

**EVALUATION OF PERFORMANCE OF SOLID WASTE MANAGEMENT SERVICE
PROVIDERS IN ZARIA URBAN AREA**

BY

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**SUBMITTED
TO**

**THE DEPARTMENT OF URBAN AND REGIONAL PLANNING,
FACULTY OF ENVIRONMENTAL DESIGN,
AHMADU BELLO UNIVERSITY, ZARIA**

MAY, 2021

EVALUATION OF PERFORMANCE OF SOLID WASTE MANAGEMENT SERVICE
PROVIDERS IN ZARIA URBAN AREA

BY

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P15EVUR8024

A DISSERTATION SUBMITTED TO THE SCHOOL OF POSTGRADUATSTUDIES,
AHMADUBELLO UNIVERSITY, ZARIA IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR THE AWARD OF MASTERS OF SCIENCE IN URBAN
MANAGEMENT.

DEPARTMENT OF URBAN AND REGIONAL PLANNING,
FACULTY OF ENVIRONMENTAL DESIGN
AHMADU BELLO UNIVERSITY, ZARIA NIGERIA

MAY, 2021

DECLARATION

I declare that the work in this dissertation entitled “Evaluation of Performance of Solid Waste Management Service Providers in Zaria Urban Area” has been performed by me in the Department of **URBAN AND REGIONAL PLANNING**. The information derived from the literature has been duly acknowledged in the text and a list of references provided. No part of this dissertation was previously presented for another degree or diploma at this or any other Institution.

Kabir Tunau LAWAL

Name of Student

Signature

Date

CERTIFICATION

This dissertation entitled “EVALUATION OF PERFORMANCE OF SOLID WASTE MANAGEMENT SERVICE PROVIDERS IN ZARIA URBAN AREA” by KABIR TUNAU LAWAL meets the regulations governing the award of the degree of Master of science in Urban Management of the Ahmadu Bello University, and is approved for its’ contribution to knowledge and literary presentation.

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DEDICATION

To my late Grand Parents: Alhaji Muhammad Tunau Ikara and Malam Aliyu Bashari. May their gentle souls rest in peace. Amin

ACKNOWLEDGEMENT

I thank the Almighty Allah for the grace He gave me to start and conclude this study. My gratitude goes to my supervisors Dr. Ma'aruf Sani and Prof. Muhammad Bello Yunusa for their academic, objective and fatherly contributions and guidance all through the course of this dissertation. My appreciation also goes to my internal examiners Doctors H. Babangida and U.F. Yaya for their valuable criticisms I must also appreciate my Head of Department, Dr. Ashiru Bello. My appreciation also goes to all other academic staff of the Department of Urban and Regional Planning, ABU Zaria, especially Prof. Adamu Ahmed, Prof. J.B Kaltho, Dr. Y.A Bununu Dr. A.O Shittu and Tpl. Idris Iliyasu for their pertinent contributions at various stages of this study. My gratitude also goes to non-academic staff of the department particularly Mal Shuaibu, Mr. Bature and Mal. Abdullahi from the departmental library and HOD's office respectively for contributing to the success of this dissertation. My profound gratitude goes to my wife, Maimuna Ibrahim, and our children, Usman and Ibrahim for their patience all the way. To my parents; Alhaji Lawal Tunau, Hajia Asmau Lawal Tunau and Hajia Maryam Lawal Tunau, to siblings, in-laws, I say thank you for all the encouragement and prayers. To my course mates and other Msc students; Haruna, Sani, Williams, Sam, Pangara, Wasinda, Victor, Atayi, Jamila, Elizabeth, Keziah, Lisa, Hannatu as well as kubiati, Benjamin, Nelson and all others, I say thank you for the encouragement

My appreciation to staff of KEPA and E. H. Department of Local Government Authorities for providing me with part of the information used for this study especially Mustapha, Magaji and Hamza as well as others who assisted at the field such as Kasimu, Emma and Clement.

To my colleagues in the URP Department Federal Polytechnic Mubi, especially Tpl. Dr. Hashim, Tpl Rabi, Tpl. M. Zira, Tpl. B. Kadala, Tpl James, Mr. Bawa, Mal Ibrahim Mal. Yakubu and Late Yakubu Abba (May his soul rest in peace), I do sincerely thank you all for your support.

Finally, to Muktar, Tajuddeen, kabir Ibrahim and others too numerous to mention, I thank you for the encouragement and prayers.

ABSTRACT

The study is concerned with evaluating the performance of solid waste management service providers and the perceptions of stakeholders. This is with a view to identifying problems and proposing solutions for improvement of the waste management practices in Zaria Urban Area. Data for the study were obtained by the use of semi-structured questionnaire, personal observation and document review. A total of 379 copies of questionnaires were administered to the respondents and Purposive sampling technique was used to select 7 representatives of the Solid Waste Management Service Providers. On the part of stakeholders, that is Business Operators and Households, the study utilised the cluster, systematic and simple random sampling techniques, to select the neighbourhoods, households and Business Operators for data collection. The data collected were subjected to descriptive and inferential statistical analysis as well as SPSS. The findings from this study reveal that, only KEPA, Public Health Departments of the two local government and the formal private sector are included in the solid waste management set-up. The study established that the problems at the local level in Zaria Urban Area, includes: lack of adequate training and awareness of existing Environmental legislation and regulations on the part of staff of the Environmental Health Department. Likewise, none of the departments has vehicles and equipment of good working condition (table 4.3). The result of responses on coordination among public and private agencies indicates ineffective coordination. The grand means of 1.70, 1.78 and 2.07 for collaboration, consultation and exchange of information respectively have justified this. Majority of the respondents are not satisfied with the performance of service providers in the study area. The grand mean score which is 1.28 and 2.21 for business operators in Zaria city district and households in Samaru district respectively signify this. The study also observed that Solid Waste Management Equipment and Infrastructure utilized by the solid waste management service providers are inadequate, thus leading to ineffective service provision. Based on the findings, the study recommends that other stakeholders should be recognized in the solid waste management set-up, substantial level of operating capital is required by service providers, for them to manage waste effectively, framework for coordination among service providers are to be developed and government is to provide the public agencies with essential equipment and infrastructure for effective solid waste collection.

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CHAPTER ONE

INTRODUCTION

1.1 Background of the study

Municipal solid Waste Management is a major responsibility of local governments, typically consuming between 20% and 50% of municipal budgets in developing countries (Shubeler,1996). It is a complex task which depends as much upon organization, cooperation and coordination between households, communities, private enterprises and municipal authorities. Furthermore, waste management is essential task which has important consequences for public health and well-being, the quality and sustainability of the urban environment and the efficiency and productivity of the urban economy (Shubeler,1996).

The campaign on urban governance is a new and strategic approach by UNCHS-Habitat for achieving the goals of the Istanbul declaration and the Habitat agenda (Taylor, 2000). The campaign is designed to promote accountable and transparent urban governance, which responds to and benefits all sectors of society, particularly the urban poor. The campaign for urban governance is to eradicate all forms of exclusion and improve the quality of life in cities, especially for the poor through improved local governance (UNDP, 1997)

Today, there are certain common notions about how solid waste management should be carried out. National governments are expected to formulate policies and establish the institutional and legal frameworks while local governments provide or manage solid waste collection and disposal services (Taylor, 2000). The private sector and community groups, organizations or leaders are to be directly involved in the management of the sector through partnerships, while cooperation is needed from individuals or households in areas such as payment for services and proper waste handling practices. However, the situation in Nigeria does not reflect this trend, as the management of solid waste is far from being satisfactory (Taylor, 2000). Zaria Urban Area does not benefit from any organized waste

management services and therefore wastes are unattended to, burnt or disposed of haphazardly (Stare,2005).

The current institutional arrangement for solid waste management in Zaria Urban Area lacks a comprehensive policy in the form of institutional structures, functional strategies, coordination and tariff setting for waste management. Different agencies at all tiers of government Federal, State and Local Government pursue different agenda. This approach has ensured that waste management policy decisions such as service delivery, fees, regulations and environmental preservation have remained highly fragmented without coordination (Stare,2005).

This calls for careful planning in line with systems of good urban governance that are based on sound, transparent and accountable processes which can go a long way in making solid waste management more inclusive.

1.2 Statement of the Research Problem

The inability of local governments to provide basic environmental services in Nigerian urban centres often results in the involvement of other actors in urban sanitation and solid waste provisioning, such as Non-Governmental Organizations (NGOs), Community-Based Organizations (CBOs) and Private Companies, the informal sector groups etc. Although these groups and organizations are becoming increasingly engaged in urban service provisioning, little systematic knowledge exists on the relationship between them and the way this affects their activities.

Similarly, those government agencies (Kaduna State Environmental Protection Authority, Environmental Health Departments of Zaria and Sabon-Gari Local Government Authorities) responsible for solid waste management within Zaria Urban Area, do not seem to work in a coordinated way, including with other non-governmental groups. Also despite the fact that households play major roles in solid waste management within the study area, their activities do not

seem to be aligned with other stakeholder groups (Stare,2005). This study evaluates activities of solid waste management service providers in Zaria Urban area for the purpose of identifying shortcomings.

Studies carried out on solid wastes are varied in scope, examples are the study by Yahaya,(1999), which focused on working out an effective partnership strategy for the management of solid waste in Sokoto Metropolis. Ahmed (2011), in a study on commercialization of solid wastes management assessed the outcomes of the commercialization of solid waste management in Federal Capital City (FCC), Abuja. Vincent (2000), described the inadequacies of public provision for waste collection and disposal in Benin City. And Ukoje (2011), analyzed the factors responsible for the performance of stakeholders in solid waste management in Zaria Urban Area to show the current status of the solid waste management in the town. Abdulmalik (2012), studied solid waste management system in Minna, and examined the general components of solid waste management. He also identified the different actors in waste management.

The study therefore, focused on evaluating the performance of solid waste management service providers, and perceptions of stakeholders in Zaria urban area.

The study sets out to answer the following questions;

1. What are the roles of the solid waste management service providers in Zaria Urban Area?
2. How effective is the performance of solid waste management service providers in the study area in terms of service delivery?
3. What are the stakeholders' perceptions of solid waste management service providers in the study area in terms of service delivery?

1.3 Aim

The aim of the research is to evaluate the performance of solid waste management service providers, and the perceptions of stakeholders, with a view to identifying problems and proposing management solutions for improvement of the waste management service delivery in Zaria Urban Area.

1.4 The objectives are to:

1. describe the institutional arrangements for solid waste management in Zaria Urban Area
2. identify the roles of the solid waste management service providers in the study area.
3. evaluate performance of solid waste management service providers in Zaria Urban Area
4. evaluate the perceptions of stakeholders on the performance of solid waste management service providers in the study Area
5. identify shortcomings interms of waste management service delivery and propose management solutions for improvement of the situation in the study Area

1.5 Significance of the Study

Failures in managing the problems of solid waste are mostly explained as emanate from inadequacy of resources without really evaluating the performance of solid waste management service providers as well as the perceptions of stakeholders on the performance of solid waste management service providers to determine the nature of relationship between them.

It is the curiosity to evaluate the performance of solid waste management service providers, and the perceptions of stakeholders that the idea to carry out this research was developed. The findings of this study shall therefore, not only add to knowledge, but will also be useful to the stakeholders in solid waste management in promoting the quality of the urban environment and other sectors, such as health and economic sectors, in protecting environmental health and supporting the efficiency and productivity of the economy respectively in Nigeria and beyond.

1.6 Scope and Limitation of the Study

The study focused on evaluation of the performance of solid waste management service providers, and Inter-relationship in terms of collaboration, consultation, exchange of information among solid waste management service providers as well as perceptions of stakeholders (households and business operators) within Zaria Urban area. The performance of the solid waste management agencies; in the

areas of regulatory or law enforcement, service provision, infrastructure provision, were considered in this study.

These agencies are Kaduna State Environmental Protection Agency (KEPA), Environmental Health Departments of Zaria and Sabon Gari local government Authorities. Others are private agencies which engage in domestic waste disposal namely Derite Klin, Dimention wastes, Private Environmental Care Takers (PECT), and also activities of private agency which deal in evacuation of dumpsites or solid waste collection points within the study area, that is Zoom Lion Global Alliance were looked into.

However, campuses of tertiary institutions in Zaria urban area are excluded, because solid waste management in these institutions is not carried out by the public and private agencies, but have their own peculiar systems, for instance, solid waste in Ahmadu Bello University Campuses is managed by the University's Health Services.

On the spatial dimension, the study focused on all the districts in Zaria Urban area; namely Zaria walled city, Tudun-wada, Sabon-Gari, and Samaru, where samples of business operators and households were taken, to garner their aspirations and perceptions of the effectiveness of service providers (public and private waste collectors)

Zaria Urban area has been chosen as a case study, because so many actors have impact on the management of solid waste in the area and also due to the fact that majority of households and individuals in the study area seem to have unrealistic expectations that the government should be responsible for solid waste management,

1.7 The Study Area

1.7.1 Location and Size of Zaria Urban Area

Zaria Urban Area is located between latitudes $10^{\circ} 57' 36''$ N and $11^{\circ} 15' 32''$ N, longitudes $7^{\circ} 39' 00''$ E and $7^{\circ} 53' 02''$ E. It is about 85km north of Kaduna. The urban area is made up of two local governments Areas of Sabon-Gari and Zaria (Figures 1.2 and 1.3). Zaria is one of the seven Hausa

States, and it is situated in the southern part of Hausa land 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. 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 (Ukoje, 2011). The present day Zaria Urban Area is formed by four distinct Urban sectors – Zaria City, Tudun Wada, Sabon-Gari and Samaru (Fig. 1.3).

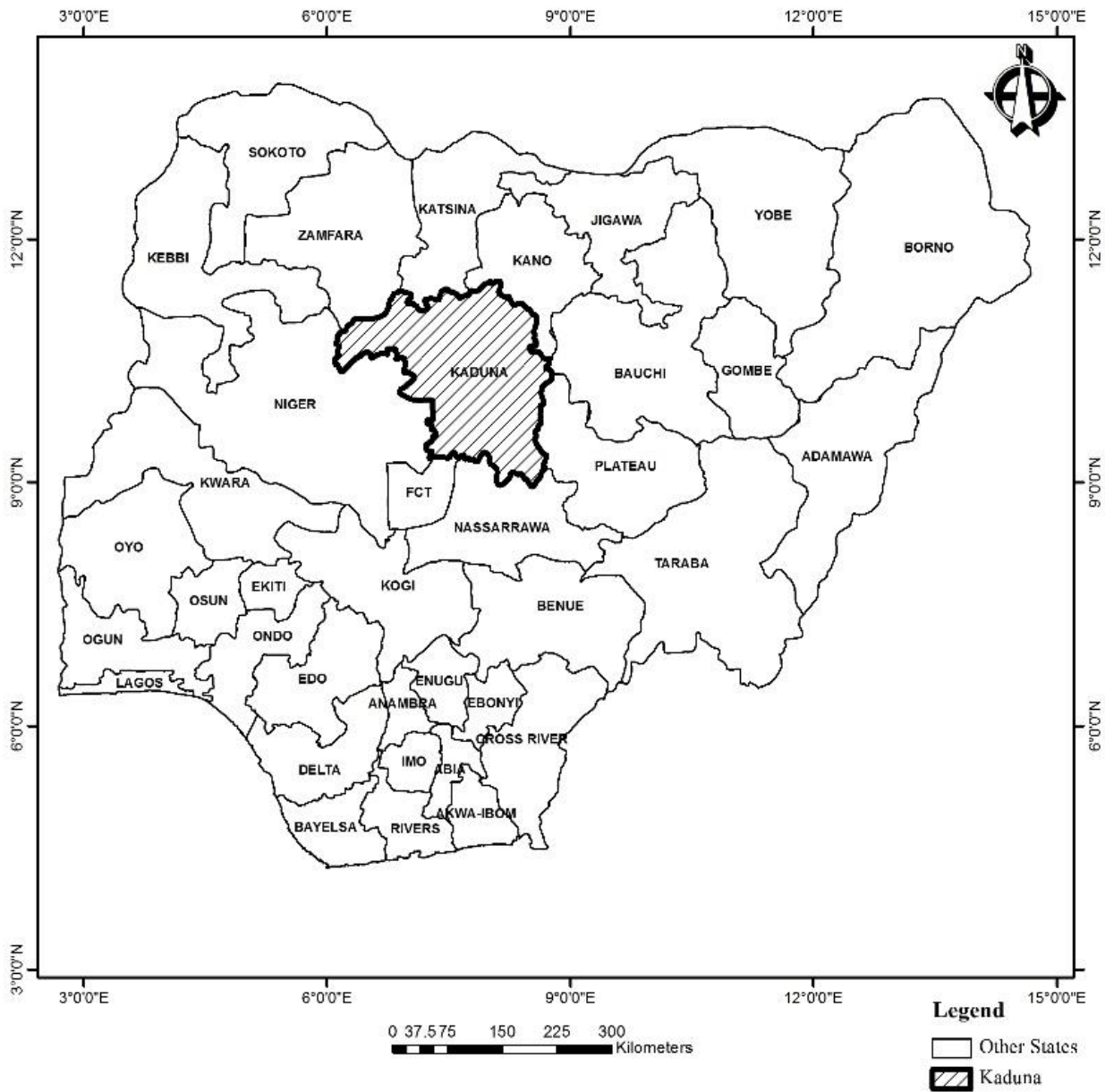


Figure 1.1: Location of Kaduna State in National Context (Source: Google image, 2018)

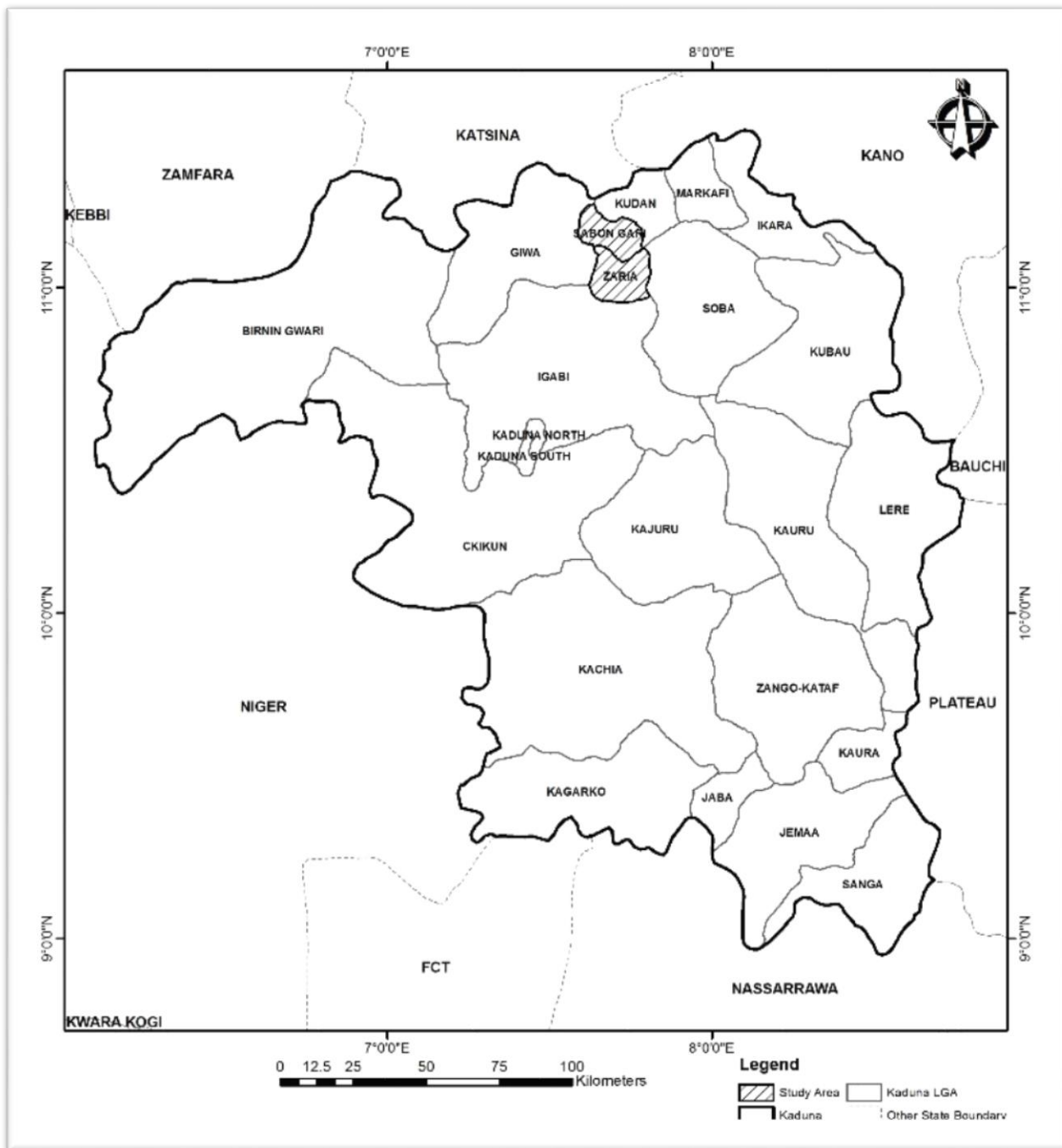


Figure 1.2: Location of Zaria and Sabon- Gari in Kaduna State (Source: Google image, 2018)

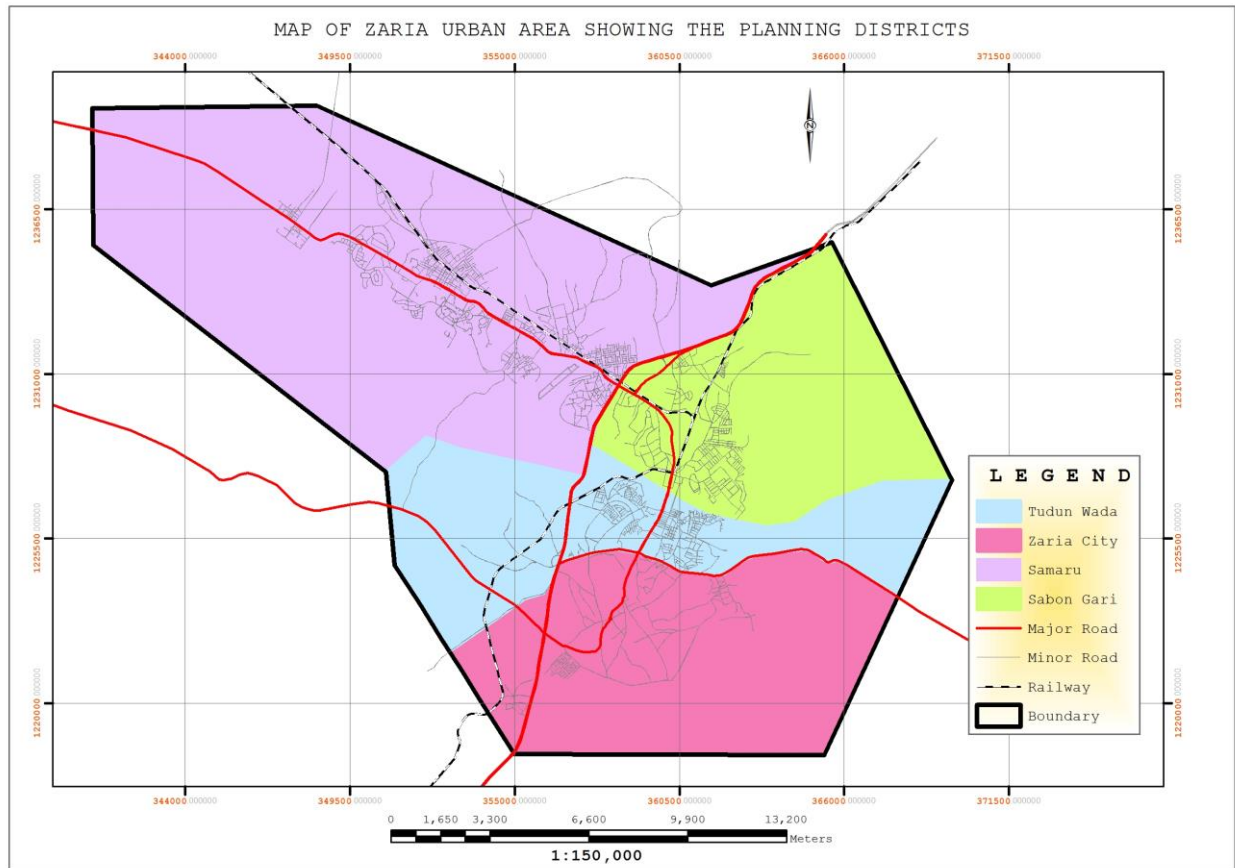


Figure 1.3: Zaria Urban Area Districts (Source: Google image, 2018)

Zaria is an important nodal point for both the railway and the road systems. It is connected to the northern 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 (Ukoje,2011)

CHAPTER TWO

LITERATURE REVIEW

This chapter examines key concepts and reviews relevant literature materials on Municipal and Solid Waste Management.

2.1 Conceptual Issues

Some of the key concepts discussed here are waste, solid waste, municipal solid waste, municipal solid waste management, solid waste management stakeholders, and history of solid waste management among others.

2.1.1 Waste

Waste can be seen as anything that is of no more use to the owner or possessor. Wastes are also referred to items which are required to be discarded. However, according to Rushton (2010) what has been discarded by one person can be useful to another person, for instance, milk packages disposed of by some people may be used as fuel by others; Likewise, food that has been left over may be fed to animals; Similarly discarded cardboard may be converted to be used as walls and roofs of thatch houses (Maria and Schienberg, 1997).

As a result of advancement in technologies, availability and cost of input materials, the demand and need to use recovered waste are also changing; waste can therefore, be defined as something that is unwanted at a particular time and needs to be disposed of. Wastes are classified as solid, liquid and gaseous which could be bio-degradable, semi-biodegradable and non-biodegradable.

Based on land-use and practices in the human environment, there are five major sources of waste, namely, domestic/residential, commercial, agricultural, industrial and institutional wastes. It is noteworthy that domestic and industrial wastes have the highest volume of wastes generated all over the world (Ahmed, 2007).

2.1.2 Municipal Solid Waste

Solid wastes according to Adedibu (1983) are non-liquid and non-gaseous wastes which emanate from activities that includes community, industrial, commercial and agricultural. Enger and Smith (2006) have categorized solid waste into four broader kinds such as mining, agricultural, industrial, and municipal solid waste, which is according to the sector of the economy that generates them.

Municipal solid wastes which are the focus of this study refer to wastes that are no longer useful. Municipal solid waste comprised of refuse from, non-hazardous solid waste from industrial, commercial and institutional establishments, market waste, households, yard waste and street sweepings.

However, semisolid wastes such as sludge and human faeces are considered to be the responsibility of liquid waste management systems. Hazardous industrial and medical wastes on the other hand are, by definition, not components of municipal solid waste, but normally quite difficult to separate from municipal solid waste, especially when their sources are small and spread all over (Schubeler, etal,1996)

Dawnarain (2004) examined solid waste management practices in Chatsworth Township, metropolitan Durban - Kwazulu-natal. The study indicated that 40% of the households disposed food, garden and sanitary wastes in the refuse bins, only 28% of respondents practiced recycling.74% were of the opinion that residents were the main contributors of littering and felt that this practice was unacceptable. The study also indicated that illegal dumping was a major concern as opined by 75% of the respondents. More than half of the respondents indicated that strict laws and fines should be enforced, waste collection days should be increased to twice weekly. The findings also revealed that 94% are willing to separate their household waste and participate in waste recycling programs and Only 52% of respondents forwarded a positive response on the issue of the waste management system and stated that it was adequate.

Attahi (2012), studied the institutional linkages and responses to the solid waste management problem in the Shama-Ahanta-East Metropolis, Ghana. The study established that, waste management in Ghana is generally the responsibility of the Ministry of Local Government, Rural Development and Environment, which supervises the decentralized Metropolitan, Municipal and District Assemblies (MMDAs). However, regulatory authority is vested in the Environmental Protection Agency (EPA), which is entrusted with the responsibility for setting environmental quality standards and ensuring their enforcement. The Assemblies are responsible for the collection and final disposal of solid waste through their Waste Management and Environmental Health and Sanitation Departments. According to 1992 Fourth Republican Constitution of Ghana, the Local Government Act 462 of 1993 and the Environmental and Sanitation Policy of 1999, the Assemblies are supposed to enact bye-laws regulating the management of waste in their areas of jurisdiction. Furthermore, the Assemblies are to strengthen their local unit committees through the Assembly Members in order to protect and manage their respective environments.

2.2 Waste Management in Nigerian Cities: An over view

The history of urban management in cities of Nigeria is related to that of the local governments, which went through four transitional periods (Onibokun and Kumuyi, 1999, p.59). As shown below:

2.2.1 Pre-colonial period

During this era, all members of society had equal access rights. Because access to social services was governed by a democratic system of communal tenure. The urban communities then were fairly simple, there were no formal laws regulating solid waste management. Therefore, the official policy then gave right to every member of the community of having access rights to services (Urban Development Bank of Nigeria; UDBN, 1999).

The native system of administration was appropriate for the management of these communities. The residents of these communities lived by a system of well-defined rules and functional differentiations. Sanitation of public places was carried out by women in groups and surrounding

bushes were used as final disposal sites for house hold refuse and others. However, the indigeneous physical planning techniques were not enough to handle the extent and rate of further developments (Urban Development Bank of Nigeria; UDBN, 1999).

2.2.2 Colonial Period

In the 19th century, British colonial administration made a number of laws and policies which aimed at regulating the relationship that existed between the native people and their environment. The foundation for improved health management was laid down by the public health Act of 1909. The colonial administration then emphasized environmental sanitation (FMoE, 2000).

During this period sanitary inspectors were made to go from house to house, to make sure that residents observe environmental sanitation and also penalize defaulters. Townships were classified into three categories by the township Ordinance of 1917 and set up different municipal arrangements for first order cities and other orders of cities. A separate establishment was recognized by the Town and Country Planning Act of 1947 so as to complement the local government councils in the south and native administration in the north, in handling of town and country planning responsibilities.

In spite of these measures and the creation of the GRAs, the major shortcoming of the colonial era was the fact that it considered Nigeria as primarily a rural country and urban centers as accidents of area development. Thus, the failure to resolve the urban problems that ensued, especially those related to sanitation.

2.2.3 Post Independence Period

As 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, that mandated Urban Local Government Authorities with the overall responsibility of environmental management.

The sanitation edicts promoted good health by directing health workers to carry out inspections of restaurants to ensure that health, hygiene and safety of employees and customers was achieved. The

edicts aimed addressing the issue of disease outbreak as a result of consumption of unhygienic food and unclean environment.

Apart from emphasizing the role of the public sector, these edicts do not have clauses that capture the roles and relationships between and among the other stakeholders and how they impacted on the management of the environment. The paramount features 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 common and well-coordinated local government system expected to function as an effective third tier of government.

The local government councils were to exercise exclusive statutory role of solid waste management. The 1976 local government edict was later established 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, which is responsible for designing the details of the objectives of the National Environmental Sanitation policy.

2.3 Role of Government in solid waste management in Nigeria

The Federal Ministry of Environment is responsible for management of environmental issues and also 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 suggested that there should be efficient, effective and sustainable waste management plan and also demand that stakeholders should be part and parcel of solid waste management and also spelt out their expected responsibilities.

2.3.1 Role of Federal Government

Apart from making sure that local governments have the necessary capacities for effective management the Federal governments are also charged with the responsibility of establishing the legal and institutional framework for urban management (Gidman, Blore, Lorentzen and Schuttenbelt, 1995).

In Nigeria responsibility was vested in the hands of the Federal Environmental Protection Agency (FEPA), and presently by the Federal Ministry of environment (FMoE). The FMoE has eight departments, and the most relevant one 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). The inability of the national government to effectively enforce policies locally and limited financial resources are causes of lack of capacity.

The administration and enforcement of environmental laws in Nigeria and municipal solid waste management by the Federal Ministry of Environment was carried out through the National Environmental Standards Regulations and Enforcement Agency (NESREA). This responsibility was taken over from the Federal Environmental Protection Agency (FEPA) in 1999, which was created under the FEPA Act of 1988. Pursuant to the FEPA Act, each state and local government in the country sets up its own environmental protection body for the protection and improvement of the environment within its jurisdiction (Babanyara, Saleh and Usman, 2010).

As the main enforcement parastatal of the Federal Ministry of Environment, NESREA is also charged with the responsibility of enforcing all environmental laws, guidelines, policies, standards and regulations to enforce compliance with provisions of international agreements, protocols, conventions and treaties on the environment, including coordination and liaison with relevant stakeholders within and outside Nigeria on matters of enforcement of environmental standards and regulations.

In 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 emphasized sanitation and waste management as part of an integrated, holistic, and systematic view of environmental issues (FEPA, 1999). The NPE emphasized the overall goal of achieving sustainable development (FEPA, 1989).

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. The Hazardous Wastes Criminal Provision Decree 42 of 1988.

- i. The Pollution Abatement in Industries and Facilities Generating Waste Regulation S.1.9 of 1991,
- ii. The Management of Solid and Hazardous Wastes Regulation S. 1. 15 of 1991.

iii. 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:

- a. Advise the state government on environmental policies and priorities
- b. Formulate and enforce policies, statutory rules and regulations on waste collection and disposal
- c. Render advisory services and support to all local governments
- d. Prepare master plans on solid-waste collection and disposal
- e. Monitor discharges and the environmental impact of these discharges
- f. Enforce applicable laws on activities related to the environment and
- g. Establish environmental criteria, guidelines, specifications or standards for environmental protection.

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

2.3.2 Role of State Government

The states Governments are responsible for implementation of the national policy on environment and solid waste in each state. 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 in Nigeria (FMoE, 2001).

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

2.3.3 Role of 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.

The roles of setting up of operation of solid waste management systems are vested in the hands of the Local governments. Most urban authorities receive their powers and obligations from the federal government on matters of powers and responsibilities to protect the rights of citizens, and provide services to them (Gidman et al, 1995). For instance, the Local governments are responsible for waste, once it is put out for collection (Schubeler et al 1996). This responsibility of ownership is assigned to the Environmental Health Department of the local government authority in Nigeria.

The local governments must implement laws and regulations to fulfill their statutory responsibilities. 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.

Wekwete (1997) and Dillinger (1993) considered inability to raise revenues commensurate with the responsibility for service provision, and poor caliber of staff due to poor pay rates to be the problems of local government authorities. Similarly, the powers of Local authorities are wiped out by special purpose agencies like Urban Planning and Development Boards.

2.3.4 Formal private sector

The formal private sector are considered to be institutions, private sector corporations, 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 modern technology (Furedy, 1990)

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 Local government 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 (1994) have specified types of solid waste services that can be privatized. Since the private sector is profit motivated, there is the fear that it may not serve all the people equally (Gidman et al 1995).

For instance, Lardinois (1996) observed in Guatemala that some of the private sector enterprises choose 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) there is a strong need for regulation by the public sector since the private sector is not politically accountable for provision of services. However, Satterthwaite (1999) thinks that the local state mechanism in the south cannot control activities of the private sector effectively

Despite the worries, there is a strong feeling that the private sector handles the service provision best. Governments should therefore, create an enabling environment for 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).

2.4 The Informal Private Sector in solid waste management

Informal private sector refers to unregulated, and unregistered activities undertaken by individuals and or family or community enterprises, who engage in value adding activities on a small-scale with minimal capital input, using local materials and labour intensive techniques (Furedy,1990). The informal private sector functions informally different from the formal framework (Rogerson,2001). The importance of the Informal sector groups cannot be over- emphasized if they are recognised, organised and incorporated into the formal system in service production (Wilson, Velis and Cheeseman, 2005)

Although the sector has started to be acknowledged, the attitude of the local authorities can be repressive and tolerance. Rogerson (2001) observed that government is not accommodative towards the sector, because they always see the waste pickers as a source of embarrassment and therefore, most a times try to block their activities when important delegates are visiting. Gidman et al (1995) argues that informal activities are transformational, and may disappear automatically with economic growth.

2.4.1 Community Based Organisations

These type of organizations are very common 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 came into being naturally as a

result of the failure of the public sector to provide for the needs of the common man (Stren and White, 1989)

Due to the fact that communities in the low-income areas generally receive marginal or no services in terms of infrastructural facilities and services including waste management they sometimes take the initiative to organize 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 activities, separation at source and implementation of programmes. CBOs may also take a role in the actual provision of service, including operations and maintenance. These CBOs play an important role in waste management system development processes. However, there are problems commonly associated with letting CBOs carryout local services, which are associated with the difficulties to grow and become formalized as part of partnership in urban administration (Rakodi,1997). CBOs have been known with the habits of abandoning of projects after implementations, rather than maintain them. This is not surprising because people could not be trusted to maintain projects without public sector support (Rakodi1997)

2.4.2 Non – Governmental Organisations

Non-Governmental Organizations (NGOs) are various organizations like labour organizations, environmental organizations and lobbies, universities, donor organizations etc. NGOs are non – political, ethnic, economic, class and religious networks that can work locally, nationally or internationally with the aim of assisting people to achieve certain goals (Aina, 1990).

Generally, NGOs are intermediate organizations 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 come in between CBOs and local governments or serve the ideological, political or altruistic interest of international organizations. The role of NGOs as partner organizations in waste management systems include serving as an umbrella organization under which CBOs operate and acting as a channel for donor financing.

Recently, NGOs have been criticized for not putting much efforts in building the capacity of the people they work with (Desai, 1995; Mitlin, 2001). They are also known for imposing their agenda on some of the local self – help organizations they work with as well as their reliance on traditional and community leadership which use these contacts to reinforce their position (Desai, 1995).

2.4.3 Individuals and Households

Households and individuals in Urban areas have become more involved in the system of management (Wekwete, 1997) certain scholars have questioned the inclusion of households and individuals in a discussion of participation, since it 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. Similarly 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).

2.5 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 Federal 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.

2.5.1 Solid Waste Management in Nigerian Cities

At the point of generation, Solid waste generators are responsible for its management which involves proper storage in covered containers and disposal at recommended collection points. However, the responsibility for collection and disposal is that of the local government councils. Likewise, 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.

Presently, 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 this service (Onibokun and Kumuyi, 1999; Ajadike, 2001).

Unlike the waste generated in developed countries which are always collected, in the developing countries, in the contrary 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). According to Uchegbu, (2002) the collection should be as soon as they are generated. With these poor

levels of collection in Nigeria, solid waste management has become one of the most pressing challenges in urban centres (Aina, 1990). The uncollected wastes accumulate at roadsides, and are burned by residents, or disposed in undesignated dumps, which serve as blight within neighbourhoods.

2.5.2 Policies on Solid Waste Management in Nigeria

On 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.

2.5.3 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.

- 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 licenses and permits for engineered landfill sites as articulated in the Act adopting the National Environmental policy of the Federal Republic of Nigeria through The National Environmental Standards Regulations and Enforcement Agency (NESREA).

- 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 law.
- iii. The Ministry of Lands (ML), has responsibility to evaluate Urban Sanitation projects, and provide guidelines 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 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 solid waste. They received 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 side walk of their buildings. 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 Governors 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 regulation at the state level. In some state capitals, autonomous municipal agencies implement solid waste management.

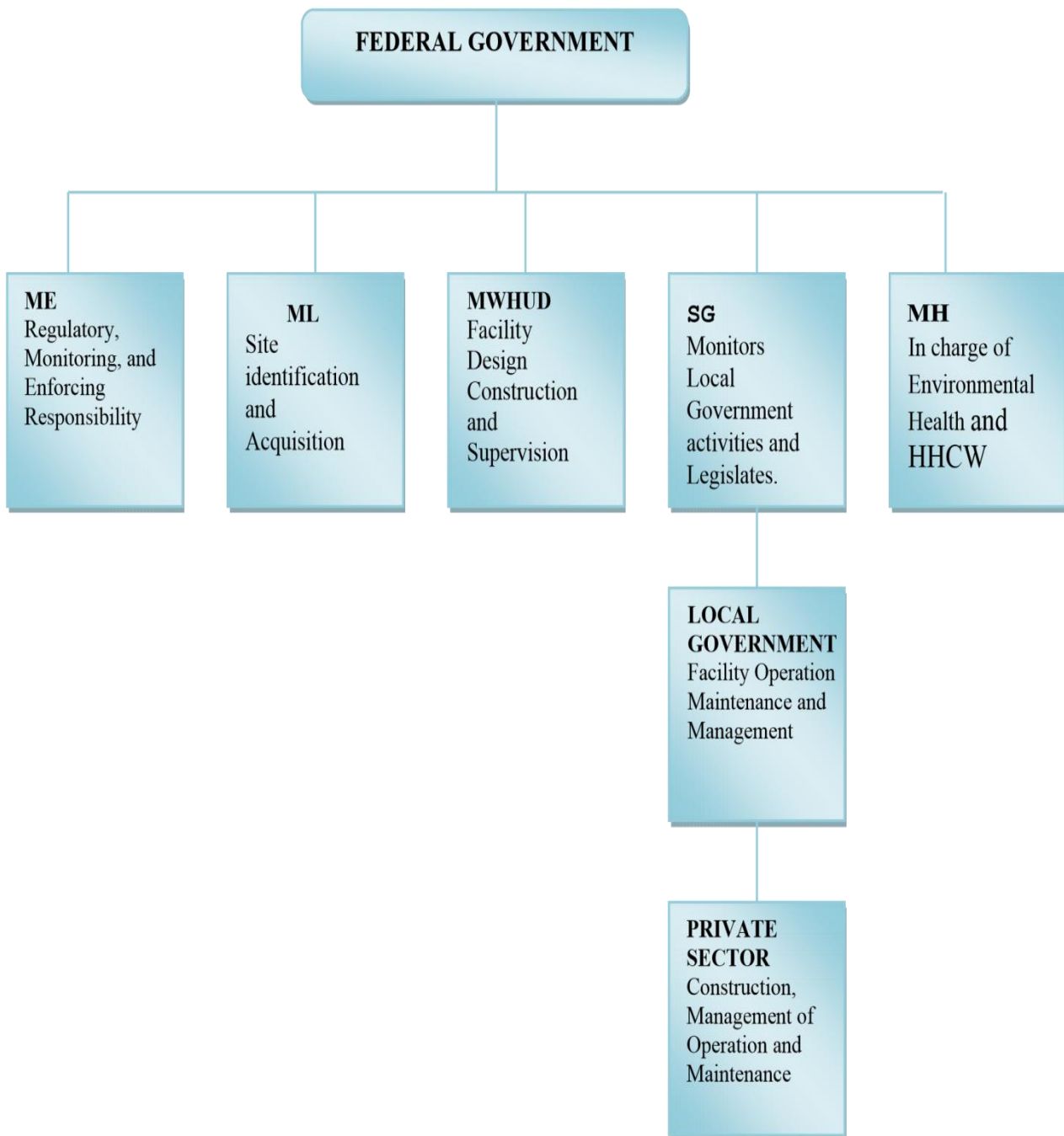


Figure 2.2: Institutional arrangement for solid waste management in Nigeria

Source: Adapted 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 site.

2.6. Solid Waste Management Service Providers

Solid waste management service providers are those agencies which participate in waste management in the areas of regulatory or law enforcement, service provision and infrastructure provision.

2.6.1 Indicators of Coordination among Solid Waste Management Service Providers

In order to collect relevant data for any research, appropriate indicators must be developed. Since this research is a status study, evaluation indicators to be developed will therefore be based on ground realities/experiences and challenges

Coordination is a necessary controlling mechanism to ensure placid functioning, particularly when organizations or agencies become large and complex. Coordination aims at ensuring that different sub-systems work towards common goals. It also helps to minimize redundancy and increase service efficiency and effectiveness.

i. Consultation

Consultation simply means building of common understanding and broad consensus among organization. Consultation with other organizations is also an important indicator of coordination. This is because partners in consultation expect their views to be heard and taken into account.

Consultation is broad in perspective and can range from simple type such as collection of information through questionnaire/interview surveys, round table discussions, public meetings, etc., to more sophisticated varieties such as regular joint meetings, and workshops. One of the effective means of consultation is workshops and seminars. Workshops and seminars can be organized with participation of all stakeholders to prepare a plan of action or formulating guidelines to prepare same. Workshops can be used as tools for transfer of information and knowledge, improve working relationships and support other management functions .

ii. Collaboration

Inter-agency collaboration is working together of organizations or agencies to realize shared goals. The need for collaboration among agencies with shared goals and objectives cannot be over

emphasized. This is because it will provide the agencies with the opportunity to consider functions that cut across them and to resolve conflicts .

Meanwhile to have effective collaboration, dialogue and negotiation are required. Antonio (2005) opined that sometimes coordination is difficult because there are not enough opportunities for organizations to engage in real dialogue and negotiations among themselves at an early point in the planning process. The resultant effect of lack of dialogue is outgrowth of disagreement and conflicts. It is worth of note to understand that overlapping of roles and responsibilities can cause confusion or even conflicts; this needs to be negotiated through collaborative efforts and dialogues.

iii. Information exchange

This refers to the situation where there is exchange or transfer of information and ideas among the organizations. Information exchange is important, because good flow of information provides the entry point for promoting discussion and ensuring involvement in decisions and actions based on that information. Also good relationships happen where there are good communications, based on smooth flow of information, participation and involvement. Good flow of information also encourages transparency hence attainment of effectiveness.

Interactive website is also another aspect for which information exchange and communication can take place between or among organization. An interactive website on the Internet may be created by the apex organization to obtain and/or provide helpful information, request, opinion, make suggestions as well as receive complaints from stakeholders.

2.7 The Concept and Principles of Urban Governance

In the increasingly urbanizing world, sustainable urban development will depend largely on the management capacity of cities and the active participation of citizens. The concept of urban governance refers to the complex set of values, norms, processes and institutions by which cities are managed. According to the UNDP (1997) governance can be seen as “the exercise of political, economic and administrative authority in the management of a country’s affairs at all levels. It

comprises of the mechanisms, processes and institutions, through which citizens and groups articulate their interests, exercise their legal rights, meet their obligations and mediate their differences

Urban governance tends to refer to either the formal and informal political processes which determine or at least influence what happens in a city. Good urban governance works towards making cities more efficient, equitable, safer and sustainable. Systems of urban governance that are based on sound, transparent and accountable processes can go a long way in making cities more inclusive. There is no alternative to working together and using collective power to create a better world. Governance is the sum total of the many ways individuals and institutions, public and private manage their common affairs. It is a continuing process through which conflicting or diverse interests may be accommodated and cooperated action may be taken. It includes formal institutions and regimes empowered to enforce compliance, as well as informal arrangements that people and institutions either have agreed to or perceived to be in their interest

2.7.1 The principles of good urban governance

i. Participation

The expectation is that participatory approaches are a way of improving the access of the poor to services. Membership in voluntary Organisations can be seen as a way through which individuals and groups can become part of the overall governance system. An example is Dar es salaam where Community Based Organisations engaged in solid waste management were subsequently incorporated into the Municipal Solid waste Management system.

Participation also means that decisions taken and their enforcement are done in a manner that follows rules and regulations. It also means that information is freely available to those who will be affected by such decisions and their enforcement are carried out in a manner that follows rules and regulations

ii. Responsiveness

Responsiveness is the measure of positive reaction to perceived needs and will be used to evaluate how responsive the actions of solid waste governance agencies are to the needs and performance of

stakeholders. It is also a reflection of how close and accessible governance agencies are to solid waste management stakeholders. It enables efficient and cost effective delivery of services at the closest appropriate level.

iii. Transparency

This principle is used to measure how open agencies are, in consultation with residents and other stakeholders with regard to solid waste management

iv. Effectiveness

This principle will be used in the study to assess how equipped and organized solid waste management agencies are in their dealings with stakeholders. The expectation is that participatory approaches are a way of improving the access of the poor to services. Membership in voluntary organisations can be seen as a way through which individuals and groups can become part of the overall governance system.

2.8 Summary of reviewed literature

The major highlights here are about solid waste management at the global, African, and national levels. At the global level, the waste management hierarchy presented drew attention to the technical as well as the social aspects of solid waste management. The former deals with safer methods for waste management while the latter focused on consumption habits and patterns. It has been presented 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

RESEARCH METHODOLOGY

The methodology of the research work includes sample size, sampling techniques as well as the data analysis approach to the study. In the course of this research oral interview was conducted and structured questionnaires were administered to the different service providers and other stakeholders

3.1 Method of data collection

3.1.1 The Structured Questionnaire

Structured questionnaires were administered to representatives of formal private operators and public agencies involved in solid waste management in order to source for information regarding their performance using the principle of effectiveness and inter relationship among them, in terms of collaboration, consultation and exchange of information. Likewise, information was also sought from selected households and Business operators (in commercially most active areas) on their perceptions on the performance of the solid waste management service providers using the principle of effectiveness too.

3.1.2 Oral Interview

Information on the roles of solid waste management service providers in the study area were gotten from Environmental Health Departments of Zaria and Sabon Gari local government authorities, Private Agencies and KEPA through oral interview with their representatives.

3.1.3 Desk study/ Literature review

This method has helped in reviewing documents relating to roles and performance of solid waste management service providers, legal provisions and institutional arrangements for the management of municipal waste by the Federal, States and local governments in Nigeria.

3.2 Data Required and Sources

In carrying out this research numerous types of data were accessed and utilized, as shown in Table

Table 3.1: Types of Data Required, Sources and Methods of Data Collection

Objectives	Data required/types	Data source	Method of data collection	Method of data Analysis
To describe the institutional Arrangement for solid waste management in Zaria Urban Area	(a) Concept, policies and institutional arrangement for solid waste management in some countries (b) Principles of good urban governance with regard to solid waste management. (c) Indicators of coordination among solid wastes management service providers	Journals, textbooks, theses, dissertations, published and unpublished literature.	Literature review	Text analysis
To identify the roles of the solid waste management service providers in the study area	Roles of the solid waste management service providers	Programs reports and activities, Environmental Health Department of Zaria, private Agencies and KEPA	Literature review and oral interview	Text analysis
To evaluate performance of solid waste management service providers in Zaria Urban Area	Performance of solid waste management service providers (using principle of effectiveness) and Inter-relationship in terms of a. Collaboration b. Consultation c. Exchange of information among solid waste management service providers	Environmental Health Departments of Zaria and Sabon- Gari local government, KEPA, Private Agencies	Structured questionnaire, Literature review and Personal Observation	Descriptive statistics
To evaluate the perceptions of stakeholders on the performance of solid waste management service providers in the study Area	Perceptions of stakeholders (Business Operators and Households) on the performance of solid waste management service providers (using principle of effectiveness)	Business Operators and Households	Structured questionnaire and Personal Observation	Descriptive Statistics
To identify shortcomings and make recommendations for improvement of the situation	Best practices	Journals, textbooks, theses, dissertations, published and unpublished literature	Literature review	Text analysis

Source: Field survey, 2018

3.3. Indicators for evaluating performance of solid waste management service providers (public and private) and Perceptions of Stakeholders (Households and Business Operators) on performance of Solid Waste Management Service Providers in Zaria Urban Area

The Indicator used for the evaluation is adapted from the Good Governance Report Card (GGRC) by The Urban Governance Initiative (TUGI) UNDP. The indicators/principles of good urban governance includes: Effectiveness, participation, responsiveness, accountability etc. But for the purpose of this study the indicator/Principle used for the evaluation of performance of service providers and stakeholders' perceptions is effectiveness. Structured questionnaires (Likert scale questions type) were used for evaluation as shown in the *Table 3.2*

Table 3.2: Indicators and variables for evaluating performance of solid waste management service providers (public and private)

Indicator (One of the principles of good Urban governance)	Variables	Tools of Measurement
Effectiveness: This refers to the degree to which stated objectives are achieved. Solid Waste services are considered effective if there is safe removal of all the wastes generated.	<ul style="list-style-type: none"> • Appropriate skills of personnel • Adequacy of capital or finance • Adequacy of facilities and Equipment. • Adequacy of infrastructure 	Multiple choice questions (the Likert scale questions type) and Personal Observation

Adapted from the Good Governance Report Card, by the Urban Governance Initiative (TUGI),2010

Table 3.3: Indicators and variables for evaluating the perception of stakeholders (households and business operators) on performance of solid waste management service providers

Indicator (One of the principles of good Urban governance)	Variables	Tools of Measurement
Effectiveness: 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 service providers 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.	<ul style="list-style-type: none"> • Ease of access to solid waste collection services • Provision of solid waste collection points • Regular evacuation of solid waste collection points • Solid waste collection coverage 	Multiple choice questions (the likert scale questions type) and Personal Observation

Adapted from the Good Governance Report Card, by the Urban Governance Initiative (TUGI),2010

3.4. Indicators of Coordination for evaluating inter-relationship of Solid Waste Management Service Providers

In order to supplement the principle of effectiveness in evaluating the performance of solid waste management service providers, the indicators of Coordination were employed to find out the nature of inter-relationship among them, which includes: collaboration, consultation and information exchange.

Table 3.4: Indicators and variables for evaluating Coordination of Solid Waste Management service providers (Private Agencies involved in Solid Waste Management)

Indicators for Evaluating Coordination	Variables	Tools of measurement
Collaboration among agencies	<ul style="list-style-type: none"> • Clearly defined roles and responsibilities of the agencies • Negotiations • Cooperation • Ability to abide by the specified tasks • Complying with joint decisions 	Multiple choice questions (the Likert scale questions type) and Personal Observation
Consultation among agencies	<ul style="list-style-type: none"> • Regular participation in stake holders workshops, seminars and other fora for exchange of knowledge • Regular stakeholders joint meetings to discuss issues of mutual interest 	Multiple choice questions (the likert scale questions type) and Personal Observation
Exchange of information among agencies	<ul style="list-style-type: none"> • Regularity of accessibility of up to date information from one Service provider to another • Regularity of inter-agency correspondences • Availability of internet service within the agency • Regularity of public awareness campaigns with regard to solid waste management 	Multiple choice questions (the likert scale questions type) Personal Observation

Source: Field Survey, 2018

3.5 Developing the Structured Questionnaire for Service Providers and other Stakeholders.

3.5.1: The Likert Scale

The choice of likert scale as the main instrument for data collection for the study was because it enables the respondents to easily respond to the items. It allows for qualitative, quantitative and analytic approaches effectively which will effectively use statistics for data interpretation.

The Likert scale ranged from '0' for undecided to '4' for strongly agree as shown in the *Table 3.5*

Table 3.5: Rating system for the Likert scale

Rating	Description
0	Undecided
1	Strongly disagree (SD)
2	Disagree (DA)
3	Agree (A)
4	Strongly Agree (SA)

Source: Adapted from Galadima (2012)

In developing the structured questionnaire based on the likert scale, the variables were listed for which the respondents indicated their responses for each. And such responses were ranked accordingly using the rating in table 3.5

3.6: Sampling Frame

The population of the study consist of 10 members of staff from KEPA, 18 each from Environmental Health Department of Zaria local government and Sabon Gari Local Government, 12 staff from PECT, 10 from Dimension waste and 11 from Deritklin and Business operators in Zaria local government and Sabon Gari Local government have a population of 10,938 and 12,134 respectively. Others includes 650 and 550 workers from Zoom lion in Zaria local government and Sabon Gari local government respectively. PECT has 102 registered customers while Dimension waste and Deritklin have 310 and 170 respectively making a total of 24,933

3.6.1: Sample Size

As the total population of the study was found to be 24,933, Therefore, the required sample size is 379 according to Krejcie and Morgan (1970). See appendix (V).

3.6.2 Sample Distribution

Since the sample frames have been developed, the specific frames were divided by the aggregate frame and multiplied by the sample size of 379 to establish the number of questionnaires to be administered to the respondents. (table 3.6)

Table 3.6: Sample frame and size distribution

S/No.		Population	Proportion	Number of questionnaires administered
1	KEPA	10	$\frac{10}{24933} \times 379$	1
2	Environmental Health Dept. of Zaria L.G .A	18	$\frac{18}{24933} \times 379$	1
3	Environmental Health Dept. of Sabon Gari L.G.A	18	$\frac{18}{24933} \times 379$	1
4	PECT	12	$\frac{12}{24933} \times 379$	1
5	Dimension Waste	10	$\frac{10}{24933} \times 379$	1
6	DeritKlin	11	$\frac{11}{24933} \times 379$	1
7	Business Operators in Zaria L.G.A	10,938	$\frac{10,983}{24933} \times 379$	166
8	Business Operators in Sabon Gari L.G.A	12,134	$\frac{12,134}{24933} \times 379$	184
9	Zoom Lion Workers in Zaria L.G.A	650	$\frac{650}{24933} \times 379$	10
10	Zoom Lion Workers in Sabon Gari L.G.A	550	$\frac{550}{24933} \times 379$	8
11	Households Patronising PECT	102	$\frac{102}{24933} \times 379$	6
12	Households Patronising Dimension Waste	310	$\frac{310}{24933} \times 379$	9
13	Households Patronising DeritKlin	170	$\frac{170}{24933} \times 379$	7
		24,933		396

Source: Field Survey, 2018

Table 3.7: Solid Waste Collection Points in Zaria Urban Area

S/NO	Location	No. of Bin (Galvanised Containers)	Coordinates	Sampled Points	
Zaria City					
1	Babban dodo round about	2	11'03.347"	007'41.105"	Opposite
2	Rimin Tsiwa	2	11'05.112"	007'42.085"	Ladan
3	Opp. Ladan Sharehu market	2	11'02.961"	007'41.842"	Sharehu
4	Gwargwaje junction	2	11'03.147"	007'41.105"	market,
5	Kofar Gayan	2	11'03.148"	007'41.842"	Babban dodo
6	Emir's Palace	-	-	-	round about
7	Kwarbai by Banzazzau	-	-	-	
8	Kofar Kuyan bana	-	-	-	
Tudun wada					
9	Yan'nono opp. T/wada market	2	11'44.256"	007'42.921"	Maje road, primary school
10	Opp. Albarka Cinema	2	11'05.245"	007'42.921"	
11	Kofar doka new Jos road pavement	2	11'04.736"	007'42.921"	Old Jos road by Gyallesu
12	Jushi by New Jos road	2	11'04.580"	007'43.059"	
13	Second gate Kongo	2	11'05.069"	007'43.543"	
14	Maje road primary school	2	11'05.364"	007'43.227"	
15	Danmagaji market area	2	11'04.575"	007'40.964"	
16	Wusasa near fly-over	2	11'04.475"	007'40.891"	
17	Old Jos road Gyallesu	2	11'03.147"	007'41.842"	
18	Gaskiya junction	2	11'05.547"	007'42.921"	
19	Gaskiya adjacent Church	EYN 2	-	-	
20	Old Jos road after FCE	-	-	-	
21	Kofar doka opp. Mamu oil	-	-	-	
22	Gaskiya road by Poly	-	-	-	
23	Old Jos road after FCE	-	-	-	
Sabon Gari					
24	PZ Area	2	11'03.347"	007'40.745"	Kano junction,
25	River road Before GTbank	2	11'05.542"	007'45.842"	
26	Post office /Police Head Quarter	2	11'04.244"	007'43.643"	kwangila Under fly-over
27	MTD junction	2	11'03.447"	007'48.745"	
28	Kano junction	2	11'06.848"	007'49.542"	
39	Under bridge, kwangila	2	11'07.642"	007'42.342"	
30	Sokoto road by Zaria Hotel	2	-	-	
31	Basawa by Aviation	2	-	-	
32	Aminu road by Railway Quarters	-	-	-	
33	GRA by IBB road	-	-	-	
Samaru					
34	Samaru Market Area	2	-	-	Sokoto road by Zango
35	Sokoto road by Zangon shanu	-	-	-	Samaru market area

Source: Field Survey, 2018

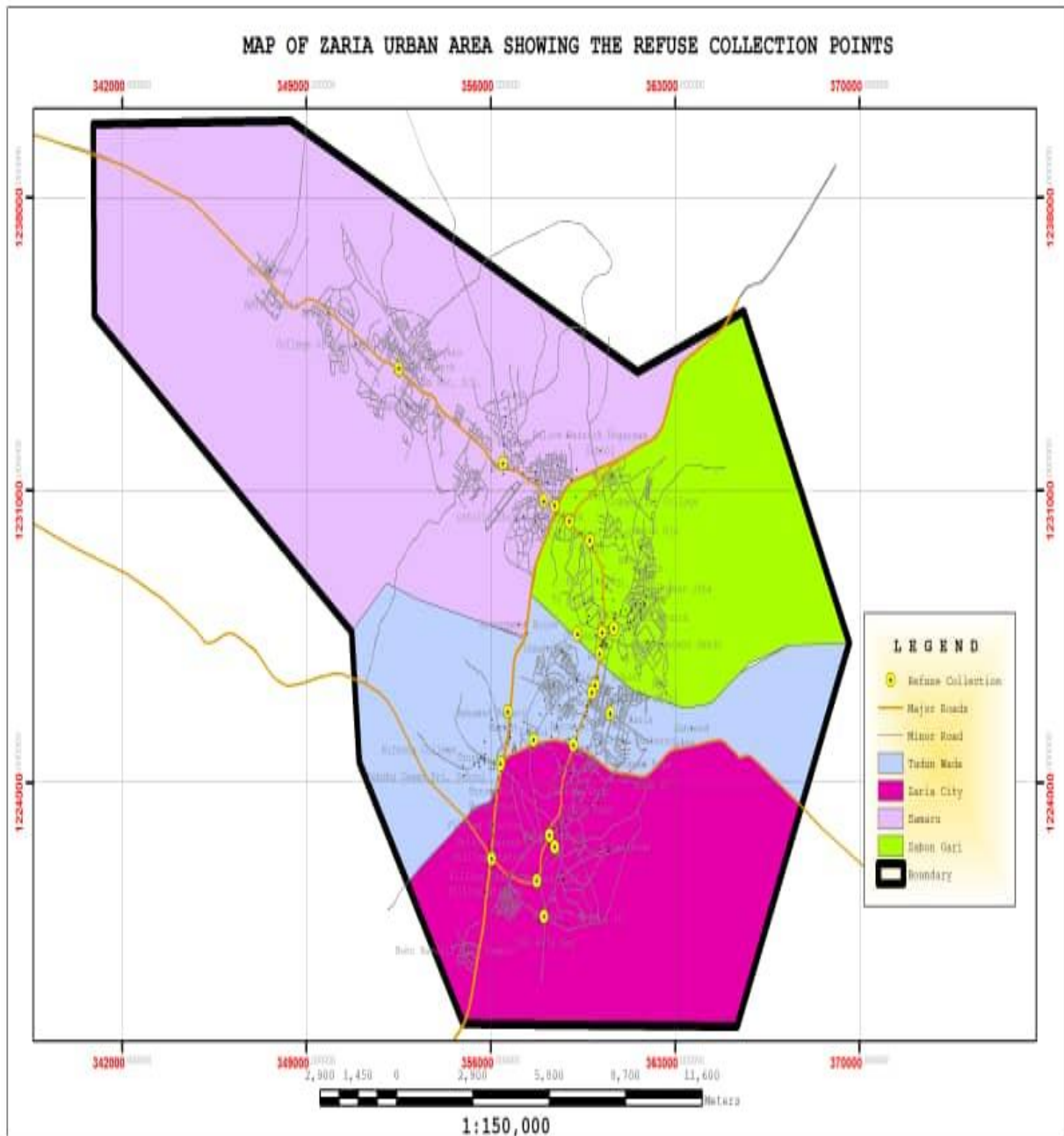


Figure 3.1: Refuse Collection Points in Zaria Urban Area (Source: Google image, 2018)

3.6.3 Sampling Techniques

Purposive sampling method was used for the service providers where one (1) questionnaire each was administered to their representatives. The sampling techniques employed for the households, and business operators were cluster, systematic and simple random sampling.

The study area was clustered based on the four districts; Zaria city, Tudun-wada, Sabon-gari, and Samaru. Systematic sampling was then used within 3 of the districts (with the exception of Zaria City) to select households that enjoy house to house collection and disposal of waste by the private providers (from the list collected from some of the companies).

Systematic sampling was also used for business operators (in commercially most active areas) where 166 and 184 questionnaires were administered to business operators within specific collection points in Zaria and Sabon Gari Local Government Areas respectively. Using simple random sampling method to choose 4 collection points from each of the 4 districts and then administered questionnaires to the respondents systematically where every second operator along the street was selected for administration of questionnaire.

In order to ensure adequate coverage of responses from the respondents four (4) final year undergraduate students of Urban and Regional Planning Department were employed as research assistants, to help in questionnaire administration within the four districts, because it was realized that some of the respondents may not be able to read or write or may not be patient enough to fill-in the questionnaires.

3.7 Data Analysis and Presentation

As the survey was conducted and the completed questionnaires gathered from the respondents that is the seven (7) service providers, business operators and households in the study area, the responses were then obtained and tabulated. Methods of data analysis employed for the research were the descriptive statistics (frequency analysis, mean scores and grand means) using the indicators of coordination (collaboration, consultation and exchange of information) and Principle of Good Urban

Governance (effectiveness) for the service providers and business operators and households respectively, as well as structured questionnaire as a tool of measurement.

The structured questionnaire was used to collect data about activities of service providers and stakeholders' perceptions. These responses were analyzed by the use of frequencies, mean scores and grand means. The descriptive statistics such as the Likert scale through the application of frequency counts, mean scores and grand means were employed for analyzing the data. To use the Likert scale for interpretation, the variables were calculated for each pair statements.

The rating values were multiplied by frequency (F) of responses to obtain the mean score. The mean score (\bar{x}) was obtained by dividing the sum of the frequencies (F) and the weighted values (x) by the number of responses (N) – i.e $\bar{x} = \sum fx/N$. To obtain the grand mean on the other hand, mean scores of the variables were added up and divided by the total number of mean scores i.e. Grand $\bar{x} = \sum \bar{x}/n$.

3.7.1 Decision Rule for the Likert Scale

In interpreting the processed data obtained based on the likert scale, a decision rule was employed. Any means score of respondents between 3.00 and 4.00 was considered as acceptance (agree), the mean score of respondents between 0.00 and 2.99 as rejection (disagree) as presented in Table 3.8 that is, if the score is high it signifies favorable conditions depending on the mode of the questionnaire items.

Table 3.8: Decision Rule for the Likert Scale

Mean scores	Description
3.00 – 4.00	Acceptance
0.00 – 2.99	Rejection

Source: Adapted from Galadima (2012)

CHAPTER FOUR

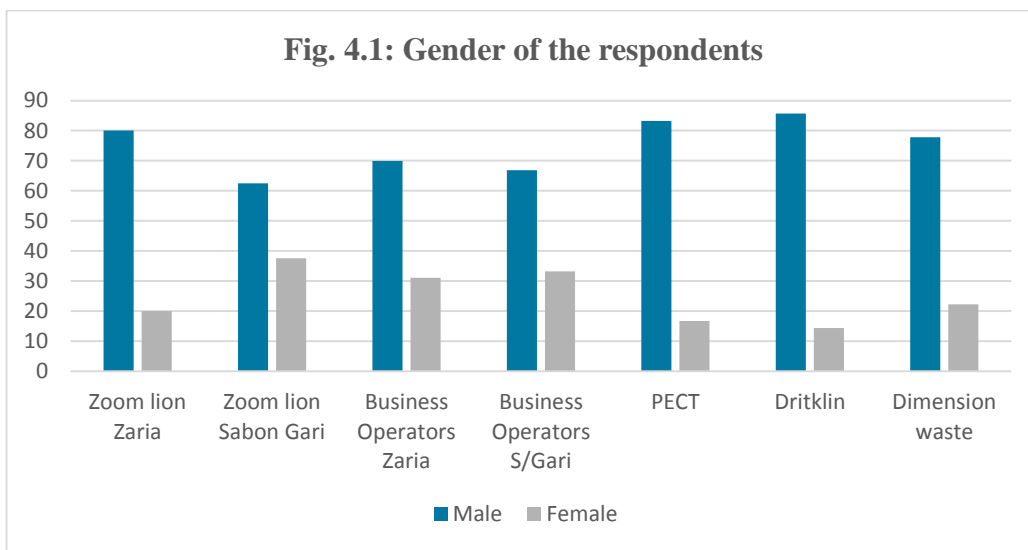
DATA ANALYSIS AND DISCUSSION

This section identified the roles of the solid waste management service providers in the study area as well as the results from the questionnaires administered to the respondents.

4.1 Demographic and Socio-economic characteristics of the respondents

4.1.1 Gender of the respondents

The gender distribution of the respondents are shown in figure 4.1 below;

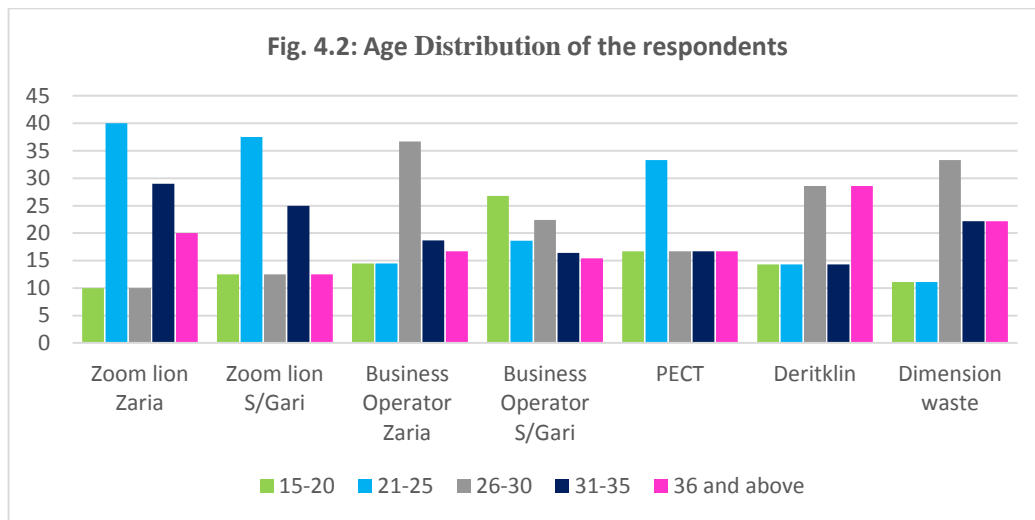


Source: Field Survey (2018)

As revealed in figure 4.1, about 80.0% and 62.5% of the responses from Zoom lion in Zaria and Sabon were male. Also, 69.9% and 66.8% of the responses from Business operators in Zaria and Sabon Gari were male. The result also indicates that majority of the respondents from PECT, Dritklin and Dimension waste were male.

4.1.2 Age of the respondents

The age distribution of the respondents are shown in figure 4.2 below;

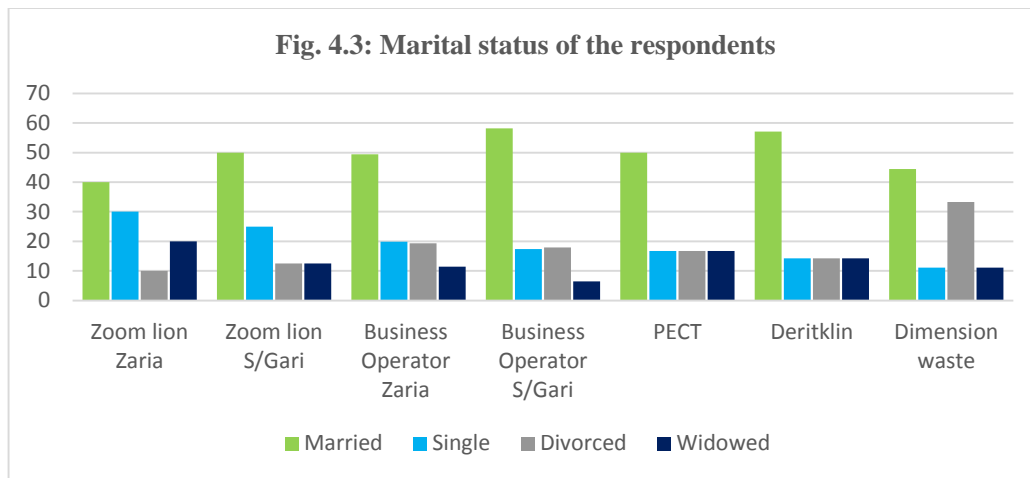


Source: Field Survey (2018)

Figure 4.2 shows the relationship in the age distribution of respondents. The result reveals that majority of the respondents 40.0% and 37.5% from Zoom lion Zaria and Sabon-Gari, respectively falls between age (21-25). On the other hand, majority of the respondents 36.7% and 26.8% of the business operators in Zaria and Sabon-Gari falls between (26-30) and (15-20) years respectively. While majority of the respondents in PECT 33.3% falls within the age range of (21-25) and 28.6% in Deritklin falls within the age range of 36 years and above.

4.1.3 Marital status of the respondents

The marital status of the respondents are categorised as shown in figure 4.3 below:

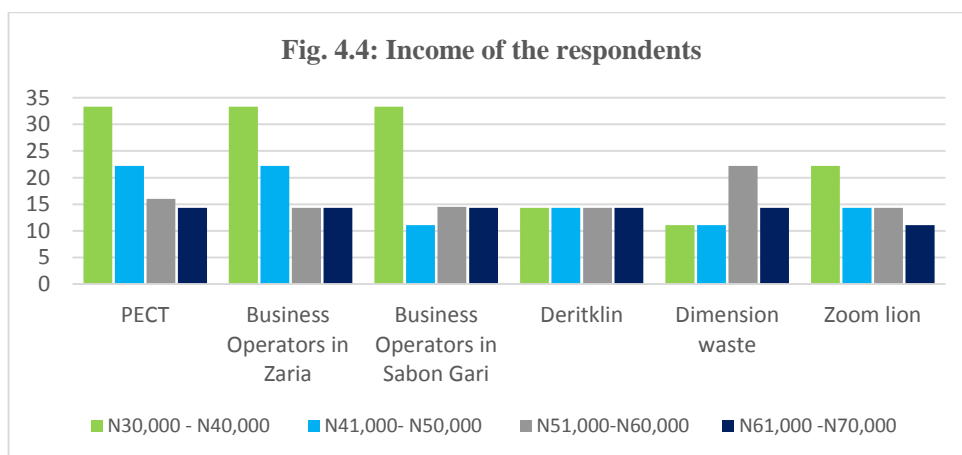


Source: Field Survey (2018)

In figure 4.3, most of the sampled respondents across the waste management agencies were married. This is indicated by the higher percentage 40.0% and 50.0% in Zoom lion Zaria and Sabon-Gari respectively. In addition, majority 58% and 62% of business operators in Zaria and Sabon-Gari respectively were also married.

4.1.4 Monthly income

The distribution of respondents according to income is shown in figure 4.4 below:

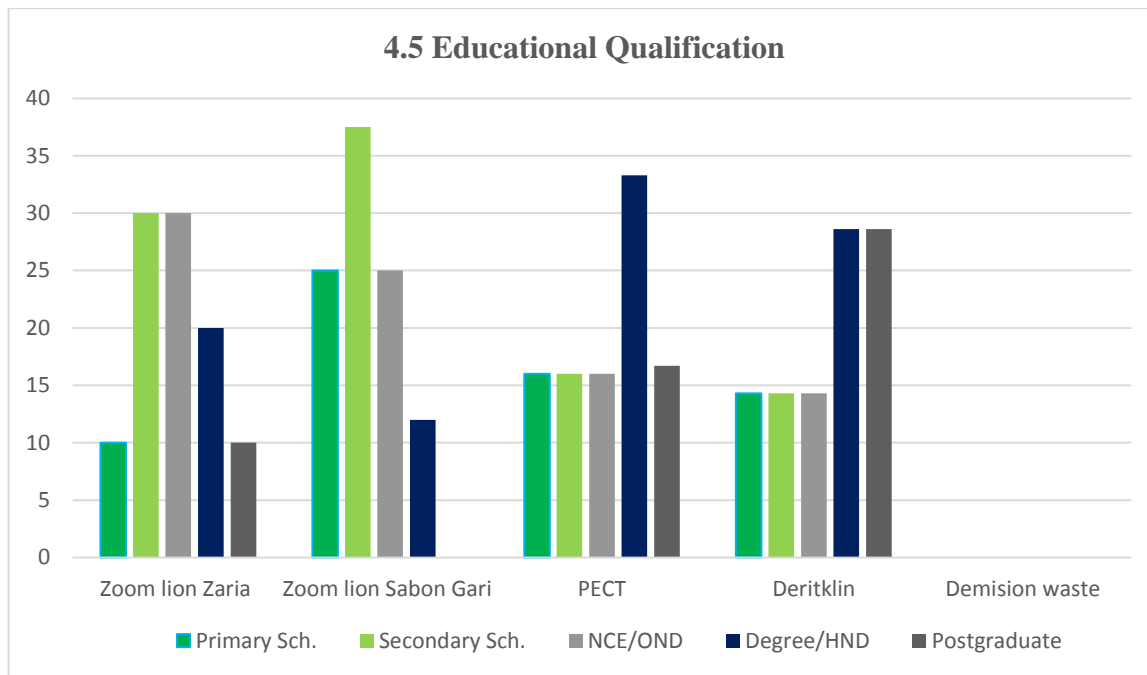


Source: Field Survey (2018)

The result shows that the highest proportion (33.3 %) of the workers earned from ₦30,000 to ₦40,000. This implies that the proportion of the respondents' income across the waste management agencies is within an average of ₦30,000 to ₦40,000.

4.1.5 Educational Qualification

The distribution of respondents according to educational qualification is shown in figure 4.5 below;



Source: Field Survey (2018)

Table 4.5 shows that majority of the respondents from Zoom lion Zaria representing 30.0% and 30.0% had secondary school certificate and NCE/OND respectively, while majority (37.5%) from Zoom lion Sabon-Gari are Secondary school leavers. This was followed by respondents from PECT with 33.3% who had Degree/HND. Majority of the respondents from Deritklin representing 28.6% and 28.6% had Degree/HND and Post graduate education respectively.

4.2 Role of service providers

The roles of service providers involved in solid waste management within Zaria Urban area are highlighted below

4.2.1 The Role of the Federal Government

The Federal government is 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 etc, undertaken by The Federal Ministry of Environment (FMoE) through the National Environmental Standards Regulations and Enforcement Agency (NESREA). The FMoE, through the NESREA normally carries out a joint inspection with the state Environmental Protection Agency (KEPA) and the State Ministry of Environment (SMoE) to ensure the achievement of the aforementioned tasks and also ensure that Industries in Zaria comply with standards and regulations in accordance with provisions of international agreements, conventions and treaties on the environment, including coordination and liaison with relevant stakeholders within the Study Area.

4.2.2 Role of Kaduna State Environmental Protection Agency (KEPA)

KEPA represents 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), 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

KEPA now manages contracts between local government authorities and private sector operators in solid waste management in addition to their responsibilities.

4.2.3 Role of the Local Government Authorities

Local governments are constitutionally empowered to handle solid waste management (FGN, 1999).

The Local Government Authorities solid waste management responsibility is undertaken by the Environmental Health Department. The functions as specified by UDBN (1998), includes 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

The two Local Government Authorities in Zaria Urban Area have at one time provided and maintained communal depots and collected household solid wastes for disposal on a regular basis. Now, solid waste collection from communal depots and disposal is very irregular. The LGAs now contracted that duty to private firms who collect wastes from areas of high visibility. 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.

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 of the country are not included (Ukoje, 2011). 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

4.2.4 Role of the Formal Private Collectors

The formal private collectors are actors who 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 small enterprises and only four are registered with KEPA at the moment. All of the operators have minimal interaction with the Local Government Authorities, though they utilize the authorities disposal facilities (Stare, 2005).

4.3 Roles and Operational Characteristics of Solid Waste Management Service Providers in Zaria urban area

This section show-cases the solid waste management stakeholders, their roles as well as the way they operate or carry out their activities.

4.3.1 The Roles of the Federal Government

In Zaria Urban Area, the Federal government which is represented by the Federal Ministry of Environment (FMoE) through the National Environmental Standards Regulations and Enforcement Agency (NESREA), normally carries out a joint inspection with the State Environmental Protection Agency (KEPA) and the State Ministry of Environment (SMoE) to ensure ensure that Industries in Zaria comply with standards and regulations in accordance with provisions of international agreements, conventions and treaties on the environment, including coordination and liaison with relevant stakeholders among other things within the Study Area.

4.3.2 The Roles of the State Government

Although the Statutory Roles of the State Government are to Regulate and monitor activities of stakeholders, Arrange for the collection and disposal of waste, Supervision and enforcement of by-laws, Provision of land for waste management infrastructure, Manages contracts between Local

Government Authorities and private sector operators, assisting in capacity building. However, the actual Roles they performed are provision of land for waste management infrastructure, manages contracts between Local Government Authorities and private sector operators, registration and supervision of solid waste contractors

4.3.3 The Roles of the Local Governments

The two local government authorities in Zaria Urban Area have roles in the set up and operation of solid waste management systems, through the Environmental Health Department of the local Government Authorities. Therefore, its statutorily responsibility includes: Locating, constructing and maintain convenient sites for erecting refuse depots, Collaborating with other agencies to collect and dispose refuse or contracting evacuation of waste dumps to private collectors. Maintain equipment and facilities for waste management, Conducting sanitation in every last week of the month, Supervision of street sweeping and drainage clearing. However, in Zaria urban Area due to lack of capacity their roles have been reduced to Contracting evacuation of waste dumps to private collectors. Conducting sanitation in every last week of the month. Supervision of street sweeping and drainage clearing

4.3.4 Formal Private Sector

The Formal private companies involved in Solid Waste Management in the study area are of two (2) types. The first one is called Zoom lion Global Alliance (ZLGA) which is responsible for waste collection, transportation, disposal, evacuation of waste collection points, waste dumps and street sweeping for profit, Contracted to it by the Local Government Authorities through their Environmental Health Departments. The company then employs certain number of staff and supplies them with facilities such as protective devices, clothings, rakes, shovels, waste disposal vehicles etc. The staff work every day with the exception of Sundays and normally use government dump sites for final disposal, jointly supervised by the Health Department and KEPA.

The other type of formal private companies includes: Dimension Wastes, Derit Clin and PECT which are responsible for House to house waste collection, transportation, and disposal for profit. They used similar facilities as the former and operate in certain areas within the study area and also supervised by the Health Department and KEPA.

4.3.5 The Informal Private Sector

Households normally engaged their own children or boys (yaro boys) who collect the waste and bring it to the collection sites. The boys normally rent wheel barrow or carry the waste on their heads and charge 50 – 100 Naira depending on proximity to the dump site or volume of waste. Scavengers or waste pickers are found on almost every waste dumps and the collected materials are sold to junk collectors. Materials collected from refuse dumps end up for sale in the markets: glass, plastics, tins, metal scraps and other objects

4.3.6 Community Based Organisations

Although I was introduced to various officials of the so-called CBOs and also visited some of their offices, however, their actual contributions to solid waste management is difficult to evaluate, since I did not see them in action and there is no evidence that the local authorities in Zaria are working with or involved the civil society in solid waste management. Likewise, the officials in KEPA and the two local government authorities are not aware of any CBOs actively engaged in solid waste management.

4.3.7 Non-Governmental Organisations

There are no active NGOs involved in solid waste management in Zaria Urban Area. The NGOs found are those concerned with general development issues. Although UNICEF is involved in environmental awareness programmes and finance facilities for developing the solid waste management in Nigeria and stresses collaboration with communities and works with a range of NGOs, but these activities have not reached Zaria (Stare, 2005).

4.3.8 Individuals and Households

Although, households and individuals in Zaria have unrealistic expectations that the local government should be responsible for solid waste management, in some cases, young people play a special part in solid waste management too. Children often help their parents with daily tasks such as bringing waste to the collection point or dump it in drainages. Unemployed adolescents discover the income-generating potential of solid waste services they collect the waste and charge them a token amount just like the boys (yaro boys) who collect the waste and bring it to the collection sites. They also rent wheel barrow or carry the waste on their heads.

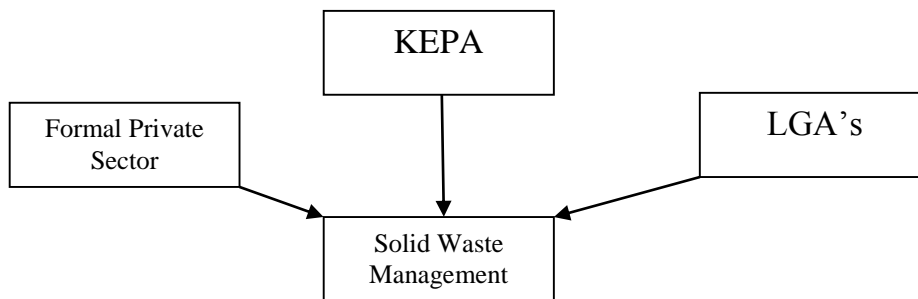


Figure 4.6: Existing Solid Waste Management Set-up within Zaria Urban Area

Source: Field Survey, 2018

Figure 4.1 shows the existing solid waste management set-up within Zaria urban area, which constitutes only the functions of KEPA, Public Health Departments of the local government in Zaria and the formal private sector. All the other actors that have impact on the management of solid waste in Zaria Urban area not included

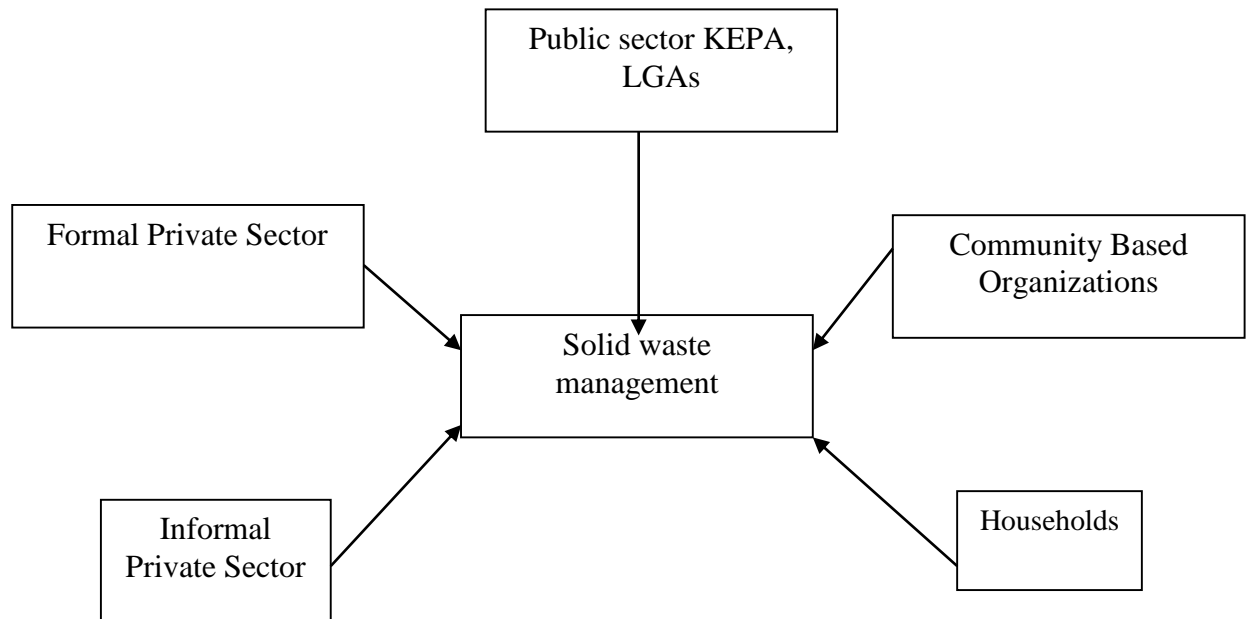


Figure 4.7: Main Actors in Solid Waste Management within Zaria Urban Area

Source: Field Survey, 2018

Although so many actors participate in solid waste management as illustrated above, it is only the aforementioned (Fig 4.2) that are officially recognized by the regulation, other actors like community based organizations (CBOs), informal waste collectors and the households are not included in the solid waste management set up.

4.4 Activities of Public Sector (Environmental Health Departments of the Two LGAs)

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

4.4.1 Staff Responsibilities

The Environmental Health Departments of the two local government authorities employed a total of 36 staff for solid waste management. The staff constitutes 18 for Sabon-Gari and 18 for Zaria local Government Authorities (Table 4.1). Among the staff are Health Officers, Environmental Technicians, sanitation workers and Drivers. The staff are in four categories.

Table 4.1: Solid Waste Management Personnel and Units

Unit	Sabon-Gari LGA		Zaria LGA	
	No. of Staff	%	No. of Staff	%
Health inspection	3	16.7	2	11.1
Sanitation	8	44.4	9	50.0
Environmental Technicians	5	27.8	6	33.3
Drivers	2	11.1	1	5.60
Total	18	100.0	18	100.0

Source: Sabon-Gari and Zaria LGAs Health Departments, 2018

The sanitation workers and Environmental Technicians have the highest number of workers with 44.4 % and 27.8 % for Sabon-Gari and 50.0 % and 33.3 % for Zaria LGA respectively. The section is grossly understaffed. The Director of health of the Sabon-Gari LGA indicated that between 50 and 100 staff are required for effective performance in the Urban area.

4.4.2 Financial Resources

It is an understatement to say that the local government authorities have not been able to attract the right staff, this is due to poor condition of service. Another major reason for this inadequacy is funds. Effective solid waste service requires considerable capital to purchase or maintain vehicles, lay and maintain the necessary infrastructure, pay workers, and enforce regulations.

Table 4.2: Financial Allocation for Environmental Health Departments between 2013-2018

Years	Allocation (₦m per Annum)	%
	Sabon-Gari LGA	Zaria LGA
2013	14.9	13.8
2014	15.9	14.1
2015	16.8	15
2016	17.7	18
2017	18.8	19.1
2018	19.7	20
Total	103.8	100.00

Source: Sabon-Gari and Zaria Health Departments, 2018

The local government authorities derive their funding from the federation allocation, money received as gifts, assistance, loan etc from other sources, money generated from fines etc. By 2017 the estimate

of financial allocation to the Environmental Health Department of Sabon-Gari LGA was N18.8 million per annum. That of Zaria LGA was N19.1 million per annum as in Table 4.2. Although, this financial allocation shows increase over the years, it has still not shown improvement in the services delivery

4.4.3 Equipment for Solid Waste Management

Solid waste management requires appropriate equipment for collection, loading and transportation of the wastes which includes tippers, pay loaders, tractors etc. A breakdown of the equipment and requirements for effective solid waste management in Zaria Urban area is shown on table 4.3. Presently, none of the local governments' Environmental Health Departments has vehicles and equipment of good working condition.

Table 4.3: Solid Waste Collection and Disposal Equipment

Type of equipment	Sabon-Gari LGA		Zaria LGA	
	No. Available	No. Required	No. Available	No. Required
Tippers	-	3	-	3
Pay Loaders	-	2	-	2
Bulldozer	-	4	-	4
Compacting trucks	1	4	-	4
Skips	10	15	-	17
Shovels	14	32	15	43
Wheelbarrows	17	45	13	60
Diggers	25	50	20	70
Rakes	22	90	20	110
Cutlasses	34	110	28	160
Brooms	71	110	63	160
Total	194	465	159	633

Source: Sabon-Gari and Zaria LG. Health Departments, 2018

These departments only have few wheel barrows, rakes, cutlasses and other supporting equipment. Due to non-availability of essential equipment for solid waste management, the Environmental Health

Departments do not engage in day-to-day solid waste collection and disposal activities within the study area.



Plate I: Open Waste Dump Site by Households in Zaria Urban Area.

Source: Field Survey, 2018

4.4.4 Infrastructure for Solid Waste Management

Solid waste collection infrastructure in Zaria Urban Area includes galvanized containers, which are designated across the urban area to serve as collection points for the wastes from households and Business operators before transportation to the final disposal sites. Altogether, there are thirty five officially designated collection points/communal depots in Zaria Urban Area, out of which 20 are provided with galvanized containers while 15 are not yet.

There are no incineration points for solid waste storage in Zaria Urban Area. Although, there are three (3) transfer stations (one in Zaria LGA and The other two in Sabon-Gari) where wastes are supposed to be transferred from the various collection points for sorting and then transported to the final disposal sites. However, only that of Sabon-Gari is functioning (Plate III). There are three officially

designated final disposal sites for Zaria Urban Area. One at Sakadadi for Sabon Gari LGA and the other two at Dakace and Dala village for Zaria LGA.

Apart from the issue of the management or formal set-up of the state, which only recognized the functions of KEPA, Environmental Health Departments of the local government in Zaria Urban Area and the formal private sector and neglecting the other actors that have impact on the management of solid waste, there are more problems at the local level in Zaria Urban Area, which includes: lack of adequate training and awareness of existing Environmental legislation and regulations on the part of staff of the Environmental Health Department. Although officials in the two Local Government Areas complained about lack of funds, however, it is evident that they receive more money than they admit as they use large percentage of their expenditures on salaries, buildings, cars etc. and little is left for service provision (Stare, 2015).



Plate II: Final Waste Disposal Site at Sakadadi, Sabon-Gari Local Government Area.

Source: Field Survey, 2018



Plate III: Solid Waste Transfer Station at Sabon-Gari Local Government Area.

Source: Field Survey, 2018

4.5 The Formal Private Collectors' Activities

The Formal Private Collectors are made up of six small enterprises with only four formally registered that operate mainly in GRA, Sabon-Gari and some commercial areas in Zaria Urban Area. 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 4.4 shows some of the characteristics of the registered private collectors. The collectors pay a waste collection registration fee of ₦30,000 and ₦100,000 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 4.4: Formal Private Collectors Services and Resources for Solid Waste Management

Organization	Area of Operation	Services provided	Office Location	Staff	Monthly Operation cost	Equipment
Dimension Wastes	GRA, Kabama layout, Part of Grace land, Doka	PZ, Kofan House to House waste Collection, Transportation and Disposal	Kabama	Admin-1 Supervisor - 2 Labourers - 7	₦205,000	Pick up -1 Hand gloves and rain boots – 7 pairs Shovels -9 Rakes 5 Respirator mask-12
Derit Klin	Maje road Gyallesu Pampo,	House to House waste Collection Transportation and Disposal	Tudun Wada	Admin-2 Supervisor - 2 Labourers - 6	₦255,000	Pick up -2 Hand gloves and rain boots – 6 pairs Shovels -7 Rakes - 4 Respirator mask- 10
PECT	Hayin Jema'a, land	Malam, Grace House to House waste Collection Transportation and Disposal	Zangon Shanu	Admin-2 Supervisor - 3 Labourers - 7	Not Available	Pick-up – 2 Hand gloves – 4 pairs Rakes - 4 Respirator mask – 12 Shovels – 7
Zoom Lion Global Alliance Zaria	Zaria Urban Area (Zaria)	Evacuation of waste Collection points Transportation and Disposal	No office in Zaria Urban area	650 casual workers	Not Available	Tipper – 1 Pay Loaders - 1 Hand gloves - 800 pairs Rake- 200 Respirator mask – 800 Brooms – 500 Shovels – 200 Diggers - 200
Zoom Lion Global Alliance Sabon – Gari	Zaria Urban Area (Sabon-Gari)	Evacuation of waste Collection points Transportation and Disposal	No office in Zaria Urban area	550 casual workers	Not Available	Tipper – 1 Pay Loaders - 1 Hand gloves – 700 pairs Rakes - 200 Respirator mask – 700 Shovels - 200 Diggers – 150

Source: Field survey, 2018

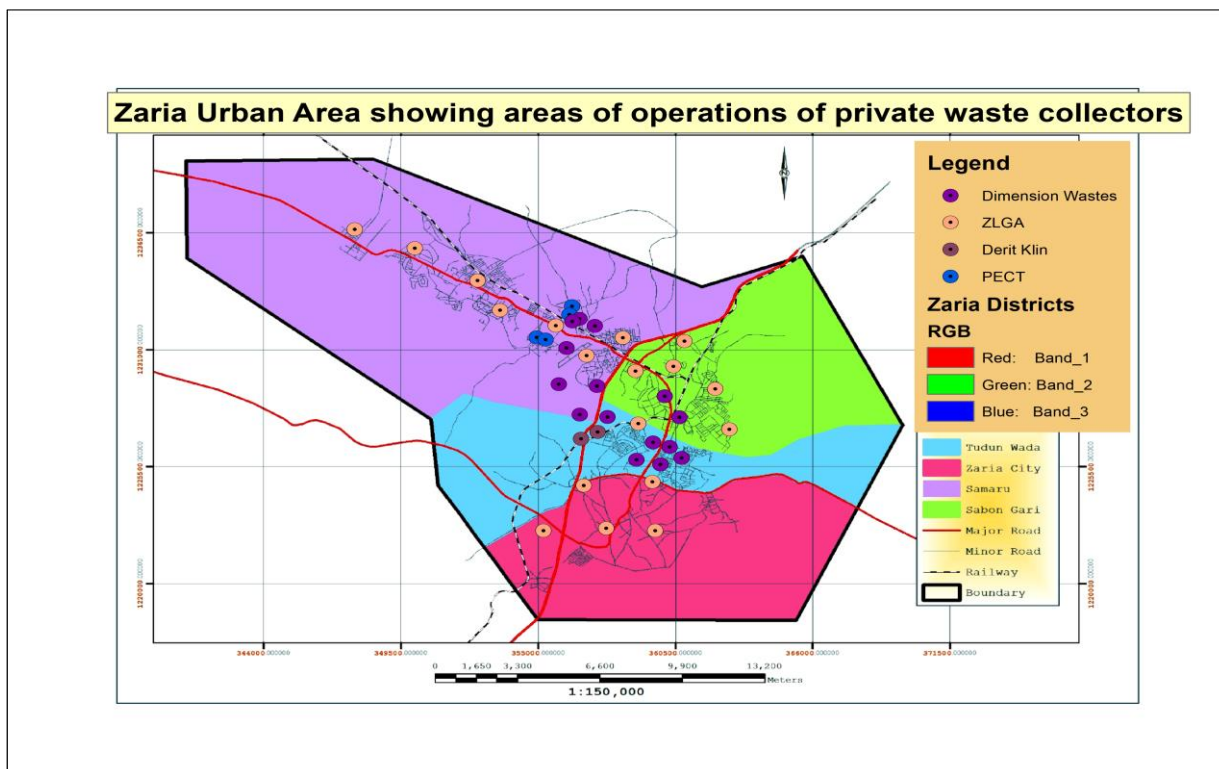


Figure 4.3: Areas of operation of private waste collectors within Zaria Urban Area (Source: Google image, 2018)

The formal private companies involved in solid waste management in the study area are of two (2) types. The first one is called ‘Zoom Lion Global Alliance’ (ZLGA) which is responsible for waste collection, transportation, disposal, evacuation of waste collection points, waste dumps and street sweeping for profit, Contracted to it by the State Government. The company then employs casual workers and supply them with facilities such as protective devices, clothing, rakes, shovels, waste disposal vehicles etc.

The staff work every day with the exception of Sundays and normally use government dump sites for final disposal. The workers are jointly supervised by the officials of Health Departments and KEPA (Plate IV)



Plate IV: Formal Private Waste Collectors Evacuating Waste Collection Points along Hospital Road, Zaria Urban Area

Source: Field Survey, 2018

The other type of formal private companies includes; Dimension Wastes, Derit Klin and PECT which are responsible for House to house waste collection, transportation, and disposal for profit. They used similar facilities as the former and operate in certain areas within the study area and also supervised by the Health Department and KEPA.

The private waste collectors undertake door to door collection services arrangement on a weekly basis and, charge clients an agreed sum of ₦1000 to ₦1500 per month. These collectors make use of pick-up vans for transportation of waste to the final disposal sites .

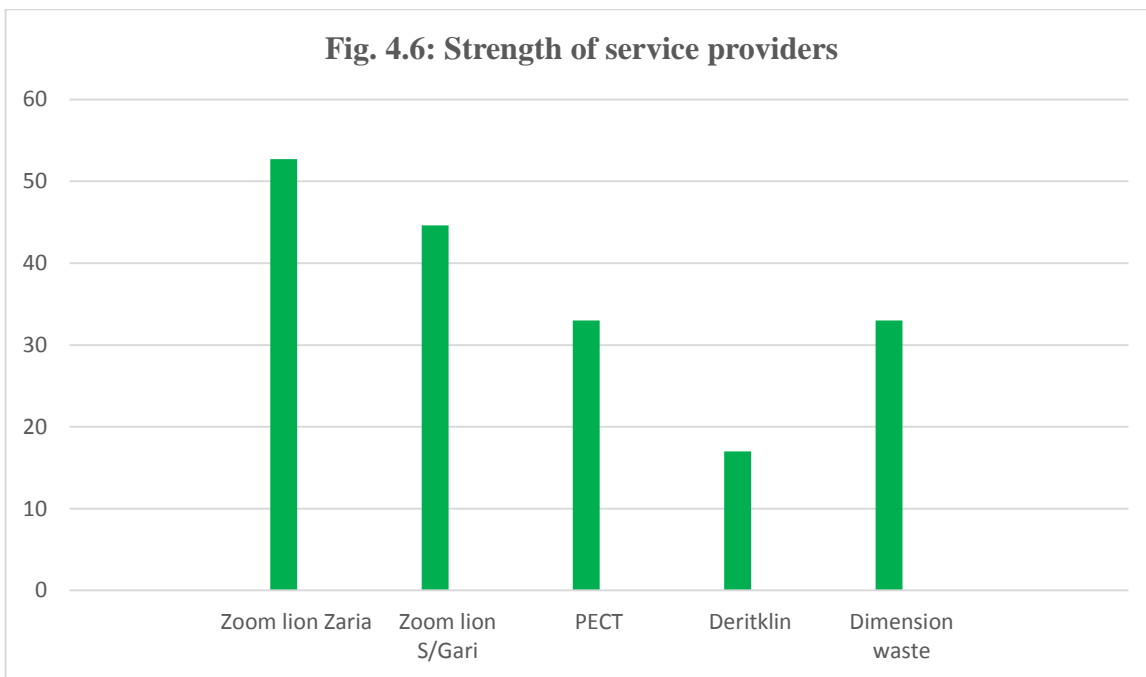


Plate V: Waste Bin Provided by Formal Private Waste Collectors in Zaria Urban Area

Source: Field Survey, 2018

4.1.5 Strength of Service Providers

The strength (employees) of the service providers are shown in figure 4.5 below:



Source: Field Survey (2018)

The result shows that the highest proportion (52.72 %) of the workers are from Zoom lion Zaria local government. 44.61% of the workers are from Zoom lion Sabon-Gari. Workers from PECT have 33.0%, while those of Deritklin and Dimension waste have 17.2% and 35.0% respectively.

Table 4.5: Responses on Collaboration among Solid Wastes Service Providers (Public and Private Agencies involved in Solid Waste Management)

S/NO	Variables	UD (0)	SD (1)	D (2)	A (3)	SA (4)	N=7	Mean score
1	Your activities are properly coordinated with the activities of other service providers	0	2	8	3	0	13	1.86
2	There is an integrated plan for solid waste management in Zaria urban area	0	4	4	3	0	11	1.57
3	Joint decisions do take place among solid wastes service providers	0	5	4	3	0	12	1.71
4	There is regular joint Public awareness campaign carried out by service providers	0	6	2	0	0	8	1.14
Grand Mean								1.70

Source: Field survey, 2018

The analysis of the variables on Table 4.5 shows that the respondents disagreed with most of the items. For instance, the respondents disagreed with all the items from 1-4 whose mean scores were 1.86, 1.57, 1.71 and 1.14 respectively. While the grand mean score is 1.70 and from the decision rule it implies that collaboration among the agencies of governance within the study area is very low. The survey also revealed a weak linkage between the public and private agencies surveyed.

There is poor interaction and lack of collaboration between agencies like the Local Government Councils Environmental Head Departments, KEPA and private waste collectors, this results to low awareness level in the study area. The above responses on effectiveness especially in the area of regular joint Public awareness campaign carried out by service providers which has the lowest mean scores (1.14) justifies this.

As far as the study observed, the local government Authorities in Zaria Urban Area (Zaria and Sabon-Gari) do not work in a coordinated way. This seems to be a common feature as the Urban Development Bank of Nigeria also writes that there is no framework for joint action to tackle city

wide problems, Therefore, the very poor scores in the effectiveness assessment of the agencies is expected

Table 4.6: Responses on Consultation among Solid Wastes Service Providers (Public and Private Agencies involved in Solid Waste Management)

S/NO	Variables	UD (0)	SD (1)	D (2)	A (3)	SA (4)	N=7	Mean score
1	There are regular formal meetings and consultations among service providers to discuss solid wastes issues	0	3	6	3	0	12	1.71
2	The coordinating agency has been settling conflicts and disputes between and or among different organizations.	0	2	8	3	0	13	1.85
3	There are regular joint workshops and seminars organized by service providers for stakeholders	0	3	6	3	0	12	1.71
4	Coordinating agency creates an avenue for other service providers to meet and consult with one another	0	2		9	0	13	1.85
	Grand Mean							1.78

Source: Field survey, 2018

The analysis of the variables above shows that majority the respondents disagreed with items 1-4 because all the mean scores are less than 3.00 and grand mean which is 1.78 also shows that there is very little consultation among the service providers responsible for solid waste management in the study area.

It was observed in the course of the study that one of the effective means of consultation is workshops and seminars. Workshops and seminars can be organized with participation of all stakeholders to prepare a plan of action or formulating guidelines to prepare same. Workshops can be used as tools for improving working relationships and support other management functions. However, just as indicated in the table above, the issue of workshops and seminars which has a weak mean score (1.71) has not been taken seriously by the coordinating agency.

Table 4.7: Responses on Exchange of Information among Solid Wastes Service Providers (Public and Private Agencies involved in Solid Waste Management)

S/NO	Variables	UD (0)	SD (1)	D (2)	A (3)	SA (4)	N=7	Mean score
1	There is regular accessibility to up-to-date information from the coordinating agency	0	2	6	6	0	14	2.00
2	There is availability of internet service and interactive website in your organization/unit/agency	0	3	9	3	0	15	2.14
3	There is regular Public awareness campaign with regard to solid waste	0	3	9	0	4	16	2.28
4	Majority of staff of your organization/agency/unit are ICT compliant	0	2	8	3	0	13	1.86
	Grand mean							2.07

Source: Field survey, 2018

The analysis of the variables on Table 4.7 shows that the respondents disagreed with most of the items. The grand mean score which is 2.07 implies that there is lack of effective exchange of information among the service providers.

Despite the fact that interactive website is an aspect for which information exchange and communication can take place between or among organizations; majority of staff of the coordinating agency, and especially those of other public agencies (EHDs of Local Government Authorities) are still not ICT compliant, this deficiency has contributed in crippling meaningful information exchange among the service providers. An interactive website on the Internet may be created by the coordinating agency to obtain and/or provide helpful information, request, and opinion, make suggestions as well as receive complaints from stakeholders.

Table 4.8: Rating of Effectiveness of Service providers by Business Operators in Zaria L.G.A (Opp. Ladan Sharehu market, Babban dodo round about, Maje road and Gyallesu)

Service provider: Formal Private Operator (Zoom Lion Global Alliance)									
S/ NO	Variables	UD (0)	SD	(1)	DA (2)	A (3)	SA (4)	N =166	Mean score
1	Service providers educate you on safe methods of handling wastes	0	15	48	93	84	240	1.44	
2	Official solid waste collection points are provided close to you	0	16	42	102	76	196	1.18	
3	There is regular evacuation of solid waste collection points	16	17	46	111	88	162	0.97	
4	Agencies conduct and supervise street sweeping and drainage clearance in every last week of the month	0	21	52	93	88	254	1.53	
Grand mean								1.28	

Source: Field Survey, 2018

Analysis here indicates that the respondents disagreed with most of the items and the grand mean score which is 1.28 implies that solid waste management is not effective.

It was observed that, even though galvanized containers are provided by service providers in certain locations, however, these containers are mostly provided along the main road only very few are provided in access roads and they mostly served business operators operating within the areas. This makes it very difficult for residential houses to have access to these collection points. Again, the containers are not big enough to contain the volume of waste generated in certain areas.

Table 4.9: Rating of Effectiveness of Service providers by Business Operators in Sabon-Gari L.G.A (Kano junction, kwangila Under bridge, Sokoto road by Zango and Samaru market area)

Service provider: Formal Private Operator (Zoom Lion Global Alliance)								
S/NO	Variables	UD (0)	SD (1)	DA (2)	A (3)	SA (4)	N =184	Mean score
1	Service providers educate you on safe methods of handling wastes	0	24	62	117	136	339	1.84
2	Official solid waste collection points are provided close to you	0	24	98	93	120	335	1.82
3	There is regular evacuation of solid waste collection points	0	36	54	99	116	305	1.65
4	Agencies conduct and supervise street sweeping and drainage clearance in every last week of the month	0	41	68	81	96	286	1.55
Grand mean								1.17

Source: Field Survey, 2018

Analysis here indicates also that the respondents disagreed with most of the items above, and the grand mean score which is 1.17 shows that solid waste management is not effective. Similarly, it is also observed that the galvanized containers are provided by service providers are not big enough to contain the volume of waste generated and they mostly served business operators operating within the areas because of their location along main roads, therefore, it very difficult for residential houses to have access to these collection points.

Table 4.10: Rating of Effectiveness of Service providers by Households in Tudun-wada District Zaria L.G.A (Pampon-gwaiba)

Service provider: Formal Private Operator (DERIT KLIN)								
S/N	Variables	UD	SD	DA	A	SA	N=7	Mean score
O		(0)	(1)	(2)	(3)	(4)		
1	Service providers Collect and dispose of waste as and when due	0	3	4	3	4	14	1.40
2	Provides you with containers for waste storage	0	2	6	3	8	19	1.90
3	Have adequate facilities for solid waste collection and disposal	0	2	4	6	4	16	1.60
4	Fee charged for solid waste collection and disposal is reasonable	0	4	4	6	4	18	1.80
	Grand mean							1.67

Source: Field Survey, 2018

The analysis of the variables in Table 4.10 indicates that the respondents disagreed with the items above and finally came up with a grand mean of 1.67 which going by the decision rule signifies rejection of the variables and also indicates that solid waste management by the service providers is not effective. The study also observed that despite the fact that Service providers (house to house waste collectors) collect and dispose of waste as and when due and also seem to relate well with their customers, but still some of the customers cannot cope with the patronage of these services especially due to the fact that they use to enjoy cheap labour from young boys (yaro boys) who engage in solid waste management service for profit.

Table 4.11: Rating of Effectiveness of Service providers by Households In Sabon-Gari District, Sabon-Gari L.G.A (Kabama Lay-out)

Service provider: Formal Private Operator (Dimension Waste)										
S/NO	Variables	UD (0)	SD (1)	DA (2)	A (3)	SA (4)	N =9	Mean score		
1	Service provider Collect and dispose of waste as and when due	0	0	0	24	28	21	3.46		
2	Provide you with containers for waste storage	0	0	0	22	8	23	4.46		
3	Have adequate facilities for solid waste collection and disposal	0	0	0	24	16	32	2.66		
4	Fee charged for solid waste collection and disposal is reasonable	0	7	8	12	0	21	1.80		
Grand mean								3.01		

Source: Field Survey, 2018

The analysis of the variables in Table 4.11 indicates that the respondents agreed with items 1 and 2, with mean scores of 3.46 and 4.46. However, they disagreed with items 3 and 4 with mean scores of 2.66 and 1.80 and finally came up with a grand mean of 3.09 which going by the decision rule signifies acceptance of the variables and also indicates that solid waste management by the service providers is effective.

It was also observed that despite the fact that Service providers collect and dispose of waste as and when due and also seem to relate well with their customers, but still some of the customers cannot cope with the patronage of these services, especially due to the fact that they use to enjoy cheap labour from informal waste collectors.

Table 4.12: Rating of Effectiveness of Service providers by Households in Samaru District Sabon Gari L.G.A (Zangon-Shanu)

Service provider: Formal Private Operator (PECT)								
S/N	Variables	UD (0)	SD (1)	DA (2)	A (3)	SA (4)	N =6	Mean score
1	Service providers Collect and dispose of waste as and when due	0	0	0	39	8	47	3.13
2	Provide you with containers for waste storage	0	0	0	36	12	48	3.20
3	Have adequate facilities for solid waste collection and disposal	0		16	12	12	38	2.53
4	Fee charged for solid waste collection and disposal is reasonable	0	7	8	9	4	28	1.86
Grand mean								2.21

Source: Field Survey, 2018

The analysis of the variables in Table 4.12 indicates that the respondents agreed with items 1 and 2, with mean scores of 3.13 and 3.20. However, they disagreed with items 3 and 4 with mean scores of 2.53 and 1.86 and finally came up with a grand mean of 2.21. In spite of the good mean scores in items 1 and 2, still the grand mean score which is 2.21 implies that management is not effective. The study also observed that despite the fact that Service providers collect and dispose of waste as and when due and also seem to relate well with their customers. The households are still not okay with their services especially in the area of collection fee.

CHAPTER FIVE
SUMMARY OF FINDINGS, IMPLICATIONS, CONCLUSION AND
RECOMMENDATIONS

The summary here is aimed at highlighting the basic findings of the research work based on data analysis and discussions. Likewise, the implications of the findings as highlighted provided the basis for the recommendations that are proffered.

5.1 Summary of findings

The aim of the research is to evaluate the performance of solid waste management service providers, and the perceptions of stakeholders, with a view to identifying problems and making recommendations for improvement of the waste management service delivery in Zaria Urban Area. This study has described the legal and institutional arrangement for solid waste management in Zaria Urban Area as well as the responsibility for solid waste management derived 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, many stakeholders that are now involved in solid waste management in Zaria Urban Area are not included in the management setup. As a result, there are no procedures and processes for coordination and supervision of agencies' activities.

There are more problems at the local level in Zaria Urban Area, which includes: lack of adequate training and awareness of existing Environmental legislation and regulations on the part of staff of the Environmental Health Department, also none of the local governments' Environmental Health Departments has vehicles and equipment of good working condition (table 4.3). Due to inadequate essential equipment for solid waste management, the Environmental Health Departments do not engage in day-to-day solid waste collection and disposal activities within the study area. Although the private waste collectors are actively involved in solid waste management within the study area

and it is expected that their entrance is supposed to bring about improvement, still this intervention does not translate to improvement in the study area.

The result of responses on coordination among public and private agencies (Local Government Councils Environmental Head Departments, KEPA and Private Waste Collectors) indicates ineffective collaboration, consultation and exchange of information, the grand means of 1.70, 1.78 and 2.07 for collaboration, consultation and exchange of information respectively have justified this.

Majority of the respondents (Business Operators and Households) are not satisfied with the performance of service providers in the study area, the grand mean score which is 1.28 and 2.21 for business operators in Zaria city district and households in Samaru district respectively signify this.

On infrastructure for solid waste management, altogether, there are thirtyfive (35) officially designated collection points/communal depots in Zaria Urban Area, out of which 20 are provided with galvanized containers while fifteen (15) are not yet.

There are no incineration points for solid waste storage in Zaria Urban Area. Although, there are three (3) transfer stations. However, only that of Sabon-Gari is functioning (Plate III).

5.2 Implication of the findings

From the findings in this study, it is observed that majority of the respondents (Business Operators and Households) are not satisfied with the performance of service providers in the study area, It is also evident that since there is lack of coordination among the service providers for solid waste in the study area, the carrying out of the activities of such agencies will not be effective, hence affecting the entire solid waste management system. For instance, it takes them a very long period to evacuate the few solid waste collection points, which leads to lack of users' satisfaction and health hazards. Other implications includes: Unsanitary disposal of waste especially by informal operators, due to inadequacy of adequate equipment for solid waste disposal and organized waste collection points, as well as lack of linkage among the different actors especially the local government authorities etc.

Therefore, there is need to coordinate these agencies in order to create an avenue for improving effectiveness in their activities within the study area. Apart from pointing to the need for clearly specified roles and responsibilities for the various service providers, It also emphasized the need for interaction among the Public and Private service providers (both formal and informal) as well as provision of adequate equipment and infrastructure for solid waste disposal.

5.3 Conclusion

The findings of this study reveal that the solid waste management system in Zaria Urban Area is ineffective, as a result of which agencies are ineffective in carrying out their roles. For there to be an effective system of solid waste management the government needs to create the will to implement the recommendations given in this study. This is necessary in order to avoid problems in the areas of inadequate essential equipment and infrastructure for solid waste management as well as enhance collaboration, information exchange, and consultation as revealed by the study, Failure to tackle these issues may result to problems such as the inability of the service providers to engage in day-to-day solid waste collection and disposal activities within the study area, irregular evacuation of solid waste collection points etc. However, if all the problems as revealed by the study are resolved, the activities of the agencies responsible for solid waste management will be improved in the study area.

Observation from this study has established that service providers pursued solid waste management in an independent way without cooperation. The failure of the public sector to deliver services to its population has led to intervention from the formal private sector that came 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 a situation where performance does not meet with expectations. The common notion is that the entrance of private sector into urban service delivery is supposed to bring about improvement, but from observations, private sectors' intervention does not translate to improvement in the case of Zaria Urban Area.

5.4 Recommendations

The following recommendations are made towards improving the solid waste management system.

1. Stakeholders like households and informal waste collectors should be recognized in the solid waste management set up. They should also be actively involved in enlightenment, mobilization and public awareness campaigns, especially at the community and household levels within Zaria Urban Area.
2. Local governments in Zaria Urban Area should ensure that, apart from fulfilling their statutory roles, they should also promote participation of the public in solid waste management, within the study area.
3. All the service providers in solid waste management in Zaria Urban Area have very limited level of capital for operation. Therefore, considerable capital should be provided to purchase and maintain vehicles and other equipment, lay and maintain the necessary infrastructure, employ the required and right caliber of staff, pay their salaries and enforce regulations.
4. It is recommended that KEPA should try to work together with other service providers to develop a framework for coordination, which will help to achieve effective consultation, information exchange and collaboration, and also enable the achievement of the desired goals and objectives of solid waste management in the study area.
5. Information exchange should be improved by providing effective means of communication among the agencies in the areas of public awareness campaigns, regularity of accessibility of the stakeholders to up to date information
6. Consultation should also be improved by organizing formal meetings and participation in joint workshops and seminars to discuss issues related to solid waste management as well as formulate strategies to solving existing problems and preventing future ones. If the level of consultation improves, this will help in obtaining peoples' and households input into various plans and projects related to solid waste management.

7. The agencies should make sure they improve collaboration among them through proper coordination and regulation of their activities as well as enforcing compliance to joint decisions taken by stakeholders.
8. The government should provide the public agencies with essential equipment for effective solid waste collection, which will ensure day-to-day solid waste collection and disposal activities within the study area.
9. Solid Waste Management Infrastructure should be adequately provided, as this will help in effective Storage, transfer and treatment of solid waste in the study area

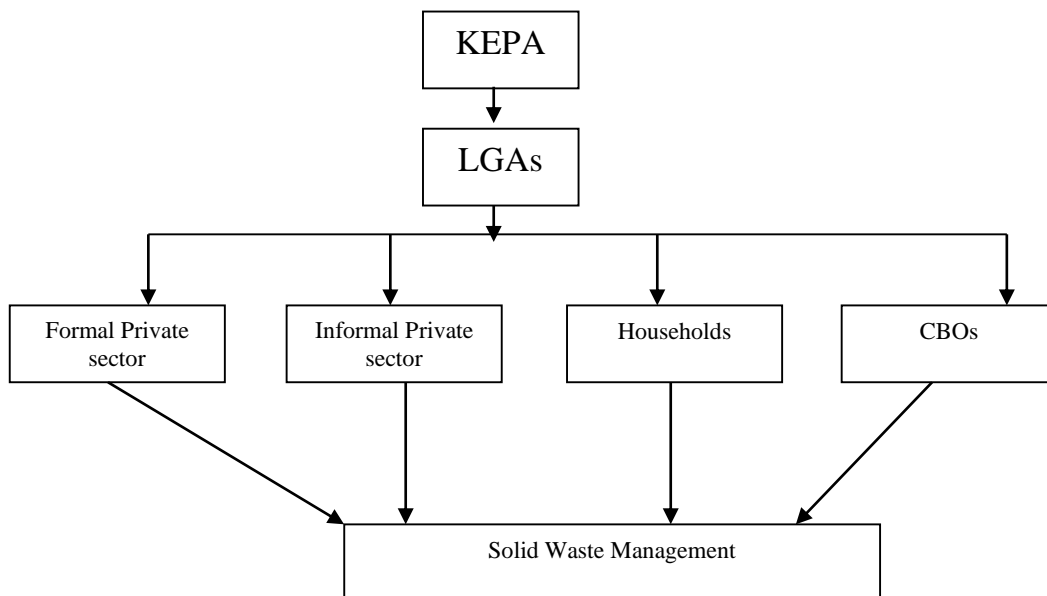


Figure 5.1: Proposed solid waste management set-up for Zaria Urban Area

Source: Field Survey, 2018.

The existing solid waste management set-up within Zaria Urban area, constitutes only the functions of KEPA, Public Health Departments of the local government in Zaria Urban Area and the formal private sector. Though so many actors have impact on the management of solid waste in Zaria Urban area, it is only the aforementioned that are officially recognized by the regulation, other actors like the informal waste collectors and the households are not included in the solid waste management set

up. Hence, the result revealed that the activities of these agencies are not well coordinated, because the level of their inter-relationship is very minimal. It is in the light of these, therefore, that the study thought it wiser to propose a new solid waste management set-up in Zaria Urban Area (Figure 5.1) which will be more participatory and include all other stakeholders.

5.5 Contribution to Knowledge

The study, through its findings has succeeded in explaining the roles, activities and operational characteristics as well as coordination among solid waste management service providers. It was also discovered from the review that essential equipment and infrastructure are needed for any solid waste management system to function effectively and that coordination is required for any system to function well and fully achieve its objectives. The review also contributed in determining the kind of facilities and equipment and the number required for effective solid waste collection by service providers and also in determining the indicators of coordination to include; collaboration, consultation and exchange of information. And finally identified inadequate equipment and infrastructure for solid waste management, lack of effective inter relationship among the service providers, poor rating of performance of service providers by the stakeholders, non-inclusion of other important stakeholders like the informal waste collectors as well as inefficiency of the system in general within Zaria Urban Area.

5.6 Areas for Further Research

This study evaluates the performance of solid waste management service providers, and the perceptions of stakeholders, that is business operators and households within Zaria Urban Area. However, further studies could include rating of perceptions of other stakeholders like the informal private waste collectors. further studies could also focus more on embracing a study that will consider the same issue in a larger study area.

REFERENCES

- Abdulmalik, M.M. (2012). *Appraisal of Solid Waste Management System in Minna, Niger State*. Unpublished M.Sc Urban Management thesis, Department of Urban and Regional Planning, ABU, Zaria.
- Adedibu, A. A. (1983, January). *Solid Waste Management in Nigeria and Prospects*. Paper presented at the National Conference on Development and the Environment, University of Ibadan, Ibadan, Nigeria.
- Ahmed, A. (2011). *Assessment of the Commercialization Programme of Solid Waste Management in the FCC Abuja*. Unpublished M.Sc Urban Management thesis, Department of Urban and Regional Planning, ABU, Zaria.
- Ahmed, M.I.(2007). *Introduction to Environmental Problems and Management*. ISBN 978- 36411-0-7 Kano, Nigeria.
- Aina, T.A (1990). Understanding the role of Community Organization in Environmental and Urban contexts : *Environment and Urbanization*, 2(1): 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.
- Antonio, Y.K.K. (2005). *An Integrated Public Transport System – A Case Study of Hong Kong*”. Being a Thesis for the degree of Master of Arts in Transport Policy and Planning submitted at The University of Hong Kong
- Attahi, K. (1999). Governance and waste management in Abidjan. In Onibokun, A. G. (Ed). (2004). *Managing the monster: Urban waste and governance in Africa*. Canada International Development Research Centre (IDRC). Retrieved from [www.idrc.ca/publication/online books](http://www.idrc.ca/publication/online%20books) on 20 November, 2006.
- Babanyara, Y.Y., Saleh, U. F. and Usman, H.A. (2010). An Overview of Urban Poverty and Environmental Problems in Nigeria. *Journal of Human Ecology*, 31(2), 135-143. Retrieved from <http://www.google.com/search>, 17 November, 2014.
- Barton, B. and Wright, A. (1991). “Investment in Solid Waste Management-Opportunities for Environmental Improvement” *World Bank*
- Brunner, P.H. and Merl, C.H. (2002). German English Terminology of the New Science “Metabolism of the Anthroposphere”. *Institute of Water quality Resource and Waste Management*
- Dawnarain, R. B. (2004). *An investigation of solid waste management Practices: The case of the Chatsworth township In Metropolitan Durban - Kwazulu-Natal* (Masters Thesis, University of Kwazulu – Natal, South Africa). Retrieved from researchspace.ukzn.ac.za.
- 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.
- Enger, E. D. and Smith, B. F. (Eds). (2006). *Environmental Science: A study of interrelationship*. New York, USA: McGraw-Hill Company.
- Federal Environmental Protection Agency (FEPA) (1999). *National Policy on the Environment. Revised Edition, 1999.Federal Republic of Nigeria*.

- Federal Environmental Protection Agency (FEPA) (1989). *National Policy on the Environment. Federal Republic of Nigeria.*
- Federal Ministry of Environment (2001). *Blue Print on Municipal Solid Waste.* Kaduna, Nigeria; Nation House press limited.
- Furedy, C (1990). Social aspects of solid waste recovery in Asian Cities” *Environmental Sanitation Reviews, No. 30, Bangkok, Thailand, 1990, p. 2-52*
- Galadima, A. (2012). *Evaluation of the Institutional Framework of Urban Transport in Kaduna Metropolis*, Unpublished M.Sc Urban Management thesis, Department of Urban and Regional Planning, ABU, Zaria.
- Gidman, P. I, Blore, J, Lorentzen, P and Schuttenbelt, P. (1995). Public-Private Partnerships in Urban Infrastructure Services. UMP Working paper Series 4, Kenya, 1995.
- 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.
- Kaduna State Environmental Protection Authority (2010). Kaduna State Government, Solid Waste Management Regulations No.1 of 2010.
- 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.html> accessed August 16,2009.
- Maria, M. and Schienberg, A. (1997). *Gender and Urban Waste Management.* Paper presented at the Gender Technology and Development Conference organised by TOOL/TOOLCONULT, Amsterdam.
- Nabegu, A.B. and Mustapha, A. (2015) Institutional Constraints to Municipal Solid Waste Management in Kano Metropolis, Nigeria. *International Journal of Innovative Environmental Studies Research* 3(3):13-21, July-Sept. 2015, www.seahipaj.org
- 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.
- Onibokun, A. G.(Ed). (2004). *Managing the monster: Urban waste and governance in Africa.* Retrieved from [www.idrc.ca/publication/online books](http://www.idrc.ca/publication/online%20books) on 10th August, 2014.
- Peter, S. Karl, W and Jorg, C. (1996). Conceptual Framework for Municipal Solid Waste management in Low-Income countries.
- 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.

- 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.
- Rogerson, C.M. (2001). The waste sector and Informal entrepreneurship in Developing World Cities. *Urban Forum, Vol. 12, No. 2*.
- Rushton, L. (2010). *Health Hazard and Waste Management*. MRC Institute for Environment and Health, Leicester. UK.
- Schubeler, P. K, Wehrle, J and Christen, P. (1996). Conceptual Framework for Municipal Solid Waste Management in Low Income Countries. Working Paper No.9, UMP (LTNDP/UNCHS
- 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>
- Stare, M. (2005). “*Decentralised Service Provision in Theory and Practice: Agency Structure of the Solid Waste Management of Zaria, Nigeria*”. Thesis 10 Credits, Specialised Course in Human Geography, Department of Human Geography, Stockholm University, Stockholm.
- Stren, R and White, R (Ed.) (1989). *African Cities in Crisis: Managing Rapid Urban Growth*. West view Press, Boulder, Co. USA.[http://www.thesis-leader\[1\].pdf](http://www.thesis-leader[1].pdf).
- Taylor, P. (2000). UNCHS Habitat the Global Campaign for Good Governance. *Environment and Urbanisation, Vol 11, No.2, 2000*.
- The Good Governance Report Card (GGRC), (2010). The Governance Initiative (TUGI) UNDP, <http://www.tugi.adip.net>
- Uchegbu, S.N. (2002). *Issues and Strategies in Environmental Planning and Management in Nigeria*. Spot lite Publishers. Enugu.
- Ukoje, J.E. (2011). *Analysis of Determinants of Participation of Stakeholders in Solid Waste Management in Zaria, Nigeria*. Unpublished Ph.D (URP) Dissertation, Department of Urban and Regional Planning, A.B.U. Zaria.
- United Nations System in Nigeria. (UNSN, 2001). *Nigeria Common Country Assessment*. Shearson Limited.
- UNDP. (1997). *Governance for Sustainable Human Develop* UNDP New York 1-11.
- Urban Development Bank of Nigeria Plc. (1998). Urban Solid Waste Management Scheme (National Stakeholders Consultative Workshop) for PTF November 23 – 27,1998. Abuja, Nigeria.
- Vincent, I.O. (2000). Private Sector Participation and Municipal Waste Management in Benin City, Nigeria. *Environment and Urbanization, Vol 12, No.2, October, 2000*.
- 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, Velis, C and Cheeseman, C. (2005). Role of Informal Sector Recycling in Waste Management in Developing Countries. *Elsevier Limited, London, U.K*.

Wilson, D.C (2007). Development Drivers for Waste management *Waste management and Research*, 25, 198-207.<http://www.drivers/pdf.aswm/pdf>.

Yahaya, A. (1999). *Partnership Approach to Solid Waste Management: A case Study of Sokoto Metropolis*. Unpublished M.Sc Urban Management thesis, Department of Urban and Regional Planning, ABU, Zaria.

APPENDIX I

**DEPARTMENT OF URBAN AND REGIONAL PLANNING,
FACULTY OF ENVIRONMENTAL DESIGN,
AHMADU BELLO UNIVERSITY, ZARIA
(BUSINESS OPERATORS' PERCEPTIONS QUESTIONNAIRE)**

Dear Sir/ Madam

This survey is part of an M.sc thesis aimed at evaluating the performance of solid waste management service providers in Zaria urban area. It is purely academic in nature. All information given shall be treated confidentially. Thank you.

INSTRUCTIONS:

Please tick where appropriate and fill in the spaces provided

SECTION A: Demographic and Socio-Economic Characteristics of Respondents

1. Gender (a) Male [] (b) Female []
2. Age (a) 15-20 [] (b) 21-25 [] (c) 26-30 [] (c) 31-35 [] (d) 60 and above []
3. Marital status (a) Married [] (b) Single [] (c) Divorced [] (d) Widowed []
6. Monthly income/allowance
(a) Between 30,000-40,000 [] (b) Between 41,000-50,000 [] (c) Between 51,000-60,000 [] (d) Between 61,000-70,000 []
4. Educational status (a) Primary school [] (b) Secondary school [] (c) NCE/OND [] (d) Degree/HND [] (e) Post-graduate

SECTION B: Rating of Effectiveness of Service providers by Business Operators

Keys for section B

UD-Undecided (0 point)

SD-Strongly disagree (1 point)

D-Disagree (2 points)

A-Agree (3 points)

S-strongly agree (4 points)

SECTION B: How do you rate the performance of service providers

		Service provider:						
S/NO	Indicators	UD (0)	SD (1)	DA (2)	A (3)	SA (4)	N	Mean score
1	Service providers educate you on safe methods of handling wastes							
2	Official solid waste collection points are provided close to you							
3	There is regular evacuation of solid waste collection points							
4	Agencies conduct and supervise street sweeping and drainage clearance in every last week of the month							

APPENDIX II

**DEPARTMENT OF URBAN AND REGIONAL PLANNING,
FACULTY OF ENVIRONMENTAL DESIGN,
AHMADU BELLO UNIVERSITY, ZARIA
(HOUSEHOLDS' PERCEPTIONS QUESTIONNAIRE)**

Dear Sir/ Madam

This survey is part of an M.sc thesis aimed at evaluating the performance of solid waste management service providers in Zaria urban area. It is purely academic in nature. All information given shall be treated confidentially. Thank you.

INSTRUCTIONS:

Please tick where appropriate and fill in the spaces provided

SECTION A: Demographic and Socio-Economic Characteristics of Respondents

1. Gender (a) Male [] (b) Female []
2. Age (a) 15-20 [] (b) 21-25 [] (c) 26-30 [] (c) 31-35 [] (d) 60 and above []

3. Marital status (a) Married [] (b) Single [] (c) Divorced [] (d) Widowed []

6. Monthly income/allowance

(a) Between 30,000-40,000 [] (b) Between 41,000-50,000 [] (c) Between 51,000-60,000 [] (d) Between 61,000-70,000 []

4 .Educational status (a) Primary school [] (b) Secondary school [] (c) NCE/OND [] (d) Degree/HND [] (e) Post-graduate

SECTION B: Rating of Effectiveness of Service providers by Households

Keys for section B

UD-Undecided (0 point)

SD-Strongly disagree (1 point)

D-Disagree (2 points)

A-Agree (3 points)

S-strongly agree (4 points)

SECTION B: How do you rate the performance of service providers

Service provider:								
S/NO	VARIABLES	UD (0)	SD (1)	DA (2)	A (3)	SA (4)	N	Mean score
1	Service providers Collect and dispose of waste as and when due							
2	Provides you with containers for waste storage							
3	Have adequate facilities for solid waste collection and disposal							
4	Fee charged for solid waste collection and disposal is reasonable							

APPENDIX III

**DEPARTMENT OF URBAN AND REGIONAL PLANNING,
FACULTY OF ENVIRONMENTAL DESIGN,
AHMADU BELLO UNIVERSITY, ZARIA
(FORMAL PRIVATE SECTOR OPERATORS' QUESTIONNAIRE)**

Dear Sir/ Madam

This survey is part of an M.sc thesis aimed at evaluating the performance of solid waste management service providers in Zaria urban area. It is purely academic in nature. All information given shall be treated confidentially. Thank you.

INSTRUCTIONS:

Please tick where appropriate and fill in the spaces provided

SECTION A: Demographic and Socio-Economic Characteristics of Respondents (workers of private agencies)

1. Gender (a) Male [] (b) Female []
2. Age (a) 15-20 [] (b) 21-25 [] (c) 26-30 [] (c) 31-35 [] (d) 60 and above []
3. Marital status (a) Married [] (b) Single [] (c) Divorced [] (d) Widowed []
6. Monthly income/allowance
(a) Between 30,000-40,000 [] (b) Between 41,000-50,000 [] (c) Between 51,000-60,000 [] (d) Between 61,000-70,000 []
4. Educational status (a) Primary school [] (b) Secondary school [] (c) NCE/OND [] (d) Degree/HND [] (e) Post-graduate

SECTION B: Formal Private Collectors Services and Resources for Solid Waste Management

Name of Organization:

Office Location.....

Position of Respondent:

Is the Organization registered with KEPA? A. Yes () B. No. ()

SECTION B: Formal Private Collectors Services and Resources for Solid Waste Management

Organization	Area of Operation	Services provided	Office Location	Staff	Monthly Operation cost	Equipment
Dimension Wastes						
Derit Klin						
PECT					-	
Zoom Lion Global Alliance Zaria					-	
Zoom Lion Global Alliance Sabon Gari					-	

SECTION C: Evaluating Coordination of Solid Waste Management service providers

Keys for section C

UD-Unclassified (0 point)

SD-Strongly disagree (1 point)

D-Disagree (2 points)

A-Agree (3 points)

S-strongly agree (4 points)

SECTION C (i): Collaboration among Agencies Involved in Solid Waste Management

S/NO	VARIABLES	UD (0)	SD (1)	D (2)	A (3)	SA (4)
1	There is a coordinating agency					
2	Agencies take joint decisions with regard to solid waste management					
3	There is an integrated plan for solid waste management in the area					
4	There is effective inter-agency communication					

SECTION C (ii): Consultation among Agencies Involved in solid waste management

S/NO	VARIABLES	UD (0)	SD (1)	D (2)	A (3)	SA (4)
1	There are regular formal meetings and consultations among agencies to discuss solid waste management issues					
2	The meetings held by agencies are effective					
3	There are regular joint workshops and seminars organized by agencies					
4	Agencies regularly participate in the joint workshops and seminars					

SECTION C (iii): Exchange of information among agencies Involved in solid waste management

S/NO	VARIABLES	UD (0)	SD (1)	D (2)	A (3)	SA (4)
1	There is accessibility to up-to-date information from one agencies to another					
2	There is availability of internet service and interactive website in the agencies					
3	There is regular awareness campaign with regard to solid waste management					
4	All Agencies' staff are ICT compliant					

APPENDIX IV

**DEPARTMENT OF URBAN AND REGIONAL PLANNING,
FACULTY OF ENVIRONMENTAL DESIGN,
AHMADU BELLO UNIVERSITY, ZARIA
(ENVIRONMENTAL HEALTH DEPARTMENT OF LOCAL GOVERNMENT
COUNCILS' QUESTIONNAIRE)**

INTRODUCTION

This research questionnaire aims at collecting data for academic purpose. All information given shall be treated confidentially. The researcher therefore, wishes to stress the need for sincerity and accuracy in giving information as vital ingredients for successful research. Thank You.

GUIDE:

Answer the following questions in sections A and B by filling the spaces provided and ticking the appropriate options given.

SECTION A: Solid Waste Management Personnel and Units

Name of Local Government Council :

Position of Respondent:

SECTION A (i): Solid Waste Management Personnel and Units

Unit	Local Govt. Area		Local Govt. Area	
	No. of Staff	%	No. of Staff	%
Health inspection				
Sanitation				
Environmental Technicians				
Drivers				

SECTION A (ii): Financial Allocation for Environmental Health Departments between 2013 - 2018

Years	Allocation (₦m per Annum)	
	Local Govt. Area	Local Govt. Area
2013		
2014		
2015		
2016		
2017		
2018		

SECTION A (iii): Solid Waste Collection and Disposal Equipment

Type of equipment	Local Govt. Area		Local Govt. Area	
	No. Available	No. Required	No. Available	No. Required
Tipplers				
Pay Loaders				
Bulldozer				
Compacting trucks				
Skips				
Shovels				
Wheelbarrows				
Diggers				
Rakes				
Cutlasses				
Brooms				

SECTION B: Evaluating Coordination of Solid Waste Management service providers

Keys for section B

UD-Undecided (0 point)

SD-Strongly disagree (1 point)

D-Disagree (2 points)

A-Agree (3 points)

S-strongly agree (4 points)

SECTION B (i): Collaboration among Agencies Involved in Solid Waste Management

S/NO	VARIABLES	UD (0)	SD (1)	D (2)	A (3)	SA (4)
1	There is a coordinating agency					
2	Agencies take joint decisions with regard to solid waste management					
3	There is an integrated plan for solid waste management in the area					
4	There is effective inter-agency communication					

SECTION B (ii): Consultation among Agencies Involved in solid waste management

S/NO	VARIABLES	UD (0)	SD (1)	D (2)	A (3)	SA (4)
1	There are regular formal meetings and consultations among agencies to discuss solid waste management issues					
2	The meetings held by agencies are effective					
3	There are regular joint workshops and seminars organized by agencies					
4	Agencies regularly participate in the joint workshops and seminars					

SECTION B (iii): Exchange of information among agencies Involved in solid waste management

S/NO	Variables	UD (0)	SD (1)	D (2)	A (3)	SA (4)
1	There is accessibility to up-to-date information from one agency to another					
2	There is availability of internet service and interactive website in the agencies					
3	There is regular awareness campaign with regard to solid waste management					
4	All Agencies' staff are ICT compliant					

APPENDIX V

DEPARTMENT OF URBAN AND REGIONAL PLANNING, FACULTY OF ENVIRONMENTAL DESIGN, AHMADU BELLO UNIVERSITY, ZARIA (KADUNA STATE ENVIRONMENTAL PROTECTION AGENCYS' QUESTIONNAIRE)

INTRODUCTION

This research questionnaire aims at collecting data for academic purpose. All information given shall be treated confidentially. The researcher therefore, wishes to stress the need for sincerity and accuracy in giving information as vital ingredients for successful research. Thank You.

GUIDE:

Answer the following questions in sections A and B, by filling the spaces provided and ticking the appropriate options given

SECTION A:

Name of Agency:

Position of Respondent:

SECTION B: Evaluating Coordination of Solid Waste Management service providers

Keys for section A

UD-Undecided (0 point)

SD-Strongly disagree (1 point)

D-Disagree (2 points)

A-Agree (3 points)

S-strongly agree (4 points)

SECTION B (i): Collaboration among Agencies Involved in Solid Waste Management

S/NO	VARIABLES	UD (0)	SD (1)	D (2)	A (3)	SA (4)
1	There is a coordinating agency					
2	Agencies take joint decisions with regard to solid waste management					
3	There is an integrated plan for solid waste management in the area					
4	There is effective inter-agency communication					

SECTION B (ii): Consultation among Agencies Involved in solid waste management

S/NO	VARIABLES	UD (0)	SD (1)	D (2)	A (3)	SA (4)
1	There are regular formal meetings and consultations among agencies to discuss solid waste management issues					
2	The meetings held by agencies are effective					
3	There are regular joint workshops and seminars organized by agencies					
4	Agencies regularly participate in the joint workshops and seminars					

SECTION B (iii): Exchange of information among agencies Involved in solid waste management

S/NO	VARIABLES	UD (0)	SD (1)	D (2)	A (3)	SA (4)
1	There is accessibility to up-to-date information from one agency to another					
2	There is availability of internet service and interactive website in the agencies					
3	There is regular awareness campaign with regard to solid waste management					
4	All Agencies' staff are ICT compliant					

APPENDIX VI

SAMPLE SIZE DETERMINATION

The formula used for calculating the sample size is:

$$n = \frac{\chi^2 * N * P * (1 - P)}{(ME^2 * (N - 1)) + (\chi^2 * P * (1 - P))}$$

Where:

n= sample

χ^2 = chi – square for the specified confidence level at 1 degree of freedom

N= Population Size

P= population proportion

ME= desired Margin of Error