger, W. (1993), *Decentralization and Its Implication for Urban Service Delivery*, *Urban Management Programme. Discussion Paper No. 16*, the World Bank, Washington, DC.

Doan, P.L. (1998), Institutionalizing household waste collection: The Urban Environmental Management Project in Cote d'Ivoire, *Habitat International,* Vol. 22, No. 1, P. 27-39.

Douglass, M .(1992), The Political economy of urban poverty and environmental Management in Asia: Access, Empowerment and Community-Based Alternatives. In: *Environment and Urbanization*, Vol. 4, No. 2, October, p. 9-32.

Egwueleka, T.C. (2009), Municipal Solid Waste Management in Nigeria, In: *Iran J. Environmental Health, Science Engineering*, Vol.6, No. 3 pg 173-180. http://www.sid.ir/En/VEWSSID/J - pdf/102620090305.pdf

Evans, M. (1996), Government action, social capital and development: reviewing the evidence on synergy, *World Development* Vol 24 No. 6 p. 1119-1132.

Federal Environmental Protection Agency (FEPA),(1989), *National Policy on the Environment.* Federal Republic of Nigeria.

Federal Environmental Protection Agency (FEPA), (1999) ,*National Policy on the Environment.* Revised Edition, 1999. Federal Republic of Nigeria.

Federal Government of Nigeria (FGN) (1979), *The Constitution of the Federal Republic of Nigeria* 1979. Federal Ministry of Information, Lagos, Nigeria.

Federal Government of Nigeria (FGN) (1999), *The Constitution of the Federal Republic of Nigeria*. Federal Ministry of Information, Lagos, Nigeria.

Federal Government of Nigeria (FGN) (2007), *The National Population Census*. Official Gazette, Lagos, 15 May, 2007.

Federal Ministry of Environment (2000), *Blueprint on Municipal Solid Waste*. Kaduna, Nigeria: Nation house Press Limited.

Federal Ministry of Environment (FMOE)(2005). P*olicy Guidelines on Solid Waste Management,* Jan, 2005.

Furedy, C. (1989). Social considerations in solid waste management in Asian Cities, *Regional Development Dialogue*, Vol.10, No. 3, p. 13-36.

Furedy, C. (1990). Social aspects of solid waste recovery in Asian Cities" *Environmental Sanitation Reviews*, No. 30, Bangkok, Thailand, 1990, p. 2-52

Furedy, C. (1992) Garbage: Exploring, non-conventional options in Asian Cities. *Environment and Urbanization,* Vol. 4, No. 2, Oct. 1992, p. 42-59.

Gidman, P., I. Blore, J. Lorentzen and P. Schuttenbelt (1995). *Public-Private Partnerships in Urban Infrastructure Services*. UMP Working paper Series 4, Kenya, 1995.

Grindle, M.S (1980) Policy Content and Context, In: Grindle, Merilee S. (ed) (1980), Policy and Policy Implementations in the Third World Princeton NJ, Princeton University Press.

Harper, M. (2000). *Public Services through Private Enterprise-Micro-Privatisation for Improved Delivery*, Intermediate Technology Publications, London, U.K.

Heden, M. (1999). Urban Solid Waste Management in Kanifing Municipal Area, *The Gambia, Department of Human Geography*, Stockholm University.

Hernandez,); B.Rawlins and R.Schwartz (1999), Voluntary recycling in Quito, factors associated with participation in a pilot programme, In: Environment and Urbanization: Sustainable Cities Revisited ii, vol.11 no.2, October 1999 P. 145-159

Hyden, G. (1999) Rethinking the study of Africa politics, In: Olowu, D; A Williams and K. Soremekun (eds) (1999) *Governance and Democratisation in West Africa*. Council for Development and Social Science Researches in Africa (CODESRIA), Dakar, Senegal.

Satterthwaite, D. (1999), Sustainable cities or cities that contribute to sustainable development? In: D. Satterthwaite (Ed.), *Sustainable Cities*, Earthscan Publications Ltd., London, UK.

Hoornweg, D., L.Thomas and L. Otten (1999), *Composting and Its Applicability in Developing Countries*. Working Paper Series No. 8, Published for the Urban Development Division. The International Bank for Reconstruction and Development/The World Bank, Washington, DC.

Johnston, R.J. (1994). *The Dictionary of Human Geography*. Blackwell, Oxford.

Judge, D. (1995), Pluralism, In: Judge, D., G. Stoker and H. Wolman (eds), *Theories of Urban Politics* ,London, Sage.

Kaduna State Environmental Protection Agency, (KEPA) (1998), *Solid Waste Management Regulation No. 1 of 1998*. Kaduna State Government.

Kaduna State Government (1979). *Zaria Master Plan.* Ministry of Land and Surveys, Kaduna State, Nigeria, Gaskiya Corporation Ltd., Zaria.

Kaduna State of Nigeria (1984). *The Kaduna State Environmental Sanitation Edict. No. 5* of 1980. Kaduna State of Nigeria Gazette, No. 15, Vol. 18, 26th July, 1984.

Kaduna State of Nigeria (1991). *The Kaduna State Environmental Sanitation Edict No. 2 of 1991*. Kaduna State of Nigeria Gazette, No. 2, Vol. 25, 21st February, 1991.

Kant, S, and A. Berry, (2001). A Theoretical model of optimal forest resource regimes. *Journal of Theoretical and Institutional Economics* 157, p. 331-335.

Keita, M. (2001). *Building Partnerships for Urban Solid Waste Management in Bamako* IIED Issue Paper No. 105, London, UK.

Kironde, J.M. (1999). Dar es Salaam, Tanzania. In: Onibokun, A.G (Ed.) *Managing the Monster: Urban Waste and Governance in Africa*: Ottawa, Canada, IDRC.

Klundert van de A. and A. Anschutz, (1995). *Community and Private Sector Involvement in Municipal Solid Waste Management in Developing Countries*. UMP/SDC Collaborative Programme on Municipal Solid Waste Management in Low-Income Countries (WASTE, Gouda)

Klundert van de A. and A. Anschutz, (2001). *Integrated Sustainable Waste Management – The Concept: Tools for Decision-makers. Experience from the Urban Waste Expertise Programme* (1995-2001) WASTE, Gouda, Netherlands.

Klundert, Van de A, and I. Lardinios (1995), *Community and Private Sector Involvement in Municipal Solid Waste Management in Low-Income Countries*. UMP/SIX Collaborative

Programme on Municipal Solid Waste Management in Low-Income Countries, Ittingen Workshop (WASTE Gouda)

Lardinois, I. (1996). (Ed). *Solid Waste Micro and Small Enterprises and Cooperatives in Latin America.* The Global Development Research Centre. http//www.gdrc.or/uem/waste/swm-waste.htmlaccessed August 16,2009

Lardinois, I. and van de Klundert (eds) (1993) *Organic Waste Options for Small-scale Resource Recovery*. Urban Solid Waste Series 1. TOOL/WASTE Consultants.

Lee, Y.F. (1997). The privatization of solid waste infrastructure and services in Asia, *Third World Planning Review*, Vol. 19, No. 2, p. 139-152.

Lee, Y.S. (1994). Community Based urban environmental management: Local NGOs as catalysts. *Regional Development Dialogue*, Vol. 15, No. 2. p. 158-176.

Martin, M. (2000). *Globalization, Development and Municipal Solid Waste Management in Third World Cities.* El Colegio de la Frontera Norte. Tijuana, Mexico.http://www.gdnet.org

Matagi, S.V. (2002). Some issues of environmental concern in Kampala, The capital city of Uganda. *Environmental Monitoring and Assessment*, No. 77, 121-138. Klawer Academic Publishers. The Netherlands.

Mathison, S. (1988). Why Triangulate? *Educational Researcher*, Vol. 17, No. 2. p. 13-17.

Miles, D. (1994). *Developing private sector capacity*. Paper presented at the 20th WEDC Conference. Colombo, Sri Lanka, 1994.

Mitlin, D. (2001). Civil society and urban poverty: examining complexity. In :*Environment and Urbanization*. Vol. 13, No. 2. October 2001, p. 151-165.

Moser, C.O.N (1996). *Confronting Crisis: A Comparative Study of Household Responses to Poverty and Vulnerability in Four Poor Urban Settlements*, Washington, World Bank.

Mugagga, F. (2006). The Public – private sector approach to municipal solid waste management. How does it work in Makindye division, Kampala district, Uganda? An M.Phil Thesis in Development Studies, Department of Geography, Norwegian University of Science and Technology, Trondheim, Norway.

Mwangi, S.W. (2000). Partnerships in urban environment management: An approach to solving environmental problems in Nakuru, Kenya. In *Environment and Urbanization*, Vol. 12, No. 2, Oct. 2000. p. 72-92.

Myllyla, S. (2001), NGOs in urban environmental governance: Waste recycling in Cairo. In A. Tostensen, I. Tredten and M. Vaa (eds.), *Associational Life in African Cities Popular Responses to the Urban Crisis*, Nordiska Afriakinstituent, 2001.

Narayan, D. (1995). The Contribution of People's Participation: Evidence from 121 Rural Water Supply Projects. *Environmentally Sustainable Development Occasional Paper Series No., World Bank,* Washington, D.C.

NEST. (1991), *Nigeria's Threatened Environment: A National Profile*. Nigerian Environmental Study/Action Team. Intec Printers Ltd, Ibadan.

New Ground (1994), Curitiba-Turning the key to the future. *Autumn*, PP 30-32.

Nunan, F. (1997), The Politics of Influence in Environmental Decision-making: An Application of Policy Networks Analysis, unpublished PhD thesis, School of Public Policy, University of Birmingham.

Oakerson, R. (1986). A model for the Analysis of Common Property Problem, Proceedings of the Conference on Common Property Resource Management, April 21 – 26, 1985. Washington D.C., National Academy Press.

Ogu, V.I. (2000) Private sector participation and municipal waste management in Benin city, Nigeria, Environment and Urbanization, Vol. 12. No. 2. October, 2000. p. 103-117.

Okoko, O. (2000). *Quantitative Technique in Urban Analysis.* Kraft Books Ltd, Ibadan.

Okoye, C.O; and A.C. Okoye (2008), Urban domestic solid waste management. In: Nnodu, V.C., C.O. Okoye and. U. Onwuka (2008) (Eds) *Urban Environmental Problems in Nigeria*. Rex Charles and Patrick Ltd., Nimo, Anambra State.

Olanrewaju, A.O., (2000). Refuse: Tinubu's victory; cited in Palcznaski, R.J. (2002). *Study on Solid Waste Management Options for Africa*. African Development Bank Sustainable Development and Poverty Reduction Unit, Abidjan, Cote d'Ivoire.

Olley, J. and R. Olbina (1999). Innovative Solid Waste Management in China; In: Pickford, J. (1999). *Integrated Development for Water and Sanitation*, 25th WEDC Conference.

Omuta, G.E.D. (1988). Urban solid waste generation and management: Towards an environmental sanitation policy, In: Sada, and F.O. Odemeerho (1988). *Environmental Issues and Management in Nigerian Development*. Evans Brothers, Nigeria Limited.

Onibokun, A.G. (1989). Urban Growth and Urban Management in Nigeria. In Stren, R.E. and R. White (ed.) *African Cities in Crisis.* Westview Press, Boulder, CO, USA.

Onibokun, A.G. (ed.) (1999). *Managing the Monster: Urban Waste and Governance in Africa*. International Development Research Centre, Ottawa, Canada.

Onibokun, A.G. and A.J. Kumuyi (1999), Governance and waste management in Ibadan, Nigeria. In Onibokun, A.G. (ed.) (1999). *Managing the Monster – Urban Waste and Governance in Africa*. IDRC, Ottawa, Canada.

Ostrom, E;L. Schoeder and Wynne, S (1993), *Institutional Incentives and Sustainable Development: Infrastructure Policies in Perspective*, Westview Press, Boulder, Colorado.

Osuocha, P. (1999). *Improving Refuse Management in Urban Nigeria. Integrated Development for Water Supply and Sanitation*, 25th WEDC Conference, Addis Ababa, Ethiopia.

Oyaigbevwen, V.O. (1988). A conceptual framework for an environmental management policy. In: Sada, P.O. and F.O. Odemerho (ed) (1988). *Environmental Issues and Management in Nigerian Development*. Evans Brothers (Nigeria) Publishers) Ltd.

Pacheco, M. (1992), *Recycling in Bogota: Developing a culture of urban sustainability, Environment and Urbanization*, Vol. 4, No. 2, Oct. 1992. p. 74-79

Palcznaski, R.J. (2002), *Study on Solid Waste Management Options for Africa.* African Development bank. Sustainable Development and Poverty Reduction Unit, Abidjan, Cote d'Ivoire.

Patton, M.Q. (2001), *Qualitative Evaluation and Research Methods*. Third Edition. Thousand Oaks, CA: Sage

Phillips, S. (2002), Social capital, local networks and community development. In Rakodi C. and T. Lloyd-Jones (eds.) *Urban Livelihoods: A People Centred Approach to Reducing Poverty*. London: Earthscan.

Pickvance, C. (1995), Marxist theories and urban politics, In: Judge D. G. Stoker and H. Nolman (eds), *Theories of Urban Politics,* London, Sage

Polsby, N.W. (1980), *Community Power and Political Theory New Haven*, C.T., Yale University Press.

Porio, E. (1997), State, civil society and urban governance in Southeast Asia, Cited in Devas, N (1999), Who Runs Cities? The Relationship between Urban Governance, Service Delivery and poverty. Urban Governance, Poverty and Partnerships. Theme Paper 4-Working Paper 4 IDD.

Post, J., Inkoom, D., Baffoe-twum, M. and Nerquaye-Tetteh, T. (2003), *Local Governance, Civil Society and Partnerships: Community Actions in Neighbourhood Service Upgrading in Kumasi, Ghana*. Amsterdam Research Institute for Global Issues and Development Studies. http://www.2.fmg.uva.nl/agids/publications

Potter, R.B., T. Binns, J.A. Elliot and D. Smith (1999).*Geographies of Development,* Addison Wesley, Longman Limited, Essex, England.

Putnan, R. (1993), *Making Democracy work: Civic Traditions in Modern Italy*, Princeton NJ, Princeton University Press.

Rakodi, C. (1997). Global forces, urban change and urban management, In: Rakodi, C. (Ed.). *The Urban Challenge in Africa: Growth and Management of Its Large Cities*, United Nations, University Press, Tokyo.

Rhodes, R.A. (1997), *Understanding Governance*, Buckingham, Open University.

Richardson, D.W. (2003), Community-Based Solid Waste Management Systems in Hanoi, Vietnam. A Research Paper for M.Sc. degree of Forest Conservation. Faculty of Forestry, University of Toronto, Canada.

Rogerson, C.M. (2001), The waste sector and Informal entrepreneurship in Developing World Cities. *Urban Forum*, Vol. 12, No. 2.

Rondinelli, D.A.,and J.D. Kasarda (1993), Privatization of urban services and infrastructure in Developing Countries. In: Kasarda, J.D. and A.M. Parnell (Eds.). *Third World cities*, Sage.

Rosario, A.and A. Scheinberg (2004). *Integrated Sustainable Waste Management in Bangalore Lessons Learnt From the UWEP Programme in India*, UWEP City Series.

Sani, M (2006) ,Prospects and Urban Development Implications of Commercializing Water Supply Case Study of Zaria, Nigeria. Ph.D Thesis of the Department of Urban and Regional Planning, A.B.U. Zaria.

Schubeler, P. (1996). *Participation and Partnership in Urban Infrastructure Management*. UNDP/UNCHS (Habitat) World Bank, UMP

Schubeler, P. K. Wehrle and J. Christen (1996). *Conceptual Framework for Municipal Solid Wase Management in Low IncomE Countries*. Working Paper No. 9, UMP (LTNDP/UNCHS/World Bank) and SDC (SWISS Agency for Development and Cooperation) St. Gallen, Switzerland, SKAT. http://WBLN0018.worldbank.org/External/Urban/UrbanDev.nsf/Attachments/UE Conceptual Framework/File/Conceptualframework.pdf. Accessed 17 August 2009.

Snel, M. (1997). The Formal and Informal Sector of Solid Waste Management in Hyderabad India. D. Phil Thesis, University of Sussex, Brighton.

Snel, M. (1999). Integration of the Formal and Informal sector waste disposal in Hyderabad, India In: *Waterlines*, Vol. 18, No. 3, p. 27-28.

Snel, M. and M. Ali (1999), *Stakeholder Analysis in Local Solid Waste Management Schemes.* Task No. 69, WELL, Study London, Loughborough WELL/WEDC. http://www.iboro.ac.uk

Sokomba, M.J. (1981). An Attempt at Separating Vehicular Circulation from Pedestrian Circulation in selected Commercial Areas of Zaria Urban Area, An M.Sc. (URP) Thesis. Of the Department of Urban and Regional Planning, A.B.U. Zaria

Stare, M. (2005). "Decentralized Service Provision in Theory and Practice: Agency Structure, of the Solid Waste Management of Zaria, Nigeria". Thesis 10 Credits, Specialized Course in Human Geography, Department of Human Geography, Stockholm University, Stockholm.

Stoker, G. (1995). Regime theory and urban politics, in Judge, D., G. Stoker and H. Wolman (eds), *Theories of Urban Politics,* London, Sage.

Stone, C. (1989), Regime Politics: Governing Atlanta, 1946-1988, cited in Onyanta A. (2007).,Governing From Above: Solid Waste Management in Nigeria's New Capital City of Abuja. A Ph.D Dissertation of Stockholm University pg, 71-78.

Stone, C.N. (2004). Its more than the economy after all: Continuing the debate about urban regimes. *Journal of Urban Affairs* Vol. 26, No. 7, p. 1-19.

Stren, R. and R. White (Ed.)(1989). *African Cities in Crisis: Managing Rapid Urban Growth.* West view Press ,Boulder, Co. USA.

Swilling, M. and D. Hutt (1999), Johannesburg, South Africa. In: Onibokun, A.G. (Ed.). *Managing the Monster: Urban Waste and Governance in Africa*: J. Ottawa, Canada. IDRC.

Tchobanoglous, G., H. Theisen and S. Vigil (1993), *Integrated Solid Waste Management. Engineering Principles and Management Issues*. New York McGraw-Hill.

Thuy, T.T. (1998). Towards efficient waste management in African Cities: The transformation Needed. Cotonou, Benin: *Municipal Development Programme* No. 1. January, 1998.

Uchegbu, S.N. (2002). *Issues and Strategies in Environmental Planning and Management in Nigeria*. Spot lite Publishers. Enugu.

UDBN (1998), Urban Solid Waste Management Scheme (National Stakeholders Consultative Workshop) for PTF November 23 – 27, 1998. Abuja, Nigeria.

UNCHS (1991). *Human Settlements Development through Community Participation*. UNCHS, Nairobi, Kenya.

UNDP (2005), *Guidelines for Solid Waste Management*. Draft Guideline. Pakistan Environmental Protection Agency.

UNEP (1983),Waste *Management Symposium. Proceedings Annex II, Synopsis of Participating Country Monographs,* Nairobi, Kenya.

UNEP-IETC ,(1998), *Source of Alternative Technologies for Freshwater Augmentation in Africa.* Technical Publication Series No. 8, Osaka/Shiga UNEP International Environmental Technological Centre.

United Nations System in Nigeria, (UNSN, 2001), *Nigeria Common Country Assessment*. Shearson Limited.

Urban Development Bank of Nigeria Plc ,(1999). *Urban Solid Waste Master Plan, Draft Final Report*. Prepared by Afri-Projects Consortium, Abuja, Nigeria. Urban Development Bank of Nigeria, plc.

Wade, R. (1986) Common Property Resource Management in South Indian Villages, Proceeding of the Conference on Common Property Resource Management, April 21 – 26, 1985. Washington D.C., National Academy Press.

Wekwete, K.H. (1997). Urban management: The recent experience, In: Rakodi, C. (Ed.). *The Urban Challenge in Africa: Growth and Management of Its Large Cities*. United Nations University Press, Tokyo, Japan.

Wilson, D.C., C. Velis and C. Cheeseman (2005). *Role of Informal Sector Recycling in Waste Management in Developing Countries*. Elsevier Limited, London, U.K.

World Bank (1992), *Governance and Development*. Washington, D.C., The World Bank. http://www.worldbank.org.

World Bank (1992), *World Development Report: Development and Environment*, New York.

APPENDIX 1

HOUSEHOLD SURVEY

This survey is directed to household heads to help characterize the socio-econ status of households in the area.

A: HOUSEHOLD CHARACTERISTICS

1. Date _____ Questionnaire No _____
2. Ward _____
3. Sex of Respondent
   (a) Male [ ] (b) Female [ ]
4. Age (years) _____
5. Marital Status
   (a) Single [ ] (b) Married [ ]
   (c) Divorced [ ] (d) Widowed [ ]
   (e) Separated [ ]
6. Educational background
   (a) Quaranic [ ] (b) Primary [ ]
   (c) Secondary [ ] (d) Tertiary [ ]
   (e) Illiterate [ ]
7. How many persons live in your household?
   (a) _____ Adults (15 years and older)
   (b) _____ children (under 15 years)
8. How many other people in your household contribute regularly to the household income?_____
9. What is the total household monthly income? _____
10. How long have you been resident in the neighbourhood? _____
11. Type of house and number of rooms

Type	No.
a)Traditional Compound	
b) Flat	
c) Bungalow	
d) Others (specify)	

12. Number of households in the compound: _____
13. House tenure type and monthly rent

Tenure	Rent
Rental	
Owner-Occupier	
Others (specify)	

14. What type of business do you run here in the house?

a. None [ ]

b. Grocery shop [ ]

Candy shop [ ]

c. Barber shop [ ]

d. Selling cooked food [ ]

e. Bakery [ ]

f. Tailoring [ ]

g. Photography [ ]

h. Video shop [ ]

i. Others (specify) _____

B : WASTE CHARACTERISTICS AND DISPOSAL

15. What is the quantity of waste your household generate on daily basis(kg)?_____

16. Give an estimate of the proportion of the wastes that is a (fraction out of ten).

i. Biodegradable (paper, cardboard, food items, leaves).

ii. Non-biodegradable (glass, plastics, metals, can etc).

17. How do you discard the waste that has no value for you?

a. Burn it [ ]

b. throws it in the gutter/on the street [ ]

c. discards it in the communal depots [ ]

d. buries it in the backyard [ ]

e. leaves it to be collected from the house [ ]

f. others (specify) [ ]

18. Place of storage of this waste before disposal

a. Drums

b. Plastic containers

c. Cartons

d. Others (specify)_____

19. How often is waste collected from your house?
    a. Not collected at all
    b. daily
    c. twice a week
    d. once a week
    e. others (specify)

C. PAYMENT AND RECEIPTIONS

20. How much do you pay for waste collection from your house?
    a. No payment [ ]
    b. Pay #_____ per trip
21. what are your reasons for sorting out your waste?
    a. No sorting
    b. Reasons _____
22. What type of waste does your household re-use?_____
23. Which part of your waste do you recycle or re-use.
    a. None [ ]
    b. Biodegradable [ ]
    c. Non-biodegradable [ ]
24. Which of the solid wastes does your household sell?_____
25. How much income per month on average do you get from selling these wastes?

_____

26. What do you do with organic waste?
    a. use as composite
    b. feed the animals
    c. others (specify)_____
27. Do you know that you can make manure out of your wastes?
    a. Yes [ ] b. No [ ]
28. Are you willing to make composts?
    a. Yes
    b. No
29. Which of the following do you think is a major impact of poor waste management in your community?

a. Personal health risk

b. Pollution of living area and playgrounds for children

c. Ground water contamination

d. Littering of solid waste in the neighbourhood

e. It becomes an eye sore with unpleasant odours

f. Others(specify) _____

30. Why in your opinion do problems of wastes management persists in your community despite government and individual efforts?

a. _____

b. _____

31. What do you think are the solution to the problems of wastes in your community?

i. _____

ii. _____

iii. _____

32. What is your opinion about the current communal depots in your neighbourhood?

a. they are too far away from the house

b. they are too few to contain all solid waste

c. they produce unpleasant odours

d. the size is sufficient

e. nothing is wrong with the communal depots

f. others (specify) _____

33. Would you be willing to contribute to the safe disposal of the solid waste in your neighbourhood

a. Yes [ ] b. No [ ]

34. Specify how you would be willing to contribute to safe disposal of waste in your neighbourhood?

a. Not willing to contribute anything

b. bringing my own garbage to the communal depot

c. bringing my own and my neighbours garbage to the communal depot

d. separate recyclables

e. separate organic waste

f. cleaning litter around the communal depots

g. cleaning litter and taking it to the communal depot

h. paying for an amount agreed upon by the community for a solid waste collection system

35. If No, why? _____

D: IDENTIFICATION OF STAKEHOLDERS AND MEMBERSHIP OF ENVIRONMENTAL RELATED NGOs/CBOs

36. Who collects your waste?

37. What is the arrangement between you?

38. Which NGO/CBO in your community th

at carryout some waste management projects that you are aware of?

_____

39. Do you belong to any of them? _____

40. How much do you pay as annual dues as a member?_____

41. For those organizations you belong, specify sources of funding for them.

a. Internal contributions

b. Government grants

c. External (international funding) support

42. What other form of contribution do you make towards the projects executed by your organisation?

a. _____

b. _____

c. _____

43. For the CBO you are aware of, specify waste management programmes executed.

Type of SW Project	Location	Methods of Mobilization (direct labour of member, hired labour contract, etc)

44. How often do they engage in these activities? _____

_____

E. DEMAND ASSESSMENT

45. How much are you willing to pay if the service is improved?

46. Which organisation you like to provide this service?

47. What form of contribution would you like to make towards future solid waste management programme?_____

_____

APPENDIX II

SURVEY OF THE LOCAL GOVERNMENT COUNCILS

A. BACKGROUND INFORMATION ON AGENCIES ACTIVITIES AND RESOURCES

1 Date: _____

2. Interviewee:_____

3. Position of respondent in the L.G Council:_____

4. Name of agency /department in charge of waste._____

5. Date of establishment _____

6. Area covered by activities of organization _____

7. Staff strength: _____

8. Categories Number

_____ _____

_____ _____

_____ _____

9. Financial allocation to the section in: (a) 2004 _____ (b) 2005 _____

(c) 2006_____ (d) 2007 _____

(e) 2008 _____ (f) 2009_____

B: PROJECTS AND FACILITIES

10. Agency's /department's SWM projects executed in the last five years.

S/No	Projects	Location

11. Facilities possessed for solid waste management

Basic working implement/ Equipment	No. Available	No. Required

12. Schedule of waste collection in the LGA.

Area	Day of week	Time of day	Disposal site
1.			
2.			
3.			
4.			

C: COOPERATION AND COLLABORATION WITH STAKEHOLDERS

13. Organization that you are aware provides waste management services.

Organization	Location of projects	Relationship (cordial, non cordial)
State government		
Federal government		
C.B.O.		
N.G.O		
Informal private effort		
Private sector		

Higher education institutions		
Others specify		

14. Problems associated with the activities of these organizations

a. _____

b. _____

c. _____

- What have you done to control their activities? _____

15. How do you intend to address these problems?

a. _____

b. _____

c. _____

16. Type of support given by the LGA to other stakeholders projects.

Name of Stakeholder	Nature of support

17. What are the major obstacles to solid waste management in your L.G.A?

a. Inadequate finances ☐

b. Lack of working equipment ☐

c. Lack of public support ☐

d. Lack of skilled manpower ☐

e. Inadequate technology ☐

f. Lack of public awareness ☐

g. Others (specify) ☐

18. What are the problems militating against effective solid waste management in your L.G.A?

(a)_____

(b)_____

(c) _____

(d)_____

19. What are the solutions to these problems?_____

APPENDIX III A

INTERVIEW WITH PRIVATE SECTOR PROVIDER

The objective of this is to assess the capability/constraints militating effective functioning of these organizations.

A: CHARACTERISTICS AND CONTEXT OF PARTICIPATION

1. Name of Organization_____
2. Address _____
3. Date of interview_____
4. Area of operation _____
5. Is the Organization registered with

   (a) KEPA [ ]

   (b) CAC [ ]

   (c) Others (specify) _____

   What prescription for operation are you required by the organization? _____

   _____

B: SCOPE OF ACTIVITIES

Which aspect of waste services do you engage in?

a. Collection _____
b. Transportation _____
c. Disposal _____

6. Which organisations do you collect waste from and types of waste?

S/No.	Organization	Type of Waste	Quantity	Charge Per Month
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

11				
12				

7. Describe very briefly your mode of operation.
   a. Where do you collect wastes_____
   b. Arrangement with client _____
   c. Is there sorting of waste into different containers? _____
   d. Where do you dispose the waste collected? _____

8. What type of equipment do you possess for waste collection and transportation?

Type of Equipment	Quantity	No. In Working Condition
Collection		
1.		
2.		
3.		
4.		
Transportation		
1.		
2.		
3.		
4.		

9. Do you treat the waste before disposal? _____

10. Monthly operation cost_____

C: EQUIPMENT AND RESOURCES

11. What other resources do you possess for carrying out your operations?

S/No.	Category	Qualification	No. Available	No. Required
HUMAN				
1				
2				
3				
4				
5				
TECHNICAL				
1				
2				

3				
4				
5				
OFFICE SPACE				
1				
2				
3				
4				
5				

D. RELATIONSHIPS AND DECISION MAKING

12. Which organisation are you collaborating with_____

    What activities do you collaborate in? _____

13. Which are the registering and supervising organizations?

    a. Registering _____

    b. Supervisory _____

14. What are the requirements for registration as a waste collection operation?

S/No.	Criteria	Requirement
A	Office accommodation	
B	Available equipment	
C	Staff strength	
D	Financial capability	
C	Dumping fee per annum	

15. list problems, if any, confronting your organization and its operations.

    i. _____

    ii. _____

    iii. _____

    iv. _____

16. what do you think are the solutions to these problems?

    i. _____

    ii. _____

    iii. _____

    iv. _____

APPENDIX III B

SURVEY OF CBO's

This interview schedule was administered to CBO's to seek information with respect to their interests, activities and capacity to effectively participate as well as their problems and consequences for participation of the result will help in determining the sustainability and contribution to environmental quality.

A: ORGANIZATIONAL INFORMATION

1. Date:_____

2. Interviewee: _____

3. Position of respondent in the CBO:_____

4. Name of the CBO/NGO:_____

5. Address: _____

6. Date of establishment:_____

7. Number of registered members:_____

8. Source of finance: _____

9. Aims and objectives/ activities of CBO:_____

B: SCOPE OF ACTIVITIES

10. If activities incorporate maintaining environmental sanitation, which equipment do the CBO possess for waste collection and transportation?

Type of Equipment	Quantity	No. in working condition
Collection		
1.		
2.		

3.		
4.		
Transportation		
1.		
2.		
3.		
4.		
Disposal		
1.		

11. Staff strength: _____

12. Equipment and resources available

    a._____

    b._____

    c._____

13. Do the CBO maintain or hire staff for the waste collection exercise or is it direct labour by its members?

    (Comment)._____

14. Method of Participation (Labour, finance, materials, advisory)

    a._____

    b._____

    c._____

C: SOLID WASTE MANAGEMENT PRACTICES

15. What type of Solid waste management projects are you involved in?

Solid waste projects	Date	Location	Status		Source of fund	Collaborative organization
			Abandoned	Executed		

16. Do you collect wastes?_____ _____

. If yes, how do you organize collection? _____

Where do you dispose of the waste collected?_____

17. Do you organize environmental awareness for the public? _____

a. Re-use _____

b. Composting _____

c. Recycling _____

18. What implementation strategy do you utilize?

a. Direct labour ☐

b. Contract ☐

c. Both ☐

d. Others (specify)

19. What problems did you encounter in carrying out your waste management activities?

a._____

b _____

D: RELATIONSHIPS AND SUGGESTIONS

20. What aspects of solid waste management is your organization interested in?

a. Management of dumpsites ☐

b. Collection and transportation to dump sites ☐

c. Supervision of waste disposal within residential areas ☐

d. Others (specify)

21. Do you collaborate with others in your waste management effort?

a. No collaboration ☐

b. Collaborate with L.G.A ☐

c. Collaborate with Households ☐

d. Collaborate with CBO ☐

e. Others

(specify)_____

22. Suggestions towards improving relationship with the following

a. Local Government _____

b. CBOs: _____

c. NGOs: _____

d. Households:_____

e. Institutions: _____

21. Which organizations would you like to collaborate with?

Organizations like to work with (Name)	Reasons	Type of solid waste to handle
L.G.A		
CBO		
Private Sector		

22. Why is the problem of waste persisting in the neighbourhood? _____

23. Please, give your suggestions towards an effective management of solid wastes management in Zaria._____

APPENDIX IV

STAKEHOLDERS PARTICIPATION IN SLID WASTE MANAGEMENT IN ZARIA

INTERVIEW SCHEDULE FOR THE TRADITIONAL INSTITUTION

1. What is your assessment of the performance of the Sabon Gar Local Government in solid waste management?

---

2. Is there any collaboration between the traditional institution and the following SWM?

   a. Local Government _____

   b. C.B.Os _____

   c. Others (specify) _____

3. With the reduction in the level of resources to the Local Government, vis-a-vis the level of population in Zaria, how can the community, and traditional institution collaborate with the Local Government for effective Management of solid waste in your Local Government Area?

   a. Community

      _____

   b. Traditional Institution

      _____

4. Which aspect of waste management will the traditional institution be interested in?

   _____

5. Which aspect of the Waste Management will you suggest for the following

   a. Local Government _____

   b. Community organisation _____

   c. Private Sectors _____

   d. Households _____

e. Institutions like Ahmadu Bello University Zaria _____

6. Would you suggest for privatization of Waste Management in Zaria? _____
7. What are your reasons for the response above? _____