AN APPRAISAL OF THE EFFECTIVENESS OF PUBLIC-PRIVATE PARTNERSHIP APPROACH TO SOLID WASTE MANAGEMENT IN KADUNA METROPOLIS, NIGERIA

BY

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MSC/SCIE/03525/2010-2011

ADISSERTATION SUBMITTED TO THE SCHOOL OF POSTGRADUATE STUDIES AHMADU BELLO UNIVERSITY, ZARIA IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF MASTER OF SCIENCE DEGREE IN ENVIRONMENTAL MANAGEMENT

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MARCH, 2016

DECLARATION

I hereby declare that this dissertation titled **'An Appraisal of the Effectiveness of Public-Private-Partnership Approach to Waste Management in Kaduna Metropolis, Nigeria'** was written by me, IDRIS Rakiya Kabir in the department of Geography, Ahmadu Bello University Zaria under the supervision of Dr. J.O. Adefila and Dr. R. O. Yusuf. The information derived from this literature has been duly acknowledged in the text and a list of references provided. No part of this research was previously presented for another degree or diplomat this or any other institution.

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CERTIFICATION

This dissertation entitle **'An Appraisal of the Effectiveness of Public-Private-Partnership Approach to Waste Management in Kaduna Metropolis, Nigeria'** by IDRIS, Rakiya Kabir meet the regulations governing the award of Master of Science (M.Sc) degree of Ahmadu Bello University Zaria and is approved for its contribution to knowledge and literary presentation.

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DEDICATION

I dedicate this dissertation to my beloved mother, HajiyaAmina Mohammed Idris.

ACKNOWLEDGEMENTS

Determination to achieve ones educational goal requires people's encouragement, in this light I acknowledge the effort of my able Supervisors Dr. J.O. Adefila and Dr. R.O. Yusuf who restlessly went through my work at various times to ensure successful completion of the study. I thank God for you being my Supervisors and indeed I am short of words to thank you, I will only say 'thanks a million times'.

My gratitude goes to the staff of Kaduna Environmental Protection Agency (KEPA) and formal private companies involved in solid waste management in Kaduna State for their tremendous support and cooperation in making this work a reality.

My gratitude goes to my field assistants Aliyu S. Ahmed, Mohammed Doko, Hajiya Adama Abdurrahman, Aisha Idris and to all the staff in Geography Department, Federal College of Education Zaria, for their support and concern during the course of this work. I also thank my Head of Department in person of Mrs.A.O. Bello for the mentorship role she has been playing for me.

I thank my beloved husband in the person of Dr.M.Kabir for his support, care and encouragement and my children Munawwar, Hawwa, Eeman, Abubakar, and Inna for their endurance. I am also thankful to the entire Salisu Ahmed's and Idris families for your care and support. I thank all friends and well-wishers who have contributed to the success of this study. Alhamdulillah!

ABSTRACT

Waste management has overwhelmed the capacity of local authorities which calls for support by the private actors. Public private partnerships (PPP) therefore became an intervention that is capable of maximizing the gains of private sector, while preserving the collective goals of the public realm in service provision. PPP has been adopted in Kaduna metropolis but whether it has been efficient has not been empirically investigated. This study therefore, is an appraisal of efficiency of public-private partnership approach to waste management in Kaduna Metropolis, Nigeria. The objectives include to; characterize the private actors involved in waste management; examine the reasons for partnership; assess the efficiency of this approach to solid waste management; examine the bases for widespread adoption of Public Private Partnership approach to waste management; and examine the constraints to public and private partnership approach to waste management in the study area. A purposive sampling technique was used to select the study location as well as the respondents. Some 326 samples were sampled from the residents and structured questionnaire was used to collect data in the study area, while 44 samples were taken purposively from the private firms engaging in waste management. In addition, Key Informant Interview (KII) was conducted with participants from private companies, KEPA and Health Department of local government council. The data were analysed using descriptive statistics.The results indicated that the total manpower capacity of the entire firms is 623and majority of the staff (79.5%) have acquired tertiary educational qualifications.
The equipment for waste conveyance for the firms is totalled 160, out of which pick-up vans and compact vehicles accounted for 55.5%. Waste is dominantly collected daily and the basis for adoption of private partners in waste management (52.0%) of respondents stated that it provides more efficient service delivery than the public counterparts. On the efficiency of private actors in service delivery, most of the residents (38.7%) agreed that there is promptness of waste managers in responding to customer complaints. Most public respondents viewed the PPP approach to waste evacuation satisfactory and many private actors claimed that the services are commendable. The major constraint faced by firms in providing their services is poor enforcement of sanitation rules on the residents. It is recommended that, to ensure efficiency in service delivery from the private sectors, there is the need for awareness to be created via mass media by government and NGOs on the need to continually patronise the services of private actors as well as the need for expansion of the firm's capacity especially in the area of equipment and man-power as this will go a long way in expanding the service coverage/efficiency which will help to improve the aesthetic quality of the environment.

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CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND TO THE STUDY

The term ‘waste’ has different interpretations and meanings. Waste could be any material which has been used and is no longer wanted, for example the valuable or useful part of it has been taken out. Waste could also mean an opportunity not taken i.e. when one does not take advantage of an opportunity when it is available. Such opportunity is said to have been wasted. It could also mean when something is surplus to requirement; such thing is said to have lie in waste (Kofoworola, 2007). From these and many more ways through which the term could be understood or used, it is in the first sense - as any material which has been used and is no longer wanted, because the valuable or useful part of it has been taken out – that waste is used in this study.

Waste can be classified into solid, liquid and gaseous wastes; it can be further classified into -biodegradable or non-biodegradable waste and toxic waste. Biodegradable wastes typically originate from plants or animal sources and can easily be broken down by bacterial action. While non-biodegradable wastes, which include mostly plastics, metals and ceramics are waste substances that cannot be broken down by natural processes or living organism (Annan, 2001). Sources of waste include; agricultural, municipal, commerce and industry, construction and demolition activities, sewage sludge and waste from mining and quarrying activities.

Solid Waste Management (SWM) is the process of collecting, storing, treatment and disposal of solid wastes in such a way that they are harmless to humans, plants, animals, the ecology and the environment generally. The unhealthy disposal of solid waste is one of the greatest challenges facing developing countries (Kofoworola, 2007).

The rapid rate of uncontrolled and unplanned urbanization in the developing nations in Africa has brought with it environmental degradation particularly due to improper waste management. Indeed, one of the most dreadful consequences of urbanization in the developing world, especially Africa has been the problem of solid, liquid and toxic waste management. Proper management of solid waste is critical to the health and well-being of urban residents (World Bank 2003): Recent happenings in major urban centre in Africa has become a monster which has rendered abortive most efforts being made by city authorities, state and federal government and professionals alike (Onibokun, 1999).

Solid wastes have become recurring features in our urban environment. It is no longer in doubt that our cities are inundated with the challenges of un-cleared solid wastes. Thus, urban residents are often confronted with poorly managed waste which could be hazardous to their collective health and safety. The hue and cry over the health consequences of exposed and fermenting rubbish have not been quantified, although their impact is noticeable (Uwaegbelun, 2004).

In Nigeria, the main reason for the poor state of waste management is inadequate local authority capacity, although rapid urbanization, inadequate legislation and lack of public concern are also contributing factors. The local authorities' inability to provide effective waste management services is due to a complex interrelationship of financial and management constraints, including inadequate financial resources, insufficient and poorly maintained equipment, insufficient and inadequately qualified human resources, inappropriate management systems, and corruption and mismanagement (Ankit and Arslan, 2012). Although these constraints can be blamed partially on the local authorities themselves, many of the causes are external in nature. These include the limited autonomy of local authorities, particularly with

regard to revenue raising, and the interrelated problems of an inhospitable macro-economic environment and cutbacks in government expenditure, which characterized most countries undergoing structural adjustment reforms (Ankit and Arslan, 2012). This incapacitation has made it important to explore alternatives such as public-private partnership approach to waste management.

Massoud and El-Fadel (2002 pp.12) defined Public-Private Partnerships (PPP) "as the transfer and control of a good or a service currently provided by the public sector, either in whole or in part, to the private sector". Researchers noted that PPP is difficult to define because the term 'PPPs' is a broad term and includes many forms of partnerships (Hodge and Greve, 2000). Partnership obviously involves two or more actors, at least one of which is public. Literature on definitions of PPP show there are some special features which could be summarized as; the Partnership involves both public and private actors, all participants are most important in a PPP, there should be good relationships between actors and in PPP each of the participants brings something to the partnership.

Partnerships mean there is some responsibility for all actors in outcomes or activities (Petts, 1994). According to Klijn and Teisman (2000), PPP is an ambitious governance arrangement, which falls within the context of the intense changes in the role of the state.

In the traditional approach to solid waste management, the local authorities are responsible for disposal of solid waste. However, there is a growing tendency towards illegal disposal of waste due to the fact that local authorities are failing to discharge their responsibility of waste collection (Manyanhaire, Sigauke and Munasirei, 2009).

In order to overcome the technical and financial deficiencies associated with the current system, state and local governments in Nigeria are increasingly resorting to the use of private

contractors for collection, transportation and disposal and private capital to supplement the mechanization and improvisation process. Private participation in the provision of municipal solid waste services is not new; several municipalities have employed private contractors for secondary transportation from the communal bins or collection points to the disposal sites. However, the services provided for by the private sector were contractual in nature and were confined to one or two segments of the municipal solid waste chain (Adebola, 2006).

The inability of government owned agencies to adequately cope with the upsurge in the volume of municipal solid waste generated led to the creation of a "vacuum" in the collection, transportation, recovery, recycling and disposal of solid waste in the state. The vacuum that was created by selective services and irregular management of solid waste was filled by both the formal and informal private sector in solid waste management. The formal private sector is made up of Registered Companies / enterprises that have the financial strength, some level of technical know-how/experience and are generally mechanized, while the informal private sector on the other hand is made up of the itinerants, cart pushers, scavengers, resource merchants and recyclers (Adebola, 2006).

For example, the activities of private sector in solid waste management streams in Lagos State have been very vital and overwhelmingly significant in the overall integrated solid waste management practice in the State and the Country at large. The sector, which encompasses all aspects of integrated solid waste management practice *vis-à-vis* collection, transportation, recovery, recycling and merchandise of both recovered and recycled materials, is an Institution on its own right. They have established a very high network of operation and distribution of their valuables both within and outside the country. The operators cut across every known nationalities in Nigeria, unlike in some other countries where the entire operatives of the

informal private sector in waste management industry is made up of people with the same cultural and religious background and about 20% of this group went into the venture to raise some start-up capital for other businesses. Some even sponsor themselves through secondary and tertiary schools (Adebola, 2006).

In Kaduna metropolis, waste management services are provided by some private sector participants in the modus operand and efficiency of their services are not clearly understood, which call for research attention. This is the focus of this study because if waste is efficiently managed; there will be no indiscriminate disposed waste on streets, highways and public places.

1.2 STATEMENT OF THE RESEARCH PROBLEM

Due to problems faced by developing countries to manage ~~solid~~ waste in the cities, several countries decided to manage the waste by incorporating private sector in a public-private-partnership (PPP) approach to help them manage the waste. However, if there is no enabling environment private sectors may find difficulties to operate effectively.

PPP in solid waste management works well in several developing nations, In Sri Lanka for instance PPP help to keep the city clean (Khajuria, Yamatotoand and Morioka, 2010). The private sector helps with investment, technology, vehicles and other equipments to collect the waste in the cities. Also in India, several public private partnerships have been undertaken in municipal infrastructure provisioning including waste management at the central, state and even local levels for overcoming capacity constraints of government agencies and for leveraging private finance and achieving efficiency (Khajuria*et al*, 2010 pp.650).

Waste management has emerged as one of the greatest challenges facing state and local government environmental management agencies in Nigeria. The volume of waste being generated continues to increase at a faster rate than the ability of the agencies to deploy financial

and technical resources needed to overcome this. The increasing consumption pattern constitutes some of the sources of the waste generation creating a major concern for the management (FEPA, 1995). There is the need to recognize key issues that are peculiar to developing countries in managing municipal waste and to understand the reasons for these peculiar issues in order to establish sustainable management of waste. Experience shows that the conventional way of waste management by relegating responsibilities solely to the government officials has proven to be no longer effective.

Since government alone cannot expectedly bear the full burden of financing solid waste management, there should be alternative sources particularly cost recovery from user charges that is "waste generator pays – principle". This can only be successful if the responsibility is shared with the private sector. Successful PPP waste management practices are multi-faceted, which involves several stakeholders in the process of implementation. To implement an innovative PPP municipal waste management programme city-wide, careful planning, organization and cooperation among these stakeholders are needed (Cebu, 2012).

Ukwede (1999) identified inadequate technology to recycle waste that could be recycled and the carelessness of the authority in charge of waste management as the major problem of waste management in Zaria. In a study conducted by Agbeda and Ajagbe (2004) on solid waste management in Ibadan North, the authors used critical observation, questionnaire to obtain the data for the study and the study found that institution responsible for the management of solid waste in the study area has not been successful in getting rid of solid waste. They attributed that to political interference, technical and labour limitations, inadequate finance and bad roads.

Ugwa (2006) in a related study on the solid waste disposal problem in Zaria metropolis, using questionnaire method of data collection, the researcher sampled 150 respondents within the

study area and discovered that waste generation in Kaduna state is on the increase and only little effort is made by the government and community to tackle the problem. Aondoakaa and Ishaya (2009) carried out a research on people's perception of the impact of urban generated solid waste in the environment of Gboko in Benue State. The study revealed that knowledge on the impact of solid waste on the environment is high among the educated inhabitants. They also reported that most people in the study area had low knowledge of the impact of solid waste disposal on the environment and they feel they are not responsible for the management of the waste they generate.

In another study, Nabegu (2006) identified problems of lack of adequate disposal facilities, finance, inadequate coverage and inefficient operation among other factors as the problems that limit the management of refuse management and sanitation board (REMASAB) in Kano state. In a similar study, Adebola (2000) highlights the important roles of the informal private sector in integrated solid waste management in Lagos State. The components of PPP include waste collection, transportation, recovery, and recycling and job creation.

Previous researches have been carried out on PPP in waste management in other areas of the country such as Lagos but none to the knowledge of the researcher have been carried out in Kaduna metropolis. This gap needs to be urgently filled because it is obvious the municipal authorities in Kaduna metropolitan area, appears to have been overwhelmed in their waste management capacities. A Pointer to this is accumulated heaps of indiscriminately disposed waste that typifies the metropolis. The assumption is that if private actors are participating in waste management under an enabling environment provided by local authorities; the waste management scenario will be greatly improved.

Lagos State has practiced such, the state government through Lagos state Waste Management Authority (LAWMA) which engages, coordinates and evaluates the activities of its private sector participants (over 300) into municipal solid waste collection. Collection frequency is either once or twice a week and usually on door –to-door basis. Waste transfer station is also a component of PPP in Lagos State. The relatively success story of Lagos could be traced to the level of cost recovery from the public (waste generators) and strong political will towards good waste management in the State (Iruruaga, 2012).

In Kaduna metropolis, Kaduna Environmental Protection Authority (KEPA) divided the city into zones for the purposes of the "commercialization" exercise and engaged forty eight (48) officially recognized firms. The monitoring of the performance of the private firms was to be coordinated by an official from the environmental sanitation unit. Appraising the effectiveness of the PPP in Kaduna metropolis is expedient because solid waste is a major health hazard that undermines people's right to a safe life. The problem is more sharply focused in the form of the following questions.

1. What are the characteristics of private actors in waste management in the metropolis?
2. Is there efficiency in public-private partnership to solid waste management in the study area?
3. What is the capacity of private firms in waste management in Kaduna metropolis?
4. What are the causes for engaging private firms in waste management?
5. What are the constraints to public private partnership on solid waste management in Kaduna Metropolis?

1.3 AIM AND OBJECTIVES OF THE STUDY

The aim of this research is to appraise the efficiency of Public Private Partnership approach to waste management in Kaduna metropolis. The specific objectives that will be pursued to achieve this aim are to;

3 characterize the private actors involved in partnership of waste management in Kaduna metropolis.

4 assess the effectiveness and efficiency of public-private partnership in solid waste management in the study area.

5 assess the capacity of the private firms in waste management

6 examine the causes for engaging private firms in waste management by the government

7 examine the constraints to public and private partnership approach to waste management in the study area.

1.4 SIGNIFICANCE OF THE STUDY

Waste management in many countries including Nigeria is a primary responsibility of the government and in practice; more often than not most governments are unable to meet this responsibility due to a number of reasons. It is argued that although the service is an important public good, most administrations in developing countries have failed to provide it to a large section of the population (Bolaane and Ali, 2004). The author pointed out that the main reason for this is the inability to manage waste is due to rapid population growth coupled with the rapid expansion of cities, diminishing financial resources and poor urban planning.

In Kaduna metropolis like in many urban centres in Nigeria, there has been an upsurge in the heap of solid waste openly dumped amidst residential, commercial and industrial areas due to

increase in population. This state of mess is apparent everywhere along gutter, ponds, roadside and backyard, which makes one to wonder whether the agency responsible is keeping to its duty. The absence of waste services can jeopardize other infrastructure services such as roads and water drains, for example, by blocking water channels and encouraging flash floods and flood poundage, which often occur in the city. Although government authorities have and are still applying all the means at their disposal, the piles of wastes continually grow. Given the economic reality of the shrinking municipal budgets due to the global economic recession and a more restriction of municipal government attention to other more pressing issues like insecurity, unemployment in Nigeria, the problem will worsen unless alternate approaches can be developed (Adewusi, 2004). It would be interesting to know whether partnership of private sectors with the government could be the best way to address the problem.

This research intends to educate the populace and bring to light the potentials of Public Private Partnership approach to waste management. Moreover, Reviewing PPP in waste management in Kaduna metropolis can give some insights about the problem and its management.

1.5 SCOPE OF THE STUDY

The scope of the study covered the whole Kaduna metropolitan area which consists of Kaduna North and Kaduna South local government areas and parts of Igabi and Chikun local government areas. The study assessed the private actors involved in PPP approach to waste management, their modes of operation in waste management , it analyzed the public perception of PPP approach to waste management, methods of wastes collection and disposal, effects of waste, and the benefits of public-private partnership to solid waste management in the study area. Temporally, data was collected within a period of one month in the 2015.

CHAPTER TWO

CONCEPTUAL ISSUES AND LITERATURE REVIEW

2.1. CONCEPTUAL ISSUES

2.1.1. Concept of Waste

There are a number of working definitions given for waste. One of the definitions conceptualized waste as the by-product of human activity containing the same material as found in the useful products but differs from useful products by its lack of value´ (McDougall, Forbes, Peter, Marina, and Hindle, 2008). According to the definition, products turns into waste when they are mixed and no more provide the service they were planned or designed to do. Similarly, Barnes (2005) defines waste as `something which the original owner or user no longer values, and has been discarded or discharged by the original owner or user. It is something the owner does not want anymore and want to throw away. Both definitions stress the inevitability of waste and its relation to the value given. Gutberlet (2008) argued that the way waste is understood and defined has basic implication on how waste is managed.

In addition, the understanding of waste depends on age, gender and social status of people, however, the perception changes through time. The working definition of this research is the definition given by UNEP. UNEP defines waste as objects which the owner does not want, need or uses any longer, which require treatment and/or disposal (UNEP, 2002).

2.1.2 Waste Management

Waste management (SWM) refers to the collection, transfer, treatment, recycling, recovery and disposal of wastes. The goals of municipal waste management are to promote the quality of urban environment and generate employment.

In the process of waste management, disposal completes the waste management chronological cycle. Solid waste disposal are influenced by the supply of waste disposal services and other infrastructures (Cointreau, 1982). Common methods of waste disposal in developing countries are observed to be open dumping, burying and burning of waste in open spaces, landfill, recycling and composting (Wilson, Araba, Chinwah and Cheeseman, 2009).

The processes of waste management consist of the generation, storage, collection, transportation and final disposal in ways that bring about good environmental sanitation. Sanitation on the other hand is the science and practice of affecting a healthy and hygiene condition or the arrangement by which the health of a community is protected from dangers caused by dirt or refuse in the surrounding area (Adedibu, 1983). Waste management involves the inter play of many factors in generation, storage, collection and disposal of waste, but management starts with collection, transportation, treatment/recycling and disposal (Adedibu, 1983).

2.1.2.1 Collection Process

In waste management activities, collection begins the process. According to Ajie and Dienye (2014) waste collections can be done through the following ways;

i. Curbside Collection: This method requires informing the people to throw their garbagesatthe curbside (road) on collection day at a specific time to helpcollection at designated time.
ii. Door to Door Collection:This is method is the most commonly used in waste collection process. It involves providing different waste containers for theinhabitants and asking them to separate their garbage as they throwthem in.

iii. Communal Collection: It involves the storage units where by people go and dump their waste within the stipulated 24 hours of the day.

iv. Block Collection: Block collection involves the greatest inhabitant participation. This is the second most common methods used for waste collection especially around organized settlements. The collection vehicles have a designed route which it follows according to schedules individuals are expected to bring out their garbage to the vehicle for discharge.

2.1.2.2 Transportation Process

Municipal waste collection may be either hauled directly to the disposal site by the collection equipment or it may be transferred by another size or type of equipment for hauling. Transferring waste to larger or more efficient hauling vehicles allows the collectors to minimize time on collection routes and it is necessary where disposal site is far from collections service area. Compactors vehicle is another type of equipment used for waste transportation and are mostly used to avoid exposure of the waste to the environment (Ajie and Dienye, 2014). Unorganised waste collectors use carts, wheel barrows, open pick-up vans etc. in transporting their wastes usually collected from door to door of residents to the disposal destinations.

2.1.2.3 Treatment/Recycling Process

According to Baud, Post and Furedy (2004) a more environmentally friendly and sustainable solid waste management strategy emphasizes on activities in relation to reduction, reuse and recycling. The application of the 3R concept into the waste management minimizes the amount of waste that goes in to landfills;

i. Reduction is aimed at reducing the amount of waste produced by adopting or optimizing the production process of manufacturers and industries. As a result, natural resources will be saved.

ii. Reuse does not involve re-processing or transforming from one type of material into another. Rather reuse occurs when one material served its original purpose and reused for another purpose rather than being thrown away.

iii. Recycling is all about transforming or reprocessing of materials that served the original function in to new products. Otherwise, those products that served the original function will be considered as waste. Recycling is common among materials produced of virgin materials such as glass, plastic, metals and electronic waste. Recycling also involves organic materials for the production of compost. (Zhu, Asnani, and Zurbrugg, 2007).

The government and the private sector are responsible for the minimization of waste by reducing the amount of inputs or resources used for production and consumption, and recycling makes these inputs more efficient. Both the reuse and recycling of waste can be carried out at the primary and secondary level. The primary level includes all the activities within the household, firms and institutions, on the other hand, the secondary level includes after the materials have entered the waste stream. At this point the extent of the source separation is an important aspect that determines the level where the recycling and reuse activities are carried out (Baud, *et al*,. 2004).

2.1.2.4 Disposal Process

Waste disposal is the final stage or process involved in waste management and it could be done through any or combination of all the following processes.

i. Incineration: This involves the disposing waste by a controlled combustion of combustible waste at a very high temperature.
ii. Composting: Refuse buried with or without light soil to produce soil fertility.
iii. Landfill: Engineered containment facilities exhausted and with impermeable geo membrane material to ensure a leaf proof integrity, therefore preventing ground water contamination.
iv. Shredding: Mechanical size reduction method, which waste could be converted to smaller pieces to accommodate more.
v. Open Dumps: This is the most commonly method of waste disposal, used mostly in developing countries. It simply involves dumping of waste materials indiscriminately in open surfaces of land or water.

2.1.3 Concepts of Public Private Partnership (PPP)

The theoretical review on Public Private Partnerships (PPPs) as a subject of discussion has been viewed from different angles by various scholars. However, there are common features across the different approaches as well as distinctive features (Khanom, 2009). In the last two decades various countries of the world have shown a growing interest in Public Private Partnerships. A PPP is a partnership between the public and private sector for the purpose of delivering a service traditionally provided by the public sector (Meidute, 2008). It is also seen as a system in which a service or a project is funded and operated through a partnership of government and one or more private organizations e.g. solid waste collection (Awortwi, 2004). According to World bank (2015) public-private partnerships are typically medium to long term arrangements between the public and private sectors whereby some of the service obligations of

the public sector are provided by the private sector, with clear agreement on shared objectives for delivery of public infrastructure and/ or public services.

Linder and Rosenau (2000) defined public-private partnership as the formation of cooperative relationships between government, profit making firms, and non-profit oriented private firms to fulfil a policy function. Bovaird (2004) also defined public-private partnership as working arrangement based on mutual commitment between public sector organizations with any organization outside of the public sector. Public-private partnership offer an alternative to full privatization by combining the advantages of both sectors; that is, they combine the: - Social responsibility, environmental awareness and public accountability of the public sector; with the finance, technology, management efficiency and entrepreneurial spirit of the private sector. In solid waste management, public-private partnerships have emerged as a promising alternative to improve municipal service delivery when private sector is involved in waste management; government role is shifted from service provision to implementation of regulation. Private sector remains to provide solid waste collection, transfer and disposal services in a more efficiently and at lower cost than the public sector (Cointreau-levine, 1994). Essential conditions for successful private sector involvement include competitive bidding, technical and organizational strengths and capacities.

In order word, PPP often starts when a crisis is identified. Crisis can occur when a service is not delivered, the need is high and the government cannot do it anymore. Also when there is long term planning, driven by a clear understanding of and respect for the needs of various actors and when there is an individual, somebody who pushes for change called the ‘champion’ that is very influential and can make a huge difference (Gentry and Fernandez, 1997).

It is primarily a contractual approach to the delivery of infrastructure, goods and services traditionally provided by the public sector or by private operators subject to tight 'command-and-control' regulation, such as public utilities. However, as rightly emphasized by New Institutional economists, PPP is a very special contractual practice that seeks to introduce market-type relationships in a context in which non-market forces play a major role (Menard, 2012). On the other hand, Federico (1999) argues that PPP has been the most prominent mode of collective action for urban and other resource services delivery. However, in developing countries the idea is very recent and largely limited to large metropolitan cities.

Public-Private Partnership include a range of possible relationships between both sectors, which are established in order to answer in a cooperative way, the need for improvement and development of infrastructure and services to deal with the suburban and environmental management issues (Federico, 1999). But under PPP, accountability for delivery of the public service is retained by the public sector whereas under a privatization, it moves across to the private sector (the public sector might retain some regulatory price control). Under PPP, there is no transfer of ownership and the public sector remains accountable for monitoring the nature of the service delivery which is indicated by the contract (UNECE, 2008).

2.1.3.1 Common forms of PPP

There are many different legal forms of PPPs. UNECE (2008) states that the following terms are used to explain partnership agreements:

i. **Buy-Build-Operate (BBO):** Transfer of a public asset to a private or quasi-public entity usually under contract that the assets are to be upgraded and operated for a specified period of time. Public control is exercised through the contract at the time of transfer.

ii. **Build-Own-Operate (BOO):** The private sector finances, builds, owns and operates a facility or service in perpetuity. The public constraints are stated in the original agreement and through on-going regulatory authority.

iii. **Build-Own-Operate-Transfer (BOOT):** A private entity receives a franchise to finance, design, build and operate a facility (and to charge user fees) for a specified period, after which ownership is transferred back to the public sector.

iv. **Build-Operate-Transfer (BOT):** The private sector designs, finances and constructs a new facility under a long-term Concession contract, and operates the facility during the term of the Concession after which ownership is transferred back to the public sector if not already transferred upon completion of the facility. In fact, such a form covers BOOT and BLOT with the sole difference being the ownership of the facility.

v. **Build-Lease-Operate-Transfer (BLOT):** A private entity receives a franchise to finance, design, build and operate a leased facility (and to charge user fees) for the lease period, against payment of a rent.

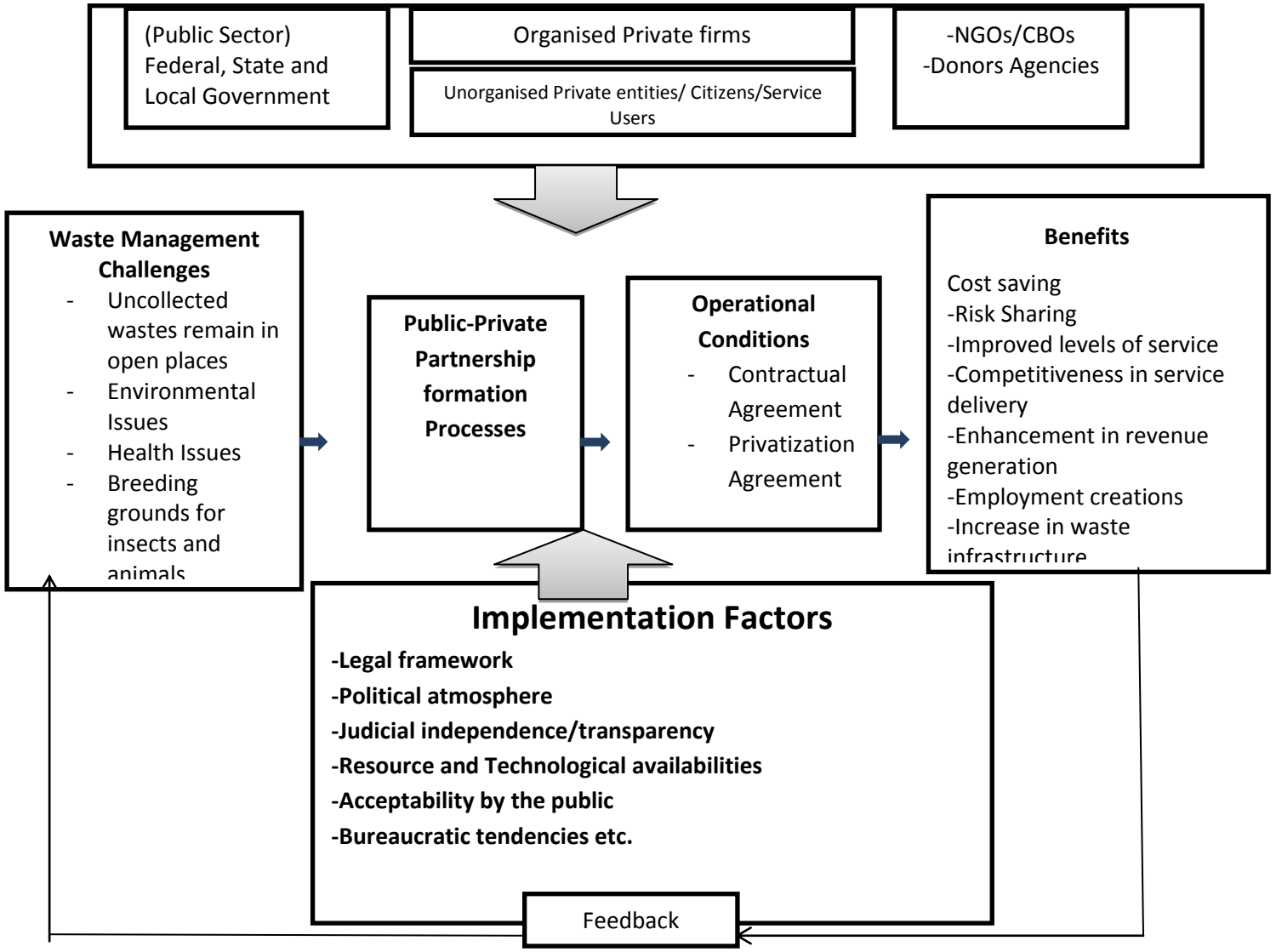
vi. **Design-Build-Finance-Operate (DBFO):** The private sector designs, finances and constructs a new facility under a long-term lease, and operates the facility during the term of the lease. The private partner transfers the new facility to the public sector at the end of the lease term.

vii. **Finance Only:** A private entity, usually a financial services company, funds a project directly or uses various mechanisms such as a long-term lease or bond issue.

viii. **Operation & Maintenance Contract (O & M):** A private operator, under contract, operates a publicly owned asset for a specified term. Ownership of the asset remains with the public entity. (UNECE, 2008).

2.2 Operational Framework/Literature Review of PPP in Waste Management

This framework involved the challenges, action plans and the effects of PPP in waste management. The research modelled the implementation processes as a chain from problem identification action to results. However, it is worth to note that implementation is always influenced by involved actions of the stakeholders as well as conditions of operation defined in the legal framework binding the partners.



Source: Author's Conceptualisation

2.2.1 Stakeholders

The term “stakeholders” is not only used to identify the class, gender, ethnicity, age group and status of the people but it also includes active participants who have different powers and various resources. It also signifies those entities, structures and individuals found operating dependently or independently in a given environment. The actions and inactions of these stakeholders in the process of interactions bring about specific outcomes (wastes generation and management challenges). Yet within the same structure, based on the affiliations of cultural orientations, attitudes, knowledge and interests a common solution is provided for a common good of the entire system. To buttress the above statement, Biggs and Matsaert (2004) stated that actor oriented “approach is concerned principally with mapping relationships and flows of information to provide a basis for reflection and action. Hence, the outcome of stakeholder’s interactions also brings the needs for common solution to be reached especially with regards to policy change/modifications so as to enhance service provisioning in the form of public-private partnership approach especially in waste management.

2.2.2 Public Sector

Public sector refers to government entities, which includes federal/central, state/provincial or local government whose actions and inactions can bring about positive or negative implications to waste management activities.

In Nigeria, the administrative framework for waste management is three tiered, thus consisting of national, state agencies as well as local government bodies. The Federal Ministry of Environment is the body charged with overseeing the protection of the environment as well as natural resource preservation to the end of achieving sustainable development. As such, they play the role of promulgation of national environmental laws, enforcement and monitoring of the

same in addition to ensuring adherence to international environmental guidelines. Operating also on the federal level is the National Environmental Standards and Regulations Agency, in addition to environmental law enforcement roles, the agency is charged with maintenance of effective interaction between national and international actors on issues related to the environment. Up until 1999, environmental laws and regulations were put forward and enforced by the Federal Environmental Protection Agency (FEPA); however these subsequently became a role of the Federal Ministry of Environment. In order to ensure protection of the environment is better managed, all states in Nigeria (and their local government) have been given the capacity to create related environmental establishments, the sovereignty of which is limited to the state or local government area it has been established (Ogwueleka, 2009).

Consequently, the responsibility for solid waste management in Nigeria lies with local governments at state level as specified in Section 5(2) of Federal Environmental Protection Agency Act No. 1 of 1994; As inter alia stated: *It shall be the duty of each Local Government Authority in the State to locate, construct, and maintain public refuse receptacles in strategic places, where residents in its area may deposit their household waste''* (FEPA, 2005). According to FEPA (2005), there is a broad policy, legal and institutional framework for environmental management in place. However, though this framework has been in place for over ten years, there is still need for additional sectors or issue-specific policies especially solid waste management. The same is true for laws and regulations with regard to solid waste management in the country. Institutionally, the structure at local government level is still evolving. This means that the problems that prevail at the lower implementation and administrative levels have their roots in the absence of specific regulations in the national policy for environmental management. Therefore, although the local governments may have the power to come up with

by-laws on any issue in their areas of jurisdiction, it may still be difficult for them to come up with such when there is no guiding policy at national level. FEPA (2005) notes that, amidst weak institutional structures, little has been achieved in ensuring people's compliance with the range of environmental management policies and laws in Nigeria.

As such, the policies and laws continue to suffer continuous violation in the hands of the citizenry. Although environmental inspectors have been gazetted and trained to improve on enforcement, not much has been done to change the trend of environmental degradation and mismanagement. The police and judiciary are also being made aware of their roles in environmental management, particularly the enforcement of environmental laws, hoping that this will change the way Nigerians interact with the environment (FEPA, 2005). The problem however, is that the policies are always made with little attention put on the mechanism of enforcement. As a result, misconceptions and confusion arise with regard to the institution with the responsibility to enforce the policies and regulations. This falters the implementation of the policies.

The policy making process is also quite slow, for example FEPA has advised government to formulate a national solid waste management policy to facilitate the development of appropriate laws to govern the management of solid waste, but not much has been done to that effect (Klijin and Teisman 2000). FEPA has also identified the need to revise national environment management policy to accommodate emerging issues like solid waste management services (FEPA, 2005). One of the objectives for the suggested policy is to reduce, reuse and recycle materials and goods purchased. All these are suggestions in a bid to improve the waste disposal and management methods in the country, however, when such policies are delayed, the situation only gets more complex.

The people of Nigeria are expected to participate in the protection of the environment and the resources there in, but without being convinced of the benefits this would bring to them. Because there is little appreciation for voluntary measures to protect the environment among the people, irresponsible methods of waste disposal have not been uncommon in the country and waste management has not been an exception ((Klijin and Teisman 2000).

2.2.3 Organised Private Firms and Unorganised Private entities/ Citizens/Service

The organised private firms include registered enterprises carrying out SWM services e.g. collection, transport, disposal and recycling. The private sector corporations, institutions, firms and individuals, operating registered and/or incorporated businesses with official business licences, an organized labour force governed by labour laws, some degree of capital investment, and generally modern technology (Furedy,1990). Whereas, unorganised private entities/citizens/services includes unregistered, unregulated waste management activities undertaken by individuals, families, groups or small scale waste pickers, itinerant buyers, traders in waste materials and non-registered small-scale enterprises. These groups of waste management stakeholders are usually not regulated or controlled by government agencies (Ahmed and Ali, 2004). These sets usually move from house to house and or street to street in search of wastes and or other recyclable waste materials. Generally these people are called scavengers and waste pickers. These activities characterize the informal sector as this is labour-intensive, low technology, low-paid, unrecorded and unregulated work, normally carried out by individuals or family groups (Wilson et al., 2009). Due to poverty, unemployment or under employment, many informal sectors are active in waste management process in developing countries with Nigeria and Kaduna State inclusive.

2.2.4 CBOs/NGOs/Donor Agencies

Community Based Organizations (CBOs) are also included in the private informal sector. CBOs are formed by community members. In general, some communities which cannot access enough facilities to maintain their environments clean due to large amount of solid waste accumulations tend to form CBOs for their safety. Generally, these people mainly undertake primary collection and street cleaning (Wilson *et al*. 2009). Some CBOs focusing on solid waste management mainly participate in primary collection and street cleaning and are mostly found at the local levels of the society. On the other hand, NGO's and Donor Agencies which could be National or international Non-governmental organizations (NGOs) are also considered as stakeholders. Geographical dictionary (2005) defines an NGO as any charity or volunteer association which takes on responsibility for a particular cause often starting on a small-scale and in response to a particular need such as natural disaster". Some agencies which consider the environment or peoples' health try to help - the developing nations to keep the environment clean. SIL international (1999) defines donor agency as an organization that gives funds for projects of a development nature. These private agencies directly or indirectly participate in waste management activities.

2.2.5 Waste Management Challenges

In recent years, the major concern of waste management has been changing, with health and safety concerns dominating the focus; therefore, waste management has been prioritizing and minimizing health risks (UNEP, 2002). Today, sustainability has become the major concern of waste management in addition to health and related issues. This is because waste is seen as a major health hazard that undermines people's right to a safe life (Enayetullah and Sinha, 2002). As all forms of wastes, municipal, bio-medical, e-waste, or industrial, if not treated and disposed

carefully can constitute threats to the health of people as well as the environment. For instance, anaerobic degradation of waste at landfill sites produces methane-a greenhouse gas that is 20 times more harmful than carbon dioxide. Filth and garbage on streets facilitate spread of diseases like malaria, plague; making a significant dent on a country's prospects of achieving sustainable development target. Accordingly, sustainable waste management incorporates the three major pillars of sustainable development which are economic, social and environmental (Enayetullah and Sinha, 2002).

However, given the fact that waste generation rates are set to more than double over the next twenty years in low and middle income countries, the costs of managing the waste is also expected to witness a steep rise, with cost increases being most severe in low income countries (more than 5-fold increases) followed by middle income countries (more than 4-fold increases). Ossai (2006) opined that in Nigeria, an annual average approximately 50 million tons per annum of waste is generated with less than 10% management capacity. Hence, management has emerged as one of the greatest challenges facing state and local government environmental protection agencies as the volume of solid waste generated increases at a faster rate than the ability of the agencies to improve on the financial and technical resources needed to parallel this growth. Therefore, sustainable waste management should be economically viable, socially acceptable and environmentally effective (McDougall, Peter, and Marina, 2008). As a result, waste management systems are providing consideration to environmental issues over economic costs in the decision making process.

On the other hand, one of the most important implications of wastes is the impact on economic activities. Labour and transport absorb the major part of the operating cost of wastes management services. It is usual for a city to employ between two and five workers for each

1000 persons. "Three workers per 1000 people may represent about 1% of the total national workforce. Transport is required on a scale of about one heavy vehicle per 15,000 persons. Thus, wastes management services can be up to 1% of the gross national product which makes it one of the most expensive services in a city (Public Health Engineering Research Institute, 2001).

Studies have also shown that in developing countries, local authorities spend 78% of their revenue on collection and the balance on disposal, but can only collect almost 50 – 70% of municipal solid waste (Ogwueleka, 2003). In the past, the focus has been on the technical aspect of different reasons of collection and disposal (World Bank, 1999), but recently, attention has been on the sustainability in waste management like reducing the amount of waste generated, minimizing the environmental burden, economic cost and maximizing the social acceptability as well as considering waste as a resource which is realizable by enhancing institutional arrangement to service delivery, with a special emphasis on privatization (UNEP, 2002; Cointreau , 1994).

Despite the various efforts of waste management authorities, towards achieving sustainability in waste management, a lot of challenges still confront the operation. For instance, Kayode and Omole, (2011) in a related study in Ibadan metropolis noted that shortage of manpower both skilled and unskilled hampered the efficient management of refuse in Ibadan metropolis which makes the enforcement of environmental law and order to be ineffective in the core area. Also, lack of maintenance on the vehicles used to evacuate the refuses deposited in the containers also hampered the effectiveness of their uses which results into abandoning of the containers and their contents which leads to environmental pollution and breeding of diseases carrying organisms. It is also noted that there is lack of cooperation between the people and the environmental health officials in charge of solid waste management.

Elsewhere, literature suggests that technical factors influencing the system are related to lack of technical skills among personnel within municipalities and government authorities (Hazra and Goel, 2009); deficient infrastructure (Moghadam, Mokhtarani and Mokhatarani, 2009); poor roads and vehicle (Henry, Yongsheng and Jun, 2006), insufficient technologies and reliable data (Mrayyan and Hamdi, 2006). Matete and Trois (2008) suggested that the factors affecting the environmental aspect of solid waste management in developing countries are the lack of environmental central systems and evacuation of the real impacts.

Sharholy, Ahmed, Vaishya and Gupta, (2007); and Sujauddin, Huda, Rafiqul and Hogue, (2008) respectively observed that municipalities have failed to properly manage solid waste due to functional factors. The researchers also noted the absence of financial support, limited resources, and unwillingness of the users to pay for the service as well as the lack of proper use of economic instruments hinders the delivery of proper waste management services. Hence, indicated that the involvement of the private sector is a factor that could improve the efficiency of the system.

In contrary, it is generally believed that waste management is the sole duty and responsibility of local authorities and that the public is not expected to contribute (Visranathan, 2005). The operational efficiency of solid waste management depends upon the active participation of both the municipal agency and the citizens. This is because, management deficiencies are often observed in the municipalities. Some researchers that have investigated the institutional factors that affect the system have come to the conclusion that local waste management authorities have a lack of organizational capacities (leadership) and professional knowledge. Besides, they concluded that the information available is very scanty from the public domain. The extremely limited information is not complete or is scattered around various

agencies concerned, therefore, it is extremely difficult to gain an insight into the complex problem of municipal solid waste management (Chung and Lo, 2008).

2.2.5 Public Private Partnership Approaches, Formation and Operational Conditions

The public-private-partnerships (PPPs) covers wide areas of cooperation and arrangement between governments and privates sectors, local communities and others stakeholders on the matter of dealing such as urban environment service delivery. PPP is widely used for different purposes. However, there are divisions among researchers about the uses of PPP in practice. Some researchers focus on PPP as an inter-organizational arrangement between different institutions in which PPP is used as a governance or management tool; some concentrate on PPP as a development strategy; whereas some think it is a discursive term or a 'language game' (Khanom, 2009). Economic and Social Commission for Asia and the Pacific (ESCAP) (2011) listed out the conventional criteria of classifying the approaches which include (i) Ownership of capital assets; (ii) Responsibility for investment; (iii) Assumption of risks; (iv) Contracting out.

Under the contracting approach, governments can provide services with their own employees or by contracting out these services to private sector providers. In PPP the goal to contract out is to improve service quality and efficiency into the system, while government still retains ownership. The services where the government retains ownership are public or merit goods, because of externality and excludability problems (Awortwi, 2004).

Phoelsingh (2006) noted that even when government decides to maintain public ownership of essential assets, the government could transfer responsibility for managing the asset to the private sector, thereby separating asset ownership from service provision. The transfer of the service provision from the public to an external organization is defined in the research as contracting out. For reasons of probity and accountability, this transfer is done by

way of a competitive tender. The contracting out principle enables the government to retain control over the specification of the service, the management of the contract, and the evaluation of the service provider performance. Privatisation of waste management services on the other hand, could take the form of complete transfer of service provision to the private sector, who decides the operational conditions suitable for their smooth running without government interferences.

2.2.6 Benefits of PPP Approach

The inability of the public sector to provide infrastructure and deliver services affects promotion and expansion of businesses in communities. As a result, governments in several countries have been increasingly engaging the private sector, communities and others stakeholders in the provision of infrastructure facilities, investments in operation and maintenance of facilities as well as the delivery of basic services through PPP arrangements (Kwame, 2011). If enabling environment is created and due process necessary for the formation of PPP in waste management are followed, there are enormous benefits that can be derived from the partnership. For instance, Cappellaro and Longo (2011) are of the view that partnering the private sectors in waste management is capable of maximizing the gains derived from private production, while preserving the collective goals of the public realm. Plummer (2002) reported that the main arguments in favour of PPP is that they enable wider participation in social decision making, expand the reach of government and make decision making more cost efficient.

Various arguments exist on the need for PPP in public service provisioning. In the first instance, it is believed that PPP allow non-government members to assume active role in decision making and management and enables citizens and businesses to become partners and beneficiaries in the provision of public goods and services. The second argument in favour of

PPPs is the opportunity to expand the natural boundary, scope, and flexibility of the state (Tadesse, 2006).

Major benefits for the government are the speed, efficiency and effectiveness associated with private business practices to public service delivery in order to ensure value for money. The involvement of the private sector in public service delivery also forces the procurement process to be transparent and competitive. As a result, the long-term costs of the service delivery can be assessed more realistically under a PPP framework which in turn promotes efficient use of resources (Kwame, 2011). Furthermore, Fiszbein (2000) has identified that the common denominator of a partnership is the pooling of resources (financial, human, technical and intangibles such as information and political support) from public and private sources to achieve a commonly agreed social goals.

For instance, Kwan (2003) summerised the following benefits from PPP in service provisioning as;

i. Cost savings

Private partners may be able to reduce the cost of operating or maintaining facilities by applying economies of scale, innovative technologies, more flexible procurement and compensation arrangements, or by reducing overhead. Mullin (2002) emphasized that 80percent of municipalities' total budget is used for the salaries of sanitation workers engaged in road sweeping and related activities. Moreso, public sector's sole handling of waste management programmes uses top-down approach to waste management, which is usually ineffective, financially wasteful especially compared with private approach which is the contrary (Addo-Yobo and Ali, 2003).

ii. ***Risk sharing***

The risks can be shared between the government and a private partner. Risks could include cost overruns, inability to meet schedules for service delivery, difficulty in complying with environmental and other regulations, or the risk that revenues may not be sufficient to pay operating and capital costs.Massoud and El-Fadel (2002) explain the roles of private sector participation in waste management to include; improved performance of the public sector by employing innovative operation and maintenance methods; reduced and stabilized costs of providing services by ensuring that work activities are performed by the most productive and cost effective means; improved environmental protection by dedicating highly skilled personnel to ensure efficient operation and compliance with environmental requirements; and access to private capital for infrastructure investment by broadening and deepening the supply of domestic and international capital. It also serves as a means of supplementing limited public sector capacities to meet the growing demand for infrastructure development (Public-Private-Partnership in Infrastructure Resource Centre, 2014).

iii. ***Improved levels of service or maintaining existing levels of service***

Through PPP, innovations can be introduced on how service delivery is organized and carried out. It can also introduce new technologies and economies of scale that often reduce the cost or improve the quality and level of services. Studies show that private sector involvement helps to reduce the service cost by half in Latin American cities with higher labour and vehicles productivity (Levine and Coad, 2010). Unlike the private sectors, waste management services provided by the public sectors in the developing nations uses centralized solid waste management approach. Accordingly, the decision making process take long a time. This means that to make decisions have to wait until the senior manager gives his/her approval. This causes

delays in the delivery of services. One of the main reasons for the delay decision making is, these public sector or municipalities act on behalf of government and respect the policies, laws, regulations, directive and so forth. Kaseva and Mbuligwe (2005) found that waste collection efficiency is a function of manpower availability and transport capacity. These two factors have a huge influence on waste management. Generally, the public sector faces problems in these factors, whereas, private sector engaged in waste management have higher operating efficiency. This means they have trained staffs, good vehicles and good equipment which give higher output and productivity and in this way they can employ cost reduction approaches. Also, Ababio (2010) noted that private agencies are profit motivated and charge for their services, thus manage to provide the services properly.

iv. ***Enhancement of revenues***

Public private partnerships may set user fees that reflect the true cost of delivering a particular service. Public private partnerships also offer the opportunity to introduce more innovative revenue sources that would not be possible under conventional methods of service delivery. Also generally, the formal private sectors collects reusable or recyclable goods and try to make something from recyclable or reusable waste and this activity creates a chance to recover valuable materials and to generate more income. Other fiscal arguments are that ifpublic services are provided by the private sector, governments will be able to reduce subsidies to loss-making public agencies, increase tax revenue from private operators and reduce public borrowing by encouraging the private financing of capital expenditure (Awortwi, 2004).

v. ***More efficient implementation***

Efficiencies may be realized through combining various activities such as more flexible contracting and procurement, quicker approvals for capital financing and a more efficient

decision-making process. More efficient service delivery not only allows quicker provision of services, but also reduces costs of operation. Massoud, Fadeland Malak (2003) states that compared with the public agencies, the private sector is more dynamic, flexible, creative, innovative and vibrant in their works. In addition, the private sector usually meets certain performance criteria, while the public sector does not benchmark their own performance. They are also generally identified to be better at design, construction, and operations. The private sector's strength includes that 'they can make decisions fast and be creative in approach, design and the use of technologies (Massoud, Fadel and Malak, 2003).It also serves as a means of exploring private sector technology and innovation in providing better public services through improved operational efficiency.

vi. Economic benefits

Increased involvement of government in public private partnerships can help to stimulate the private sector and contribute to increased employment and economic growth. Local private firms that become proficient in working in public private partnerships can "export" their expertise and earn income outside of the region. Solid waste collection is an essential public service which benefits the urban residents. It is not feasible to exclude those who do not pay, because public cleanliness and the safe disposal of wastes are essential in public health and environmental protection. As a result of these characteristics, solid waste collection is a public good for which the government is responsible. This however, does not mean that the government has to accomplish the task of solid waste service delivery entirely by its own staff, equipment and monies. In fact, they make use of private enterprises to help them (Awortwi, 2004).

The private sector is generally perceived to be better at design, construction and in operations. The private sector strength includes the ability to make decisions fast, manage and

control costs, and be creative in strategy, design and the use of technologies and create access to financial resources. Through partnerships, the advantages of the private sector are combined with the social responsibilities, environmental awareness, local knowledge and job generation concerns of the public sector (Cointreau, 2005).

According to Public-Private Partnership in Infrastructure Resource Centre (PPPIRC) (2014) economic benefits of public private partnership are that it gradually exposes state owned enterprises and government to increasing levels of private sector participation (especially foreign) and structuring PPPs in a way so as to ensure transfer of skills leading to national champions that can run their own operations professionally and eventually export their competencies by bidding for projects/ joint ventures. It also creates diversification in the economy by making the country more competitive in terms of its facilitating infrastructure base as well as giving a boost to its business and industry associated with infrastructure development (such as construction, equipment, support services).

2.2.7 Constraints to Effective Public Private Partnership Approach

i. Autocratic/Bureaucratic Hostility

Many of the origins of hostility towards private sector participation are to do with attitudes, perceptions and prejudices, rather than facts. In some countries senior local government officials may be accustomed to autocratic control of certain functions and of their subordinate employees. Consequently they may oppose efforts to involve the private sector for political, emotional and personal reasons, because control is being passed to private sector managers and actions are restricted by contracts. This opposition may express itself in the creation of obstructions to the processes of tendering and awarding contracts, in the delaying and reduction of payments, or in personal hostility towards private sector managers. Politicians and

officials may be suspicious of the motives of private enterprises in negotiating long-term concessions on landfill sites and plant, fearing that the companies wish to use the assets for other purposes (Batley and Moran, 2004).

Ekpu and Archibong (2007) observed that bureaucratic problems in government do not allow for easy release of funds, employment of adequate manpower and purchase of functional tools required for managing refuse, whereas NGOs find it easier to manage waste by various methods. Government owned organizations find this difficult to achieve. Oyeyomi (1998) went further to state that inadequate provision of equipment such as bulldozers, pail-loaders sanitary refuse vans, mechanical shovels and storage containers have affected government effective management of waste in the urban centers. In seconding the above, Agyepong (2011) stated that the traditional method of procuring public infrastructure and service delivery including waste management proved untenable as the public sector entities mandated with execution were characterized by inefficiencies, poor pricing policies, overstaffing, mismanagement and stagnation and therefore did not provide value of money to the public clients. To effectively address bureaucratic tendencies, Da Zhu (2008) suggested that "some decisions should be taken by the top level of management (such as planning and monitoring) and others by the middle and lower levels of management (such as day-to-day activities related to providing service). The writers further emphasized, "a medium or large city will obtain greater efficiency by dividing the municipality into zones or wards for service provision and by delegating some decision making powers. The powers delegated to the zones or wards will ensure more effective supervision of the work force engaged in tasks like sweeping streets, door-to-door collection, and secondary storage of waste while the municipality takes care of transportation, treatment and disposal.

ii. Corruption

Plummer (2002) described that Corruption and the fear of corruption have very major impacts on public-private partnerships, and so should be considered carefully before making the decision to go ahead with involving the private sector. In the minds of many people, public officials pursue private sector participation because they see the opportunity for getting bribes and other favours from bidders and contractors. If the power is concentrated in the hands of a few local government officials, with little transparency and no quick access to effective judicial decisions, there is a serious probability that there will be arbitrary decisions and demands for additional payment.

There is also the concern, which is justified because this has often occurred, that officials promote private sector participation because they will arrange that the contracts are given to friends or members of their family, perhaps at a higher price than if the contract were awarded fairly, or with the expectation that the contractor will not be penalized if the service is poor (Adrian, 2005). Fear of accusations may also make junior officials, such as field inspectors, unwilling to sign reports and reluctant to certify that a job has been well done by a contractor. If only a few officials sign all documents, it becomes easier to accuse them of taking bribes to modify records, so it is important to empower and encourage more junior inspectors to sign.

Biasness in the selection process is another form of corruption which affect the effective the benefits of PPPs in waste management. This is because in conventional forms of service delivery, there is always the potential for government to be accused of bias in selecting proponents. This may be more prevalent with public private partnerships given that “low bid” may not always win the contract if the government has established other criteria. The potential

for accusation of bias can be reduced through well-developed policy and procedures, and by ensuring transparency in dealing with potential private partners.

iii. Political instability

Changes of political leadership may bring in different concepts of private sector participation or even a reversal in policy – the new leadership not wishing to continue the relationship with the private sector. If the contract (with support from the judiciary) does not protect the contractor in such a situation there may be internal conflicts, and damage to confidence among waste management contractors (Fiszbein, 2000); Plummer 2002). In addition, governments can have less experience with PPP. The combination of inexperience by government and stakeholder unfamiliarity with public private partnerships may result in higher political risks. Governments may wish to reduce potential risks by initially entering into less complex and better understood public private partnership contracts.

iv. Lack of capacity

New skills are needed when there is a change to private sector involvement. From the development of the strategy and basic concept, and the involvement of the public, through tendering and the development of the contract, the inception stage, to the challenge of monitoring performance to get the best possible service, there is the need for knowledge, skills and a backup network of specialists. In some cases this situation is aggravated by changes in organizational responsibility, typically that the organization that was the public sector provider of solid waste services is not the organization that is responsible for arrangements with a new private sector provider, so that the practical experience of the former operator is not used to frame the conditions for the new private sector service provider. If such a change in institutional

responsibility has taken place, there is an even greater need for capacity building and exchange of experience (Adrian, 2005). Also, not all governments consider the true costs of providing services when establishing their pricing policies for fees for services. The delivery of services through public private partnerships requires pricing policies and fees to reflect all relevant costs. This can have the effect of increasing user fees for specific services. The cost of managing public controversy over increased fees or developing complex policies for staging fee increases can often negate the value of public private partnerships for specific services.

v. Clash of culture

Lack of local knowledge can also cause difficulties and hostility, particularly for foreign contractors. Successful approaches in solid waste management depend on a good understanding of the local situation, including cultural, socio-economic, employment and geographical factors. A contractor who has been very successful in another country may not achieve good results in a new situation if he does not pay enough attention to local factors (Adrian, 2005).

vi. Loss of control

If a powerful private company succeeds in winning many long-term contracts, it may work itself into a monopoly position so that there are no alternative service providers. In such a situation it becomes difficult for local government to control costs and service standards or to offer an alternative service (Barr, 2004). Public private partnerships, by their nature, involve a sharing of risks, benefits and decision making between the partners. PPP that involve significant investments and risks by the private partner often provide for greater involvement of the private partner in decisions concerning how services are delivered and priced. This often leads to concerns about who controls the delivery of services. The issue of control needs to be addressed at the time the project is defined and kept in mind when the contract is negotiated. In the final

analysis, government has the authority and responsibility to establish servicing standards and to ensure that the public interest is protected.

vii. Lack of acceptance by the public

Citizens are generally very aware of solid waste collection systems, and their co-operation is of great importance. Widespread objection to a private company for any reason can cause major difficulties if it induces an unwillingness to cooperate, or a lack of respect for the contractor's street containers (which can be easily damaged by fire, vandalized in other ways, stolen or even recycled). The introduction of private sector participation in solid waste management is often accompanied by a change in the way that the service is paid for (Adrian, 2005). Typically a user charge is introduced. If public opinion is not prepared carefully for this change, resentment of or opposition to the fee may develop into hostility towards the enterprise that collects the waste (Barness, 2005).

2.3 REVIEW OF EMPIRICAL STUDIES

It is worth to note that there is a large body of empirical studies relating to waste management challenges and strategies to effective management process both across states in within Nigeria and countries outside the shores of Nigeria. Some of which includes the following;

Across the regions of Nigeria, such as the northern part of the country, Haruna and Bashir (2013),studied the nature and operational performance of public-private partnership in waste management in Bauchi metropolis. According to the researcher, the use of public-private partnership in provision of basic urban services like water and sanitation in many developing countries is becoming inevitable for attainment of sustainable development and meeting the

millennium development goals and in Bauchi metropolis, Nigeria, the case is not different, as public-private partnership in solid waste management has been in operation since 2007. The study analysed the roles and relationships between the public and private actors, the constraints hampering success and finally suggest mechanism of bettering the partnership. A qualitative approach involving interviews, focus group discussions, observations and photography was used to gather necessary primary data, while reference to relevant literature provided the much needed secondary data.

It was found in the study that throughout the metropolis, the secondary waste storage facilities are grossly inadequate which encourages the illicit and indiscriminate disposal of waste on drainages, around the waste bins, uncompleted buildings, and vacant plots and so on, also, the newly developed suburbs were characterized by lack of planned and motor able accesses, drainages and irregular building developments and this limits the accessibility levels of the waste management service providers to the areas. The study recommended capacity building in both the Public and the Private sector in solid waste management would greatly improve their skills and competence in handling the ever-increasing waste generation in the metropolis as well as the enactment of stringent rules and regulations by both the state agency for environmental protection (BASEPA) and Bauchi State Urban Development Board (BSUDB) to regulate the erection of buildings illegally in and around the metropolitan areas of the state.

In addition, Ogbe (2014)**,** analysed the impact of private sector as against the conventional (public sector) in waste disposal in urban towns of Delta state as perceived by users as a means of advocating and promoting co-operative approach or a hand off of the weaker sector among the two. The study adopted the field survey design using 214 samples, who were Household heads (180) and Environmental officer (34), four research questions and one

hypothesis that guided the study. Descriptive statistics and paired t-test were used to analyze the data at 0.05 intervals. The study found that the private sector had advantaged score in all four variables of equipment, personnel, cost effectiveness and general overall effectiveness over the public sector. It was recommended among others that government/private participation should be encouraged and the private sector participation in refuse disposal would be a better means of keeping a sanitary environment.

Also, Uwadiegwu and Chukwu (2013) studied the urban solid waste management strategies in three layouts in Enugu city. Namely, Independence Layout (low density), Idaw River (medium density) and Uwani (high density) were used for the study. About 310 households selected randomly from the layouts participated as respondents. Principal Components Analysis (PCA) version of Factor Analysis was used to analyse the responses of respondents. The PCA was used to reduce the 27 considered management options into 7 composite strategies which should be adopted for effective urban solid waste management. They are citizen mobilization and environmental education, strengthening of public agencies, responsible government, logistics and infrastructural improvement, legislation, appropriate technologies, monitoring and surveillance. It is recommended that all segments of the society must team up with public agency to find a panacea to urban solid waste management.

Elsewhere, outside Nigeria, Akaateba and Yakubu (2013) used a cross-sectional household survey to investigate householders' satisfaction with solid waste collection services provided by Zoomlion Ghana Ltd in the Wa Municipality. A total of 193 householders were selected through simple random sampling from registered household clients of Zoomlion Ghana Ltd in the Wa Municipality. The results of the study revealed that householders were 'moderately satisfied' with most waste management services delivered by the Company

indicating an acceptable level of service delivery. The one-way ANOVA results showed significant differences in householders' satisfaction by income level and house type for service delivery dimensions on frequency of waste collection; handling of waste during transport and disposal; and household education on waste management. The study therefore concluded that although the services delivered by the company can be considered as acceptable, much improvement could be made by simply addressing issues on household education, prompt response to user complains and ensuring effective monitoring and sanctioning by the Municipal Assembly as this will enable Zoomlion Ghana Ltd deliver quality services to its clients.

From all the reviewed empirical studies, one common trend is the focus on strategies for ensuring efficient waste management process. However, it is worth to note that from all the reviewed studies above, none have focused on assessing the effectiveness of public-private partnership strategy in waste management in Kaduna State in particular, hence the need for this study to explore performance of public-private partnerships involved in waste management in the study area, with a view to recommending the appropriate measures necessary to ensure that the set goals for the partnership are achieved.

CHAPTER THREE

STUDY AREA AND METHODOLOGY

3.1 THE STUDY AREA

3.1.1 Location and Size of the Study Area

Kaduna metropolis is located between Latitudes 10º 25 N - 10º 36 N of the Equator and Longitudes 7º 21 E - 7º 30 E of the Greenwich Meridian (Quickbird imagery, 2011). It is bounded in north by Igabi LGA, southern and western parts by Chikun LGA and the eastern part by Kajuru LGA. The city formerly occupied a land area of 21.10 Km² in 1960 and has increased significantly to 172.47 Km² in 2010 due to spatial expansion and development (Ndabula,Jidauni, Oyatayo, Averike and Iguisi 2014; Akpu, 2012). The distance between the eastern and western limits of the metropolis is approximately13.7km while the north to south distance is about 20 Km. Due to spatial expansion development, through government legislation, Kaduna metropolis has annexed some of the settlements that were outside the city limits (Akpu, 2012). The Kaduna River tends to divide the city into two unequal parts and the metropolis is composed of Kaduna North, Kaduna South, parts of Igabi and Chikun Local Government Areas (Oyedele, 2011). The map of the Study area is presented in (Figure 3.1).

3.1.2 Climate

The study area has a tropical continental climate (Aw) with distinct wet and dry seasons, reflecting the influences of tropical maritime air mass (mT) and tropical continental air mass (cT) which alternate over the country. When mT which originates over the Atlantic Ocean, prevails over the area, it brings in the rainy seasons. While cT originates from the Sahara Desert and it brings in the dry season with cold and dusty air that occasionally limits visibility and reduces

solar radiation bringing in harmattan conditions in the areas (Iguisi, 1996). Kaduna metropolis experiences four distinct seasons:

1. Dry and cold season- from end of November to February
2. Dry and hot season- from March to beginning of May
3. Wet and warm season- from mid May to beginning of October
4. Dry and warm season- from mid October to mid-November

The city has mean monthly minimum and maximum temperatures of 15.9°C and 35.35°C respectively, with a range of about 19.45°. The highest temperatures are recorded in March and April, and the lowest occurred in December and January. Average annual rainfall in the city is about 1530mm; it ranges from 0.00mm November and 825.0mm in August, which is the wettest month. High evaporation during the dry season creates water shortage problems in many part of the metropolis and night temperatures is recorded as low as 10^0C around January and day time temperatures as high as 40^0C in April (Iguisi 1996). These climatic elements affect the rate of waste decomposition especially if not properly disposed which invariably increases the odorous nature of the environment. Moreover, during rainy season, many inhabitants dump their wastes in drainage channels which often clog the channels and make waste to spill over on to streets and public space.

3.1.3 Soils and Vegetation

The soils are typically red-brown to red-yellow tropical ferruginous soils derived from the regolith of the Basement complex. In some places these soils are covered by a layer of Aeolian drift materials. Soils in the upland are rich in red clay and sand but poor in organic matter. While soils within the flood plains are rich in kaolinitic clay and organic matter and are referred to as Fadama soils (Iguisi, 1996).

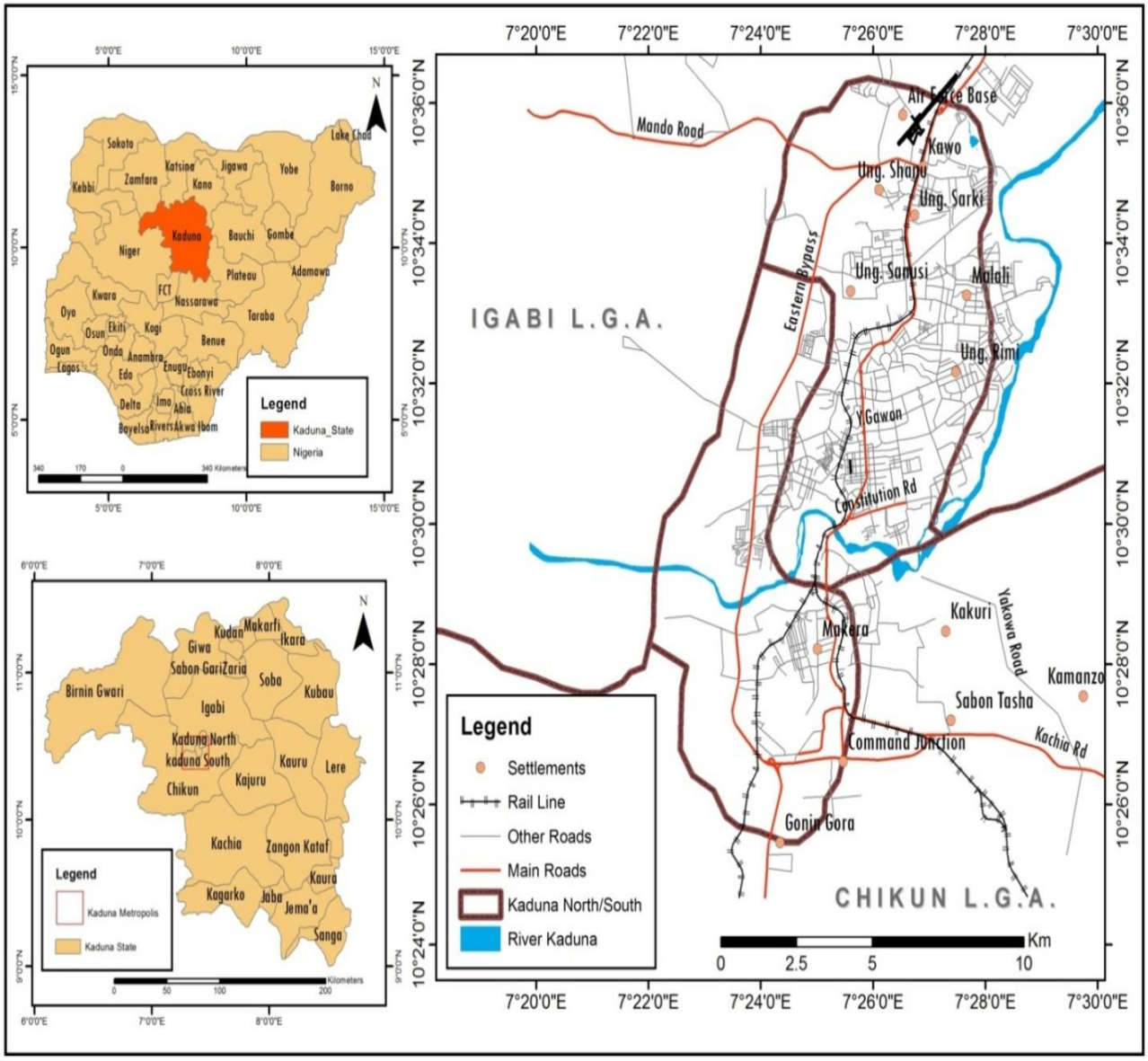


Figure 3.1: Kaduna Metropolis

Source: Adapted from Administrative Map of Kaduna State

Kaduna metropolis is located within the Guinea savanna vegetation zone of Nigeria; therefore it has a savannah grassland type of vegetation. The natural vegetation of this zone consists of scattered trees interspersed with tall grasses. However human activities associated with urbanization have seriously modified to the extent that now, trees are most often found only as ornamental ones, comprising mostly of exotic species. Such as Eucalyptus and economic trees such as guava, mango, sheer butter trees *(Viteletriaparadoxa), isoberliniadoka, Parkiabiglobosa,* silk cotton tree (*ceibapentadra)* and a variety of flowers with an average height of about 6m-10m. Other less frequent shrub species are *Dachrostachys specie, Termalina specie, Vitexpiliostima* etc. The area consists of vegetal cover made up of scattered trees predominantly grasses (Usman, 2012). In public places, especially within the built-up areas, the trees shed their leaves during the dry seasons which constitute wastes. Also people use them for various purposes and their residues are left as waste in the environment.

3.1.4 Population

The population of Kaduna has grown rapidly from 40,000 in 1952 to 149,000 in 1963 to an estimated 150,000 in 1965 and 500,000 in 1984 (DFD final research report, 2003). The 1991 census put the human population of Kaduna metropolis at 971,070 (NPC, 1991). Based on 2.7% growth rate, the population was estimated to have reach 1,448,129 in 2006. By 2009, at 3.0% growth rate, the population was estimated to have hit 1,582,409. The-population was projected to reach 1,729,142 by 2012. This high growth rate can be attributed to natural increase and high rate of immigration (Akpu, 2012). The increase in population of the area also comes with increase in waste generation, which may not be matched with the available waste management infrastructure provided by the authority. Hence compounding the waste management related issues in the environment.

3.1.5 Settlement Pattern

Kaduna Metropolis is divided into two by river Kaduna. The northern part is made up of residential quarters mentioned here in decreasing order of population density; Hayin-Banki, Badarawa, Malali, Unguwan Dosa, Unguwan Sarkin Musulmi, Unguwan Kanawa, Unguwan Shanu and Kurmin Mashi. These areas serve mixed residential and commercial purposes and are interspersed with Government Institutions and military establishments such as schools, hospitals, Nigerian Defense Academy and military Barracks. The central part of Kaduna metropolis is made up of Government Residential Area, polo grounds, race course, and the state house of assembly building (Lugard hall). The area has been designed with broad tree-lined avenues. The main axis avenue is known as Independence Way led south through an open area consisting of military parade grounds, golf course and other government establishments (Usman, 2012).

The low density core is flanked to the west by high density commercial and residential areas along Ahmadu Bello Way, which is the principal commercial artery of Kaduna Metropolis. This is where a regional and the largest market in the city, Abubakar Gumi Market is located. To the west of the Ahmadu Bello Way lies high density residential quarters such as Sabon Gari, Tudun Nupawa, Tudun Wada, Unguwan Sanusi and Badikko. The central part of Kaduna South constitutes the largest industrial area of the city known as Kakuri Industrial area or Kaduna South Industrial Area. This area is flanked to the west by medium density residential quarters such as Nasarawa and Tirkania. To the east is flanked by high density residential areas like Barnawa, Narayi, Unguwan Television, SabonYelwa, Unguwan Sunday/UngwanBako and Sabon Tasha (Usman, 2012).

Military establishments are scattered all over the city. Right from the Lugard's plan of 1917 up to the late 1960s, they were the largest occupiers of land in Kaduna Metropolis (28.8%),

followed by Low Density Housing (20.7%). Due to influx of people into the city coupled with rapid population increase characteristics of cities in developing countries, residential quarters (especially high density housing) have recently taken the lead. . It is now the "country residence of bureaucrats, technocrats, retired military officers and businessmen as well as the second most cosmopolitan city in Nigeria after Lagos and a multi ethnic society which is inhabited by more than 200 different ethnic groups (Ndabula *et al.,* 2014). It is generally known that the pattern of settlement greatly determines the type of waste management infrastructures to be put in place.

As noted by Zurbrugg (2003) generally municipal authorities in developing countries collect their wastes in limited areas especially residential areas where rich people are located or where they find more political influence. As a result only some parts of the cities in developing countries are relatively clean. Slums or low income settlements are usually not reached by certain methods of transport vehicles due to the small roads, slopes and overcrowding.

3.1.6 Socio-Economic Activities

Economic activities in northern Nigeria Kaduna ranks second only to Kano. It has many industrial manufacturing plants mostly located within the largest industrial area at Kakuri. Other small industrial areas include Unguwan Mu'azu industrial layout and Kawo Light Industrial Area. There is also the international trade fair center, where the Kaduna international trade fair takes place annually. Some of the industrial manufacturing plants found within Kaduna metropolis (especially in Kakuri area) include: Federal Super Phosphate Fertilizer Company Limited, Peugeot Automobile (Nigeria) Limited, Arewa Textile Limited, First Aluminum (Nigeria) Limited, Arewa Bottles, Ballapur Glass Nigeria Limited, NOCACO Limited, Kaduna Textiles, National Oil and Chemical Company Limited, Nigerian Breweries Limited, Defense Industrial Company of Nigeria, Kaduna Refinery and Petro-chemical Company Limited etc

The city is also a railway and road network hub connecting north and south of the country in addition to housing an international airport and important educational institutions such as the Kaduna Polytechnic, Kaduna State University and the Nigerian Defense Academy (The only military university in West Africa). Kaduna still plays an important role in the politics of northern Nigeria. Each of their northern states maintain a liaison office in Kaduna and governors of northern states holds there quarterly meetings in Kaduna to discuss matters of common interest affecting the north (Usman, 2012). Since waste generation types and quantity are products of types of economic activities, living standards and level of development. Therefore the diverse economic activities carried out in the study area indicate that various types and quantities of wastes are generated daily, hence requires a more functionally-effective waste management service providers.

3.2 METHODOLOGY

3.2.1 Reconnaissance Survey

A reconnaissance survey was carried out to familiarize the researcher with the study area. The list of Private actors of waste management, functions, and their locations were obtained from Kaduna Environmental Protection Agency (KEPA). The interviews and discussions on waste management practices were conducted with some personnel. The discussion helped the researcher gain a good overview of how the government partners with the private individuals on waste management in the study area.

3.2.2 Types of Data Utilized

In line with the objectives of the study, the data utilized for the study include the followings:-

a) Characteristics of private partners with government in waste management.
b) Data on methods of waste collection and disposal
c) Forms of waste management practices adopted by the private partners in waste management
d) Forms of operations and strategies employed by these partners' regulatory processes involved (standards, permits, sanctions and licenses).
e) Data on people's perception of PPP approach to waste management.
f) The challenges facing the private companies in the management of waste.

3.2.3 Sources of data

For the purpose of this research, data were obtained from primary and secondary source.

3.2.3.1 Primary sources

The primary sources of data are questionnaire, field observations and Key Informant Interview (KII). These contain relevant and well-structured questions aimed at eliciting responses that addresses the objectives of the study.

3.2.3.2Secondary sources

Secondary materials are from KEPA, the waste and sanitation units of Kaduna north and south LGA's secretariat. The materials used for literature and conceptual frameworks were obtained from internet sourced document, journals, textbooks, newspapers, thesis and dissertations related to the study. The information also provided the basis for proper understandingof the legislation guiding the environment in general and wastes management in particular in Nigeria as a whole and the study area as well which helped in addressing various issues raised in the study objectives.

3.2.4 Sample Size and Sampling Techniques

The population of Kaduna Metropolis which is 1,570,331 according to 2006 census (NPC, 2009) is projected to 2015 which is 4,268,160 used in this study. To determine the sample size for this research, the Krejcie and Morgan's (1970) table of sample size was adopted, which indicate that for a range of population 1,600,000 – 4,300,000 the sample size is 384 with 95 percent margin error Hence, the study adopted 384 sample size (see Table 3.1) The projected population is derived from the formula;

$P_{n=} Po\ e^{rn}$

Where; $P_{n=}$ Future population (2015)

Po = Base year population (2006)

r = Growth rate (3%)

e = Exponential sign

n = Interval between future population and base year population (2015- 2006) 9years

The size of the sample population of each ward is determined with the formula below;

$n/N \times Q$

Where n = population of ward

N = total population of wards

Q = Total number of questionnaire

These two approaches provide the bases for Table 3.1 where the sample size is clearly presented.

In addition, one key officer in each of the 48 private companies involved in waste management in the study area was selected as part of the sample for the study. (see Table 3.2) . The 384 samples were taken from the public in the study area each ward was assigned a number of questionnaires proportionate to the projected population as presented in Table 3.1.

Table 3.1: Sample Size by Local Government Area

S/N	Local government area	Locality	Population (Census 2006)	Projected population (2015)	Sample size per local government
1.	Kaduna North	Badarawa Unguwan-dosa Kawo	364,575	990,915	89
2.	Kaduna South	Kakuri Barnawa Kabala West Nasarawa Tudunwada	402,731	1,094,623	99
3.	Parts of Igabi	Rigasa Unguwan-Rimi Mando	430,753	1,170,787	105
4.	Parts of Chikun	Unguwan-Romi Sabon-Tasha Kudenden	372,272	1,011,835	91
	Total		1,570,331	4,268,160	384

Source; Author's Computation from 2006 census (NPC, 2009)

A total of three hundred and eighty four (384) residents were surveyed from different ages, sex and social class. Forty-five (45) copies of questionnaire were not retrieved and thirteen (13) were wrongly completed which were subsequently cancelled. This implied that, only three hundred and twenty-six (326) of the returned questionnaire (that is 84. 89%) were properly completed and were used for the analysis. Responses to the questionnaire were pooled, edited and scored. Nominal values were assigned to the items according to scales, questions for the public on Public-private partnership awareness had an assigned score of 1-5 for ―Strongly Disagree , Disagree, Neither agree nor Disagree, Agree, and Strongly Agree.

Out of the 48 copies of questionnaire administered to private firms identified to be involved in waste management in the study area, a total of 44 which represents about 92% of the administered copies were retrieved and used for the analysis.

Table 3.2a: List of Private Companies Engaged in Waste Management

S/No	Operational Area	Company Engaged
1	Barakallahu and Environs	Shaded Global Services
2	Rigachikun North South and N.T.I	Sleeve Logistics
3	Old Airport/Air Force base North Afaka	Atiwe Nig. Ltd
4	Ung. Gwari/Ung. Kaji and Trade Fair Complex Area	Danshehu
5	RafinGuza settlement	Gold Fish Integrated Services
6	Mando/FarinGida and National Eye centre	Nabalco& Sons Nig.
7	HayinBanki and New Extension	Minimum Resources Global Ventures
8	Kawo high density/New extension	Juma& Co. Ltd
9	Ung. Dosa and Badarawa settlement	NAC Engr. Co
10	Malali GRA, Low cost, village and Ung. Maisamari	AJNU Ventures
11	KurminMashi and New extension	Sultana Global Solution
12	Govt. College area, Abakpa, Ung. Shanu and Ung. Kanawa	G4 Nig. Ltd
13	Ung. Sarki and GRA	CleanTexEnv. Services
14	Ung. Rimi GRA	Muasfat Int'l.
15	Coronation/State House of Assembly Complex area	Sahif Global Resources Ltd
16	Ung. Sanusi, Badiko, Govt. House area and Askolaye	Jama'a Integrated Services
17	HayinDanmani settlement	Express Agency ventures
18	Rigasa North	M.G. Nig. Ltd
19	Rigasa South	Salim Investment Co.
20	Tudun Wada I	F & J Nig. Ltd
21	TudunNupawa and Panteka area	Dangado Enterprises
22	Doka 1 and Magadishu area	Wetrack Global Resources
s23	Doka 2 and Gabasawa area	Mamia Nig. Ltd
24	Ung. Rimi settlement	Eilat Global Services Ltd.
25	Kabala Costain and Kigo road New Extension	Himma Dynamics
26	Tudun Wada II	Subula Integrated Services Ltd.
27	Tudun Wada III and Kinkinau settlement	Finix-Nuh ventures
28	Bakinruwa, Kabala west and Ung. Muazu	InterProject Ltd
29	Kudenda settlement and Industrial area	Idahia Enterprises Ltd
30	Down Quarters and Railway station area	Biyagim ventures Nig. Ltd.
31	Nassarawa and Trikaniya settlement	Jawyn Designs
32	Kakuri, Makera and Ung. Mission	C.K. & K.
33	College of Environment and Challawa	Fadiya Integrated Services

Source: Authors computation from Kaduna Environmental Protection Agency Report (2015)

Table 3.2b: List of Private Companies Engaged in Waste Management (Cont'd)

34	Barnawa High Density and GRA	Epitome Int'l Nig. Ltd.
35	Narayi village and Bayan Dutse	Mazuga Engr. Ltd.
36	KakuriGwari and Industrial area	Magna Engr. Ltd.
37	Shagarilowcost and Shekari avenue	Wide Reach Engr. Services
38	Narayi High cost	B.M.B. investment
39	Sabon Tasha North (Ung. Pama and Boro)	Scienteque Consultants
40	Ung. Boro II/Mahuta settlement and Kamazo	The Symbols ventures Ltd.
41	Gonin Gora West	Hejeesg Integrated services Ltd
42	Gonin Gora East and Buwaya	Nchas Nig. Ltd
43	Ung. Romi settlement	Gemstat Nig. Ltd
44	Television and Ung. Yelwa	Rik-Gee Nig. Ltd
45	Poly and New Romi settlement	El-Captone Int'l Ltd
46	Ung. Gimbiya and Ung. Bulus	M.I. Daura Enterprises
47	Sabon Tasha South and Tsaunin Kura area	Environmental System Int'l Ltd
48	Ung. Sunday	First System Integrated

Source: Authors computation from Kaduna Environmental Protection Agency Report (2015)

3.2.5 Methods of Data Analysis

Objective i characterize the private actors involved in partnership of waste management in the study area

This objective was achieved through the use of descriptive analytical techniques such as frequency and percentage. The results were presented in bar/pie charts.

Objective ii: analyze the efficiency of public-private partnership to solid waste management in Kaduna metropolis

This objective was achieved through the use of Likert scale to analyze the data generated on people's perception of PPP approach to solid waste management in the study area

Objective iii and iv; examine the causes for engaging private firms in waste management by the government and examine the constraints to public and private partnership approach to waste management in the study area.

These objectives were achieved using descriptive statistics such as frequency distribution and percentages to analyse the data gathered from the questionnaires administered to both the private officers of the selected firms and residents and the results were presented in tables and charts.

CHAPTER FOUR

DATA ANALYSIS AND DISCUSSION OF RESULTS

4.1 SOCIO-ECONOMIC CHARACTERISTICS OF THE PRIVATE PARTNERS IN WASTE MANAGEMENT

Table 4.1 shows the educational qualification and income of the contractors as major characteristics that affect their activities. From the result on the educational qualification of the officials revealed that majority have attained tertiary level of education, while the rest have secondary school qualifications.In addition, it also shows from Table 4.1 that the highest amount of income earned by most officials is between ₦31,000 - ₦50,000 which accounted for 52.3%, followed by those earning between ₦51,000 and above that accounted for 38.6%. The least income earned by the officials is between ₦11,000 - ₦30,000 which make up 9.1%.

Table 4.1:Distribution on Socio economic characteristics of private contractors

Characteristics	Frequency	Percentage
Qualification		
Primary	0	0.0
Secondary	9	20.5
Tertiary	35	79.5
Income		
Below ₦10,000	0	0.0
₦11,000 - ₦30,000	4	9.1
₦31,000 - ₦50,000	23	52.3
₦51,000 and above	17	38.6

Source: Field Survey, 2014

This implies that bulk of the officials earn above the minimum wage of ₦18,500 obtainable in the Nigerian civil service sector. This high level of income of officials may also be likened to their level of educational attainments. As it is generally believed that individual

education attainments, determine the type of occupation and amount of income such individual earns.

4.1.1 Socio-economic Characteristics of Respondents from the Public

Table 4.2 shows the distribution of respondents by age, sex, educational level, occupation and level of income. Gender distribution of respondents shows that males constitute the majority with about 60%, while the females were close to 40%. The dominance of male respondents over their female counterparts is due to the fact that male respondents were more accessible and willing to give information as compared to the females.

The marital pattern of the respondents revealed that majority (82.4%) were married, followed by the unmarried with 10.1%. While widows and divorced accounted for 2.1% and 4.3% respectively. Educationally, about (55%) have attained tertiary educational qualifications, followed by those with secondary qualifications that made up 27.3%. Whereas, others qualifications such as Quranic education and other literacy programmes that are not covered under the normal class room curriculum accounted for 4.3%. The high percentage of those with tertiary educational attainments indicate that respondents in the study area are educated and as such should easily and readily co-operate in achieving a healthy living environment through good solid waste management practices. The importance of education to waste management is also emphasised by Pacey (1990) who reported that formal education is a prerequisite for positive change in sanitation behaviour.

Distribution of respondents by occupation indicated that civil servants constituted the highest proportion of respondents with 42.0%, followed by traders (31.3%). The artisans accounted for 15.6%, while other occupations include farmers, apprentices among others accounted for 11.0%.

Table 4.2: Socio-Economic Characteristics of the Respondents (Public)

Gender	**Frequency**	**Percentage**
Male	196	60.1
Female	130	39.9
Total	**326**	**100.0**
Marital Status		
Single	33	10.1
Married	272	83.4
Widow	7	2.1
Divorced	14	4.3
Total	**326**	**100.0**
Educational Qualifications		
Primary school education	45	13.8
Secondary school education	89	27.3
Tertiary education	178	54.6
Others	14	4.3
Total	**326**	**100.0**
Occupation		
Trading	102	31.3
Artisan	51	15.6
Civil Servant	137	42.0
Others	36	11.0
Total	**326**	**100.0**
Income Levels		
Below N10,000	37	11.3
N11,000 – N30,000	64	19.6
N31,000 – N50,000	125	38.3
N50,000 and above	100	30.7
Total	**326**	**100.0**

Source: Field Survey, 2015.

The earnings of the respondents revealed that majority that comprise of 38.3% earn between N31,000 – N50,000 monthly, whereas, those earing below N10,000 monthly accounted for the least with 11.3%. The dominance of those with occupation as civil servants and monthly income between N31,000–N50,000 is not surprising, as this can be attributed to the high percentage of respondents with tertiary education qualifications. This is because; it is generally believed that one's educational attainments determine the type of occupation as well as income one gets. In concordance, Tsai (2007) gives evidence that higher incomes and higher education levels increase the willingness to participate in waste management programmes like recycling in order to protect the environment.

4.3 CAPACITY OF PRIVATE CONTRACTORS IN WASTE MANAGEMENT

In line with objective one, Table 4.3 reveals the strength of the contracted firms in terms of manpower and equipment. In terms of manpower, the total capacity of the entire firms is 223, out of which 123 were labourers, drivers were 57 and managers are 43. In terms of equipment, it was found that the entire private firms have a total of 160 different types of equipment, out of which 50 were pick-up vans, compact vehicles were 21, while other types of equipment like wheel barrows, motorcycles and official cars amounted 89.

Table 4.3: Capacity of Private Contractors

Capacities	Total
Manpower	
Labourers	123
Drivers	57
Managers	43
Total	**223**
Operational vehicles	
Pick-up van	50
Compact vehicle	21
Others	89
Total	**160**

Source: Field Survey, 2014

This is an indication that the firms are small scale in terms of size, but considering the area of coverage (Kaduna metropolis) it is relatively fair to conclude that positive result should be expected. This is because the strength and quality of staff with available facilities are often an indication of firm's waste collection capacity.

4.3.1 Types of Waste Collection and Disposal Options by Private actors

Table 4.4 shows that both residential and commercial types of wastes dominated the types of wastes mostly collected in the study area. The least type of waste was industrial wastes with less than twenty percent of the total. This type of wastes generated in the area is an indication of residential and commercial land use activities dominant in the area.

Table 4.4 Distribution on Waste type and Management Practices after Collection

Variables	Frequency	Percentage
Type of waste collected		
Domestic	18	40.9
Industrial	8	18.2
Commercial	18	40.9
Total	**44**	**100**
Waste Management Practices after Collection		
Sort the re-usables	Nil	0
Sort the recyclables	Nil	0
Separate bio-degradable from non-bio degradable materials	Nil	0
Convey everything to the permanent dumpsite	44	100
Total	**44**	**100**

Source: Field Survey, 2015.

Waste recycling or sorting practices not only improve waste management process but also brings economic benefits to those involved in it but from Table 4.3, it is clear that none of the private firms partnering in waste management in the study area are involved in either waste sorting, recycling and or re-use. This is indicated 100% of the sampled firms attested that after waste collection, the entire waste is then disposed at the permanent dumpsite.

4.3.1.1 Waste Collection point/Equipment used and Frequency of Collection

Table 4.5 shows the distribution of responses from private firms on the type of collection points from where wastes are collected by the private waste management companies. Majority (40.9%) attested to collect the waste from personal bin (household dustbin), while about 29.6% and 29.5% of the private collectors regularly packed wastes from KEPA bins and authorized dumpsites respectively. Moreso, trucks dominated the type of conveyance equipment used for waste collection (45.5%), followed by the use of compact vehicles which accounted for 31.8%.

Plate I is an example of compact vehicle belonging to Wet Global Limited. This implies that waste collection and disposal in the study area is expected to be carried out more efficiently and effectively as the use of these forms of sophisticated equipment will help for better collection and evacuation of wastes.

Table 4.5 Distribution on Waste Collection point/Equipment, Frequency of Collection

Collection Point	**Frequency**	**Percentage**
KEPA bins	13	29.6
Personal bins	18	40.9
Authorized dumpsites	13	29.5
Total	**44**	**100**
Collection Equipment		
Wheel barrows	7	15.9
Trucks	20	45.5
Compact vehicle	14	31.8
Others	3	6.8
Total	**44**	**100**
Frequency of Waste Collection		
Once weekly	25	56.8
Twice weekly	14	31.8
Others	5	11.4
Total	**44**	**100**

Source: Field Survey, 2015.

Based on the frequency of waste collection, majority collected wastes once a week with about 56.8%, followed by those who gathered their wastes twice a week. The frequency of waste collection seemed to be in line with the standard frequency of waste collection especially if wastes are sourced from the residential areas. This frequency is typical of urban centres as documented by Akaateba and Yakubu (2013) that the officially stipulated frequency for waste

collection is once a week for house-to-house collection and no defined collection frequency for the Central Collection Point where by waste is collected as and when containers are full.



Plate I: A Compact Truck Used for Waste Collection in Doka area by Wet-Track Global
Source: Authors Field Survey, 2015

4.3.2 Nature and Types of Waste Generated by Public

Presentation in Table 4.6 reveals waste generation issues by the public respondents. It revealed that the highest proportion of the respondents agreed that they mostly generate domestic waste. This is not surprising as it represents an indication that the area serves mostly as residential area. This is because type of wastes generated in an area is a product of types of socio-economic activities dominant in the area. On the type of dumpsites where wastes are disposed, majority of the respondents claimed they use authorized dumpsite, while only minute percentage of respondents agreed that they regularly use unauthorized dumpsite for their waste disposal.

Table 4.6: Opinion of Respondents on Waste generation Issues

Variables		SD	D	N	A	SA	Total
Household wastes dominated type of waste generation	Freq	8	13	6	204	95	326
	%	2.5	4.0	1.6	62.6	29.1	100
Waste is disposed in unauthorized dumpsite	Freq	0	154	44	111	0	326
	%	00	47.2	13.5	34.0	00	100
Dumpsite is far away from Residence	Freq	22	72	15	169	48	326
	%	6.7	22.1	4.6	51.8	14.7	100
Waste is disposed of in designated dumpsites	Freq	104	177	12	23	10	326
	%	31.9	54.3	3.7	7.1	3.1	100
Improper waste disposal have negative effect on the environment	Freq	5	9	7	94	211	326
	%	1.5	2.8	2.1	28.8	64.7	100
Improper waste disposal have negative effects on human health	Freq	3	8	6	92	217	326
	%	0.9	2.5	1.8	28.2	66.6	100

Source: Field Survey, 2015.

Analysis on the location of dumpsites where wastes are temporarily disposed before final collection by the authorities from the residence shows that majority of the respondents agreed that the dumpsites are not far away from their residence, while the least percentage about a quarter of the respondents neither agreed nor disagreed that the dumpsite is far away from them. This is an indication that indiscriminate waste dumping that usually results from citing of dumpsites far away from residential areas/unavailability of dumpsites is not expected to be the case in most parts of the study area. For instance, from the researcher's observations during the reconnaissance survey around the metropolitan parts of the metropolitan areas that are well served with temporal dumpsites where indiscriminate waste disposal is seldomly witnessed includes the low density areas of Air force Base, Unguwan Rimi, Malali, Kawo new ext., Unguwan Dosa, Barnawa, Barakallahu among others areas.

Furthermore, the result on level of awareness of the negative effects of improper waste disposal on human health and the environment revealed that majority strongly claimed to be aware that improper waste management has inimical effects on human and environmental health respectively. Only as little as 1.5% and 0.9% claimed not to be aware of the negative effects of improper wastes disposal on their health and the environment. This implies that the level of awareness among the respondents of the negative implications of improper waste management to their health and the environment.

4.3.2.1 Methods of Waste Disposal by the Public.

Figure 4.1 indicated that open dump system dominates the method of waste disposal practices of most respondents. This is evident where about 56.4% identified open dump system as their method for waste disposal. This may account for the large quantity indiscriminately dumped wastes that are found littered along gutter, ponds, roadside and backyard of residential, commercial and industrial areas as field observation around Tudun Wada, Narayi, Badarawa and sabon-tasha, Rigasa north reveal (See plate II). The waste generated in these part of the study area is more than the wastes collected, the residents are underserved by private sectors as compared to the low density areas of Malali and Unguwan Rimi G.R.A.

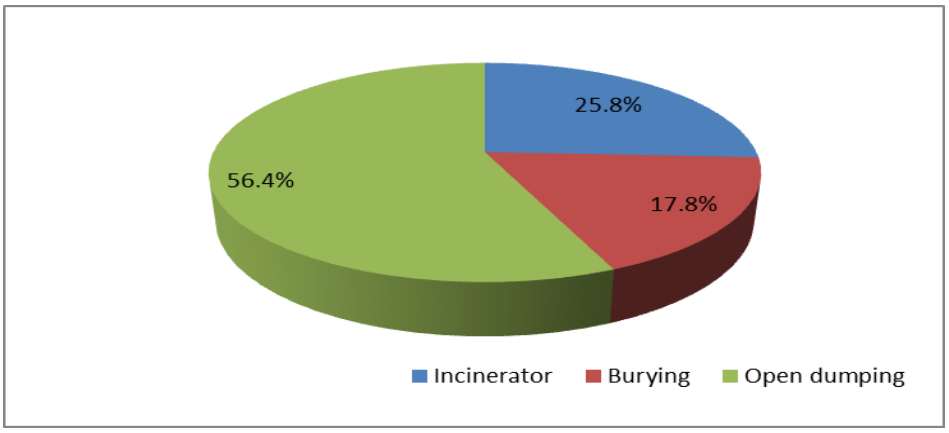


Figure 4.1: Distribution of Respondents on Waste Management Methods
Source: Field Survey, 2015.



Plate II: Indiscriminate dumping of refuse in Rigasa North.

Source: Authors Field Survey, 2015

In addition, least proportion of respondents (17.8%) buries their wastes. The use of waste burying method as the least method of waste management can be attributed to lack of undeveloped land space as well as awareness of a possible contamination of ground water as a result of such practices.

4.4 CAUSES FOR ENGAGING PRIVATE FIRMS IN WASTE MANAGEMENT

Figure 4.2 indicated that the major reason for adoption of public private partnership in waste management is because private actors are more efficient than public servants in service delivery. This is so as majority of the representatives of private actors indicated that they are more efficient in service delivery than their public counterparts.

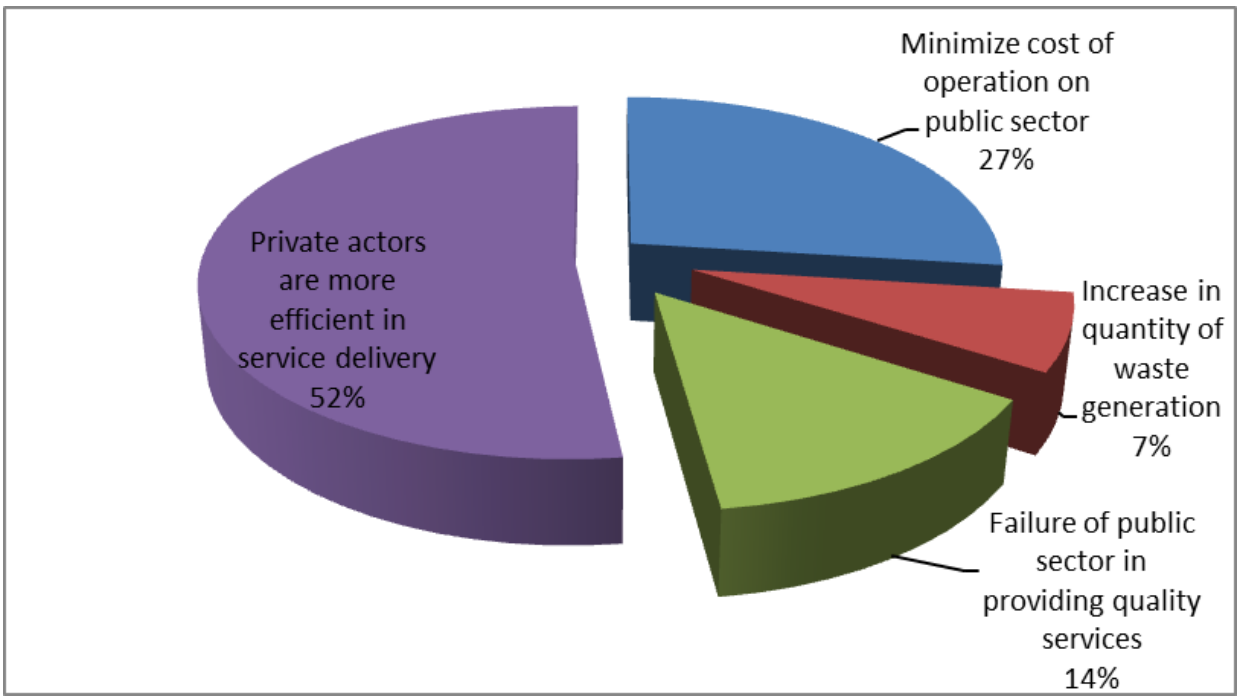


Figure 4.2 Reasons for adoption of private actors in Waste Management

Source: Field Survey, 2015

More so, about 27% of the private actors indicated that the partnership was formed to minimize cost of operation by public sector. Those who believe that it was due to increase in quantity of waste generation and failure of public sector in providing quality services accounted for 7.0% and 14.0% respectively. The general claim that efficiency in service delivery by the private sectors is the basis for adoption of private partners in waste management is expected because studies have shown that public sectors are often ineffective in service provision especially in waste management activities. In a nutshell, the basis for the inclusion of private actors in waste management can be summed up with the assertion by Gentry and Fernandez (1997) that public private partnership often starts when a crisis is identified, which can occur when a service is not delivered, the need is high and the government cannot do it anymore. Also when there is long term planning, driven by a clear understanding of and respect for the needs of

various actors and when there is an individual, somebody who pushes for change called the 'champion' that is very influential and can make a huge difference.

4.4.1 Responsibility for Waste Management

Figure 4.3 showed the responses on whose responsibility it was to manage the wastes they generate. Most respondents (61.96%) claimed that it was the responsibility of the government to manage waste in the environment, while only a few (18.40%) believe it was the responsibility of the individual to collect and dispose their waste materials.

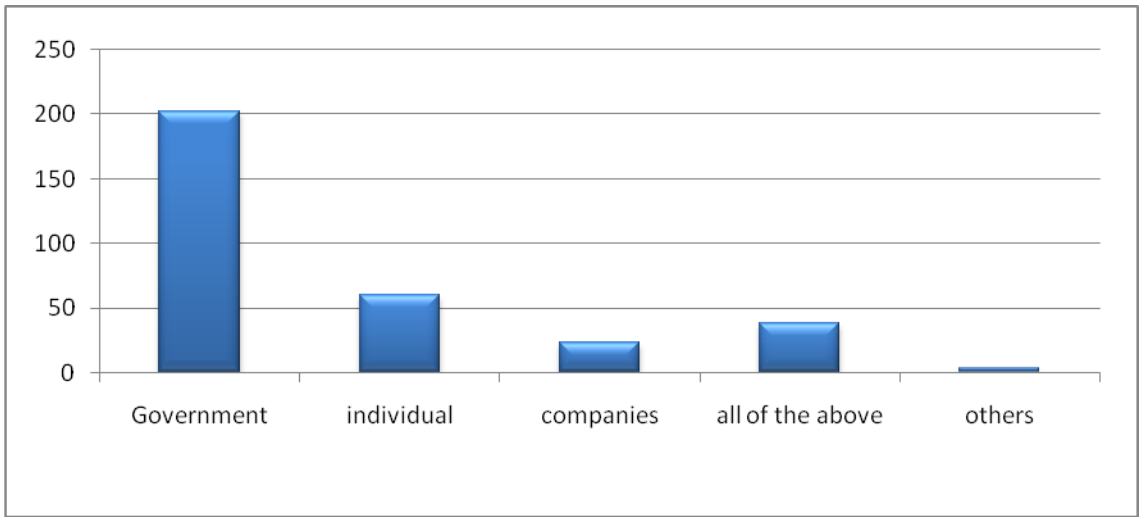


Figure 4.3; Response on the Responsibility of Waste Collection and Disposal

Source: Field Survey, 2015.

This outcome is not surprising, as it is well stipulated that government is solely responsible for waste management in Nigeria. However, this may account for the reason why majority in Table 4.6 were found not to be willing to pay for their waste collection and disposal services rendered by the private companies.

4.5 EFFECTIVENESS AND EFFICIENCY OF PUBLIC-PRIVATE PARTNERSHIP IN WASTE MANAGEMENT

The presentation in Table 4.7 provides an over view on the opinion of the respondents on the effectiveness and efficiency of Public-Private-Partnership approach to waste management. This assessment is necessitated by the increasing public demands for service quality from both public and private organizations. Therefore, it is important for various actors in public service delivery including waste management services to be increasingly concerned about increasing customer satisfaction as well as improvement in the environmental well-being.

From Table 4.7, it is indicated that quite a large proportion of the respondents attested to the existence of private waste managers within their areas of residence. On the promptness of waste managers to the complaints of customers that attested to the existence of private firm companies involved in waste management, majority (38.7%) agreed that there is promptness of waste manager's response to customer complaints, compared to approximately 3% who claimed the contrary. This is an indication that the performance of waste managers with regards to responses on customer satisfaction/needs can be inferred to as being averagely satisfactory.

The highest proportion of respondents disagreed that private actors are efficient in waste evacuation but populace kept littering the environment. Their assertion is right to some extent especially in the low density areas of Unguwan Rimi GRA, Unguwan Dosa, Malali GRA, Kawo new extension, Coronation/State House of Assembly Complex area, Kurmin Mashi etc, where private firms are mostly found in the early hours of the day moving from house to house and one street after another to pick wastes from the household bins to ensure that wastes are timely and effectively collected and disposed as at when due to guarantee healthy environment.

Table 4.7: Distribution of Effectiveness and Efficiency of PPP in Waste Management

Indicators of Effectiveness and Efficiency		SD	D	N	A	SA	Total
Private companies are involved in waste collection in my area	Freq	53	48	32	104	89	326
	%	16.3	14.7	9.8	31.9	27.3	100
Private actors give prompt response to user complaints	Freq	9	98	31	158	30	326
	%	2.8	30.1	19.3	38.7	9.2	100
Private actors evacuate wastes regularly but people kept on littering the environment	Freq	72	107	30	75	42	326
	%	22.1	32.8	9.2	23.1	12.9	100
Private actors collect wastes at regular intervals	Freq	55	112	41	72	46	326
	%	16.9	34.4	12.5	22.1	14.1	100
Present approach to waste collection/evacuation is satisfactory	Freq	40	136	28	79	43	326
	%	12.3	41.7	8.6	24.2	13.2	100
People are more willing to pay for waste collection and disposal	Freq	43	105	62	94	22	326
	%	13.2	32.2	19.0	28.8	6.7	100
Private actors have adequate equipment for waste collection	Freq	57	103	78	64	24	326
	%	17.5	31.6	23.9	19.6	7.4	100
Overall service delivery of private actors is commendable	Freq	6	101	32	170	17	326
	%	1.8	31.0	9.8	52.1	5.2	100

Source: Field Survey, 2015.

On the regularity of waste collections, most respondents disagreed that private waste collectors come to pick wastes on regular intervals. As observed from a field survey, respondents in this category are those residing in Rigasa, Tudun Wada, Kawo, Badarawa, Kabala and Sabo area which are mostly under-served due to the high rate of waste generated as a result of high population. In addition, most respondents (41.7%) also disagreed with the fact that the present

approach to waste collection and evacuation is satisfactory. This contradicts the findings by Kasim and Ali (2006) and Katusiimeh, Mol and Burger (2012) who reported in a related study in Dares Salaam city of Tanzania and Kampala respectively that majority of households are satisfied with the frequency of services provided by private waste collection firms.

On the willingness to pay for services, majority were unwilling to pay for waste collections services, while the least percentage that represents 6.7% strongly agreed that payment for waste collection services is necessary. According to Key informant interview, with private waste official, most respondents are not willing to pay for waste generated, in many cases residents and businessmen consider that it is the duty of the municipality to collect the waste and since they have received the service in the past without making a specific payment for it, they are often unwilling to start paying for a continuation of that service.

About one-third of the respondents which constitutes the majority disagreed that private actors have adequate equipment for waste collection and disposal, while only very few strongly agreed that private actors have adequate equipment for waste collection and disposal. It is worthy to emphasize that most of these private actors are small firms attempting to partner with the state agency in waste management, therefore, while the small size is observed, the capacity problems (equipment, manpower etc.) should be recognized.

Responses on the overall service delivery of private actors shows that majority (52.1%) agreed that the services are commendable. This is an indication that the involvement of private sectors in waste management has brought positive improvement to waste management. This is in-tune with the report by Onyema (2004) who noted that the progressive increase in the role of private service providers in the waste management sector over the past few years has brought about improved efficiency, effectiveness, integration and accountability.

4.6 CONSTRAINTS TO PUBLIC PRIVATE PARTNERSHIP

Table 4.8 reveals the constraints faced by private waste management firms in providing their services. Of all the constraints, poor enforcement of sanitation rules on the residents is viewed as severe by a little more than one-third of the respondents. The finding on poor sanitation enforcement is not surprising this is because, generally, people mostly shows poor attitudes to sanitation issues especially in most developing countries and this according to Enweze (2000) stems from the perception that environmental sanitation and hygiene related matters are of a lower-order priority than most other social issues.

Table 4.8: Constraints to Service Provision by Private Firms

Constraints	**Frequency**	**Percentage**
Unfair Competition from other Agencies	3	6.8
Non Cooperation of Residents	9	20.4
Poor accessibility to Buildings	13	29.6
Poor location of Permanent Dumpsites	5	11.4
Poor enforcement of Sanitation rules	14	31.8
Total	**44**	**100.0**

Source: Field Survey, 2015

Poor accessibility to building also ranked high as aas constraints to effective waste management service provision by private firms. From the field observations, areas around Tudunwada, Hayinbanki, Rigasa and its environs are mostly inaccessible due to the slum nature of the settlement as well as bad road conditions especially during the rainy seasons.

Noteworthy is the fact that unfair competition from other agencies is rated the least with 6.8%. This is because all the participating firms within the study area are assigned areas of operational jurisdiction within which they are expected to cover as presented in Table 3.2. This

assignment of duty units is expected to help for easy supervision and monitoring of performance by government taskforces.

4.6.1 **Problems encountered in Service Delivery of Private Actors among Residents**

Table 4.9 presents the distribution of respondents on the problems encountered from private firms' involvement in waste management in the study area. From the identified problems, discriminatory service provision by private firms dominated with 30.1%, followed by irregular collection of wastes with 20.6%. A cursory observation by the researcher shows that this is witnessed mostly by residents around the Rigasa and the environs where residents are underserved by the private firms mainly due to inaccessibility of residential areas by waste management service providers owing to nature of settlement patterns and road networks which is mostly in bad conditions.

Table 4.9: Associated Problems of Waste Collection by Private Firms

Constraints	**Frequency**	**Percentage**
Discriminatory Service Provision	98	30.1
Irregular Collection of Wastes	67	20.6
High Charges	56	17.2
Lack of Clean environment after waste collection	47	14.4
None	58	17.8
Total	**326**	**100.0**

Source: Field Survey, 2015

In addition, about 18% of the residents indicated that they have never encountered any problem from patronising private firm operators. It can be concluded that the reason for variation in the level of services enjoyed by the respondents may be due to location of residence, compliance to payments of N1000 per household per month whereby service providers claimed

that some areas do not pay regularly, social status of residents especially those in the slum areas of Rigasa who cannot afford three square meals not to say the payment of waste charges, some locations generate obnoxious waste which are difficult to evacuate and high quantity of waste generation. The finding can also be used to confirm the widely held view that the private waste collection agencies largely serve the high income residents (Katusiimeh *et al*, 2012; Kasim and Ali 2006).

CHAPTER FIVE

SUMMARY, RECOMMENDATIONS AND CONCLUSION

5.1 SUMMARY OF FINDINGS

Adoption of public-private partnership in waste management has emerged as a promising alternative to improve municipal waste services at a more efficient and cost effective manner. The achievement is largely dependent on capacity of the private partners, population to be served, quantity of waste generation and government policies regulating the citizen waste management behaviour as well as the activities of other stakeholders involved in waste management.

The result of the socio economic characteristics of private company officials shows that majority (79.5%) have attained tertiary level of education and their earnings differ, while the rest (21.5%) have secondary school qualifications, with majority earning monthly between ₦31,000 - ₦50,000 which accounted for 52.3%, followed by those earning between ₦51,000 and above that accounted for 38.6%.

In terms of manpower, the total capacity of the entire firms is 623, out of which 523 are labourers, drivers 57 and managers are 43 and in the area of equipment capacity, it was found that the entire private firms have a total of 160 different types of equipment, out of which 50 were pick-up vans, compact vehicles were 21, while other types of equipment like wheel barrows, motorcycles, official cars totalled 89. The type of wastes collected by the companies involved in waste management shows that both residential and commercial dominated with each accounting for about 40.9% each and the least type of waste being industrial wastes with 18.2%, which is an indication of the type of land use activities dominant in the area.

Moreso, trucks dominated with 45.5% on the type of equipment used for waste collection, followed by the use of compact vehicles which accounted for 31.8%, with daily collections dominating the frequency of waste collections with 56.8%, followed by those with twice daily collection which amounted to about 31.8%. The frequency of waste collection seemed to be in line with the officially stipulated frequency for waste collection of once a week for house-to-house collection and no defined collection frequency for the Central Collection Point (waste is collected as and when containers are full). It is also clear from the study that none of the private firms partnered in waste management in the study area are involved in either waste sorting, recycling and or re-use.

On the causes for engaging private firms in waste management by the government, it was found that majority of the private officials (52.0%) indicated that they provide more efficient in service delivery than the public counterparts, while about 27.0% of the private actors indicated that the partnership was formed to minimize cost of operation on public sector. Those who believe that it was due to increase in quantity of waste generation and failure of public sector in providing quality services accounted for 7.0% and 14.0% respectively.

To understand the level of waste service coverage in the area, residents were asked to affirm the existence of private waste managers within their respective areas and it was found that majority with 31.9% and 27.3% agreed and strongly agreed to the existence of private waste managers within their areas, compared to those that disagreed and strongly disagreed with 14.7% and 16.3%. On the promptness of waste managers to customer complains, majority that comprises of 38.7% agreed to promptness of waste managers response to customer complains, while the least proportion of respondents that make up 2.8% strongly disagreed to the promptness of response from waste managers to customer complains. Also the highest

proportion (32.8%) of respondents disagree that private actors are efficient in waste evacuation but populace kept littering the environment.

On the regularity waste collections, most respondents (34.4%) disagreed that private waste collectors come to pick wastes on regular intervals, in addition, most respondents that comprises of (41.7%) also disagreed with the fact that the present approach to waste collection and evacuation is satisfactory, whereas, on the willingness to pay for services, majority with 32.2% disagreed to be willing to pay for waste collections, while the least percentage that represents 6.7% strongly agreed to payment for waste collection services. About 31.6% of the respondents which constitutes the majority disagreed that private actors have adequate equipment for waste collection and disposal, while only about 7.4% which accounted for the least strongly agreed that private actors have adequate equipment for waste collection and disposal. Noteworthy, the result on the respondent's overall service delivery of private actors showed that majority (52.1%) agreed that the services are commendable, followed by those who disagreed that the services are commendable.

Findings on the constraints faced by firms in providing their services, shows that poor enforcement of sanitation rules on the residents contributed the most with 31.8%, followed by poor accessibility of building with 29.6%. While an unfair competition from other agencies is rated the least with 6.8%. On the other hand, the distribution of respondents on the problems encountered from private firms involvement in waste management in the study area. Discriminatory service provision by firms accounted as the most with 30.1%, followed by irregular collection of wastes with 20.6%, while about 17.8% of the residents indicated that they have never encountered any problem from patronising private firm operators.

5.2 CONCLUSION

With regards to man-power capacity, it is indicated in the study that majority of the firms involved in waste management are mostly small scale sized, however, considering the area of coverage (Kaduna metropolis) it is relatively fair to conclude that positive result should be expected. This is because; the strength and quality of staff with available facilities are often an indication of firm's waste collection capacity. Also, the general claim on the efficiency in service delivery by the private sectors as the basis for adoption of private partners in waste management is expected because studies have shown that public sectors are often ineffective in service provisioning especially in waste management activities.

Considering this appreciable efforts which have been rendered owing to the private firm involvement in waste management in the study area and to ensure sustainability and efficiency in service delivery from the private sectors, adequate cooperation is required from government, businessmen, politicians, religious organizations, civil servants, men, women, literate, illiterate, the rich, the poor and a host of other tangible and intangible groups especially with regards to waste handling habits, lifestyle, general attitudes towards environmental sanitation as well as in the designing, implementation and monitoring of waste infrastructures as these will go a long way in ensuring a sound environment for all.

Noteworthy is also the fact that waste management providers finds it difficult to access some parts of the areas due to inaccessibility of such areas, whereby making reducing the extent of service coverage among residents in the study area.

5.3 RECOMMENDATIONS

Government should provide incentives and reward private operators for performing effectively. This is to simulate the interest of other operators and create competition among them

resulting in improved standards of waste management and clearer environment. In the same vein there should be penalties and collection of user charges by concessionaire in case of default from private operators and ensuring that some areas are not serviced or under-served.

The capacity of the waste collectors must be improved by appropriate capacity building efforts. To do this, the firms must employ more workers and get more working equipment and ensure a better pay package for the employees so as to motivate workers which on the long run, will help to increase the firm's capacity to cope with the city's waste generation rates.

There is the need for government to make concerted effort towards developing new road networks as well as engage in repairs of bad road linkages especially around Rigasa and the environs where residents are being underserved by the private firms mainly due to inaccessibility of residential areas by waste management service providers owing to nature of settlement patterns and road networks which is mostly in bad conditions.

For a public private partnership to deliver its expected results, all actors in the partnership arrangement are required to execute their assigned responsibilities. Therefore there is the need to partner the residents especially the women as well as the communities in service monitoring as this will go a long way in eliminating irregularity of waste collection as well as ensuring service payment compliance by service benefactors.

5.4 RECOMMENDATIONS FOR FURTHER STUDIES

To fully understand other issues which were not addressed under the scope in this research, more research is required to be conducted especially in the area of detail study on government roles in ensuring the sustainability of public-private partnership approach in waste management in the study area as well as on the need assessment of private firms partnered in

waste management in the study area. As this will go a long way towards improving and consolidating the achievements witnessed in partnering private actors in waste management in the state as well as expanding the service coverage beyond the metropolitan areas of the state.

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QUESTIONNAIRE I- FOR PRIVATE WASTE MANAGEMENT COMPANIES

Dear Sir/Ma,

This questionnaire is designed to obtain information on the topic "**An appraisal of the efficiency of public private partnership approach to waste management in Kaduna metropolis, Kaduna State, Nigeria**", an MSc. research project in the Department of Geography, Ahmadu Bello University Zaria, Kaduna State.

I assure you that the information provided will be used strictly for academic purpose and treated with utmost confidentiality it deserves.

Thank you.
Idris, Rakiya Kabir
March, 2015

Please **TICK (√)** where applicable.

SECTION A

SOCIO ECONOMIC CHARACTERISTICS

1. Area of coverage.....
2. No. of personnel in the company.....
3. Types and number of equipment.....
4. Educational attainment a. primary school b. secondary school c. tertiary institution d. none f. Others (specify).....
5. What is your income per month? a. below ₦10,000 ( ) b. ₦11,000 – ₦30,000 (c. ₦31,000 – ₦50,000 ( ) d. others (specify).....

SECTION B; INFORMATION ON EFFICIENCY OF PPP TO WASTE MANAGEMENT AND BASES FOR WIDESPREAD ADOPTION OF APPROACH IN KADUNA METROPOLIS;

7. What type of waste is normally being collected? a. Residential waste ( ) b. commercial waste ( ) c. industrial waste ( ) d. All of the above ( ) e. All of the above ( )
8. Where do you collect the wastes? a. KEPA Bin ( ) b. Personal Bin ( ) c. Authorized dump sites ( ) d. Un-authorized dump sites ( )
6. How do you collect these wastes from residential areas? a. Wheel barrows ( ) b. Truck ( ) c. Compact vehicle ( ) d. others specify.....

7. How many times per week does your company collect waste? a. 1 ( ) b. 2 ( ) c. 3 ( ) d. 4 ( ) e. others (specify).....
8. What do you do with the solid waste? a. sort the re-usable ( ) b. sort the recyclables ( ) c. separate bio-degradable from non-bio degradable materials ( ) d. convey everything to the permanent dump site ( ).
9. How do you dispose these wastes? a. Incineration ( ) b. Burying ( ) c. Open dumping ( ) d. Others Specify.....
10. Where do you dispose these wastes? State the location.....
11. Do you think private actors are adopted because..... a. the public sector has failed in providing good service ( ) b. private sector is more efficient ( ) c. Increase in population d. increase in coverage area ( ).
12. Do you think public and private involvement will improve waste management? a. Yes ( ) b. No ( )
13. If yes, how do you think public private partnership will improve waste management? .....

.....

SECTION C; OPINION ON PPP APPROACH TO WASTE MANAGEMENT

14. Do you think people are cooperating with agencies in managing wastes? a. Yes ( ) b. No ( ) If No, state your reason.....
15. Do you think people should pay for solid waste collection and disposal? a. Yes ( ) b. No ( ) if No, why .....

SECTION D; INFORMATION ON CONSTRAINTS OF PPP TO WASTE MANAGEMENT

16. Are you facing any challenges with the public a. Yes ( ) b. No ( ) if yes, specify .....
17. What are the major constraints of private companies on waste management? .....

.....

18. What are your suggestions for improvement ……..

…….....

QUESTIONNAIRE II- FOR MEMBERS OF PUBLIC

Dear Sir/Ma,

This questionnaire is designed to obtain information on the topic "**An appraisal of the efficiency of public private partnership approach to waste management in Kaduna metropolis, Kaduna State, Nigeria**", an MSc. research project in the Department of Geography, Ahmadu Bello University Zaria, Kaduna State.

I assure you that the information provided will be used strictly for academic purpose and treated with utmost confidentiality it deserves.

Thank you.
Idris, Rakiya Kabir
March, 2015

Please **TICK (√)** where applicable.

SECTION A; SOCIO ECONOIC CHARACTERISTICS

1. Gender: a. Male ( ) b. Female ( )
2. Marital Status a. Single ( ) b. Married ( ) c. widow ( ) d. divorced ( ) e. Separated ( )
3. Educational qualification: a. Primary school education ( )
   b. Secondary school education ( ) c. Tertiary education ( )
   d. Others (specify) ……...
4. Occupation: a. Trading ( ) b. Artisan ( )
   c. Civil Servant ( ) d. Others (specify) ……
5. What is your income per month? a. below ₦10,000 ( ) b. ₦11,000 – ₦30,000 ( )
   c. ₦31,000 – ₦50,000 ( ) d. ₦50,000 and above ( )

SECTION B; WASTE GENERATION ISSUES

Please **TICK (√)**where appropriate. SD= Strongly disagree. D= Disagree. N= Neither agree nor disagree. A= Agree. SA=Strongly Agree

No.		SD	D	N	A	SA
6.	I mostly generate Residential wastes					
7.	I dispose my wastes in an authorized dumpsite					
8.	The dump-site is far away from my vicinity					
9.	Am aware of the effect of waste disposal on the environment					
10.	Am aware of the effect of waste disposal on the human health					

SECTION C; RESIDENTS OPINION ON PPP APPROACH TO WASTE MANAGEMENT IN THE STUDY AREA

Please **TICK (√)**where appropriate. SD= Strongly disagree. D= Disagree. N= Neither agree nor disagree. A= Agree. SA=Strongly Agree

No.		SD	**D**	**N**	**A**	**SA**
11.	There is a private company involved in waste collection in my area.					
12	Private actors give Prompt response to user complains					
13.	Private actors are efficient in waste evacuation but populace kept on littering the environment					
14.	Private actors collect wastes at regular intervals					
15.	present approach to waste collection/evacuation is satisfactory					
16.	I am willing to pay for solid waste collection and disposal					
17.	Private actors have adequate equipment for waste collection and disposal in my area.					
18.	Overall service delivery of private actors is commendable					

19. Who is responsible for collection and disposing of the waste? a. government ( ) b. individual ( ) c. Companies ( ) d. all of the above ( ) e. Others (specify).....
20. How do they dispose these wastes? a. Incineration ( ) b. Burying ( ) c. Open dumping ( ) d. Others Specify.....

SECTION C; INFORMATION ON CONSTRAINTS TO PPP FOR WASTE MANAGEMENT

21. What are the problems of patronizing private firms in waste management? a. Discriminatory service provision ( ) b. Irregular Collection of Wastes ( ) c. Lack of Clean environment after waste collection ( ) d. High Charges e. None ( ) f. others (specify) .....
22. What are your suggestions on how to improve waste collection and disposal …… ……..... ....