AGJ ARABIAN GROUP OF JOURNALS

Social Development

NG-Journal of Social Development, VOL. 6, No. 1, February 2017

Journal homepage: www.arabianjbmr.com/NGJSD_index.php

NGJSD

PRIVATE WASTE CONTRACTORS AND SOLID WASTE MANAGEMENT IN ANAMBRA STATE

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Abstract

The rapid growth of urban population in Anambra State has far-reaching implications for waste generation and management. This study therefore examines the role of private waste contractors in solid waste management in the state. The study anchored on the New Public Management theory. The descriptive survey research method was adopted and data was collected from primary and secondary sources. Four hundred questionnaires were distributed. The data generated were analyzed using descriptive statistics like frequency count, percentages and mean scores. The hypotheses formulated were tested with regression analysis. The findings show among others that solid waste recycling has not been adequately adopted by the state government and the private waste contractors as a waste management strategy. The State government is therefore encouraged to thoroughly review their contractual agreement with the private waste contractors to ensure that perceived inadequacies in their operations are addressed for enhanced service delivery. There is also need for intensified enlightenment campaign to ensure that citizens imbibe the right sanitary habit.

Keywords: *Private Waste Contractors, Solid Waste Management*

Introduction

Studies show that Nigeria is one of the most urbanizing countries among developing nations in the world, (Iyida, 2015). It is believed that over 240 urban centers exist in Nigeria with a population of about 35 million people and urbanization level of 42% (Nwachukwu, 2009; and Ezeodili, 2013). According to the United States Report (2000), Nigeria may reach an urbanization level of 61.6% by the year 2025. These statistics and projections are good because urbanization carries with it enhanced business growth and opportunities, entrepreneurial development, increased infrastructural facilities and agglomeration economies.

However, the rapid growth in urban population in Nigeria has far-reaching implications for waste generation and management. In 1983, the total volume of solid waste generation in Nigeria cities was about a million tones and it was projected to about 15 million tonnes by the year 2000 (Uwadiegwu & Chukwu, 2010). Presently, there are fears about the capability of urban administrators to cope with the management of solid waste. The volume of solid waste being generated continues to increase at a faster rate than the ability of the agencies to improve on the financial and technical resources needed to parallel this growth. This is why Ogweleke (2009) stated that solid waste management has emerged as one of the greatest challenges facing state and local environmental protection agencies in Nigeria.

Solid waste management is one of the major services provided solely by the government for several years in Nigeria. It is on record that since the 1976 Local Government Reforms, the collection and disposal of solid waste have been the statutory responsibilities of local government authorities in Nigeria. In some cases, state governments have joined hands with their local authorities in the management of waste in most of the urban places in the country. Despite the synergy of efforts between both state government and local

authorities, solid waste management, especially, the organic portion of the waste has continued to be a major environmental problem in Nigeria indicating that an effective and efficient waste management plan is not yet in place. It is obvious that the government is presently not managing the waste system efficiently and will require the collaboration of the private sector. The existing era of private and public sector dichotomy must give way to a robust period of participation between the two in municipal solid waste management (Olufemi, Egbuta & Adejuwon, 2011).

The negative impact of solid waste on the environment and on people's health is critical, and this was aptly stated by Momodu, Dimuna & Dimuna (2010) and Agwu (2012) when they revealed that the World Health Organisation (WHO) and United Nations International Children Education Fund (UNICEF) reported that about 2.4 billion people will likely face the risk of needless disease and death by the target of 2015 because of bad sanitation. The report also noted that bad sanitation-decaying or non-existent sewage system and toilets fuels the spread of disease like cholera and common illness like diarrhoea, which kills a child every twenty-one (21) seconds. The hardest hit by bad sanitation is rural poor and resident of slum areas in fast-growing cities, mostly in Africa and Asia. This critical report underscores the dangers of poor solid waste management on our urban centres. Hence, solid waste management is crucial in a bid to ensuring that the environments we inhabit are clean, conducive and habitable.

In Anambra State, the state government rebranded the waste management agency from Anambra State Environmental Protection Agency (ANSEPA) to Anambra State Waste Management Agency (ASWAMA) yet the challenges of properly managing solid wastes (the issues of ineffective collection, transportation, monitoring (enforcement of sanitation laws), recycling, treatment and disposal of solid wastes) in Anambra State still persist. The level of public awareness and attitudes to solid waste in Anambra State is also very poor. It is not unusual to see heaps of wastes dumped indiscriminately; roads and streets littered with garbage; drainages completely blocked by solid wastes; and unofficial refuse dumps created by anyone who cares to create one anywhere. It has become a culture for waste receptacles to be filed to the brim and wastes littered on the roads before the waste management agency will evacuate them. And most times, it takes three to four days for waste receptacles to be returned. These poor sanitary practices are appalling and constitute serious health challenges to the inhabitants of the cities in Anambra State.

Due to the inability of the Anambra State Government to effectively manage the huge tonnes of solid waste generated in its cities, private waste contractors were invited to partner with the Anambra State Government. It is expected that the participation of the private waste contractors will effectively and efficiently manage solid waste in Anambra State as evident in other States of the Federation and countries (Akaateba & Yakubu, 2013; Anazodo, Okoye, Dim & Agbionu, 2011; Kassim, 2009 and Madinah, 2016) where it was introduced.

Solid waste management, as a process of collection, transportation, storage, treatment, monitoring, recycling resources, and disposal of solid waste involves huge expenditure and specialized skills hence the need for partnership with the private sector. To this end, the broad objective of this study is to examine the role of private waste contractors in solid waste management in Anambra State. The specific objectives of the work are to:

i. Ascertain whether the private waste contractors have contributed significantly to solid waste collection and disposal in Anambra State.
ii. Determine whether the private waste contractors have contributed significantly to solid waste recycling in Anambra State.
iii. Ascertain the extent private waste contractors have contributed to public enlightenment on good sanitary practices in Anambra State.

In order to gain better insight on the background of this study, the literatureon the solid waste management in Nigeria is thematically organized into the following sub-themes and reviewed:

(ii) Solid waste management.
(iii) Solid waste collection and disposal in Anambra State.
(iv) Solid waste recycling in Anambra State.
(v) Public enlightenment on sanitary practices in Anambra State

Solid Waste Management

Solid waste management is a polite term for garbage management. As long as humans are living in communities, solid waste will continue to be an issue. Modern societies generate far more solid waste than early humans ever did. Daily life in industrialized nations can generate several pounds (kilogrammes) of solid waste while agricultural wastes, commercial and household wastes are generated in large quantum prompting for effective ways of managing than in order to avoid environmental pollution. Solid wastes are all discarded, putrescible and non-putrescible solid and semi-solid wastes, including garbage, trash, refuse, paper, rubbish, ashes, construction and demolition wastes, discarded home and industrial appliances, manure, vegetable or semi-solid wastes and others substances or material resulting from various community activities. Solid waste consists, therefore of discarded materials resulting from domestic and community activities and from industrial, commercial and agricultural operation (Okpechi, 2007 and Ezigbo, 2012). These solid wastes generated from different categories of people and various economic activities are usually very large, posing great challenge to the society in form of blocked drainage, littering of streets, air and water pollution and health related diseases. In a bid to ensuring proper collection, transportation, treatment, recycling and disposal of these solid wastes, the issue of efficient service delivery in solid waste management becomes inevitable.

The needs for proper solid waste management, according to Eberinwa (2010) are; to preserve the aesthetic beauty of the environment and ensure favourable living and working conditions for man; to avoid pollution by not directly or indirectly altering the physical biological and thermal properties of any part of the environment by allowing such refuse to accumulate in excessive or dangerous amount or to create a condition which is hazardous to public health and safety or welfare to animals and plants; and to try to reduce the incidence of epidemics of available diseases, which often results from failure or delay in disposing wastes. The objective of solid waste management is basically the use of resources efficiently in the process of waste materials (Squires in Yaaba, 2012).

The components of solid waste management identified by Iloanya (2011) include; solid waste generation; solid waste evacuation and solid waste disposal. It is critical to adopt a broad approach in developing a working framework for solid waste management. This covers the social, economic, technological, political and administrative dimensions. For example, the social dimension of solid waste management involves waste minimization; the economic dimension of solid waste management involves waste recycling; the technological dimension involves waste disposal; and the political and administrative and disposal. The waste management hierarchy (minimization recovery and transformation and disposal) has been adopted by most industrialized nations as the menu for developing solid waste management strategies. The extent to which any one option is used within a given country however varies, depending on a number of factors, such as topography, population density and transportation infrastructure, socioeconomic and environmental regulations (Eberinwa, 2010 and Salai in Babalola et al, 2010).

There are a range of actors in solid waste management and they are be clustered into to four groups, which are the public sector (national authorities, local public departments) constituting a central set of players; the private sector (large and small registered enterprises carrying out collection; transport, disposal and recycling); the small scale non-recognized private sector (waste pickers, itinerant buyers, traders in waste materials and non-registered small scale enterprise); local community and its representatives (NGOs and CBOs). In solid waste management systems, the stakeholders involves are varied and numerous. The federal, State and Local Governments are all involved in waste management in Nigeria. The federal government oversees the state and local agencies and authorities that manage waste in the country. A wide range of individuals, groups and organizations are involved as services users, service providers, intermediaries and regulators. There are formal and informal private sectors. The formal private sector includes a wide range of enterprise types, varying from informal micro enterprises to large business establishments. They are primarily interested in earning a return in their investment by waste collection, transfer, treatment, recycling and/or disposal services. They may as well provide management and

organizational capacity, labour and/or technical skills. The informal private sectors comprise unregistered, unregulated activities carried out by individual, families groups or small enterprise. Their basic motivation is self-organised revenue generation. These informal, unregulated private sector companies are often driven to work as waste collectors or scavengers. Communities and non-governmental organizations (NGOs) are also partners in solid waste management. NGOs operate between the private and government realms. They are motivated primarily by humanitarian and/or developmental concerns. They help to increase the capacity of people or community groups to play an active role in local solid waste management. The communities form community based organisations to upgrade local environmental conditions, improve services and/or petitions the government for service improvement (Baud in Yaaba, 2012).

The notable techniques for solid waste management include refuse composting, incineration, sanitary, landfill/dumpsites and anaerobic digestion (Chukwujindu, 2010 and Momodu, Dimuna and Dimuna, 2011). Solid waste management in developing countries is predicted to face a great challenge in the future owing to their rapid urbanization and economic growth. Empirical analyses using macroeconomic data indicates that the per capita generation of solid waste is at least 0.3-0.4 kilograms per day even for the poorest people. In general, a one percent increase in population is associated with a 1.04 percent increase in solid waste generation, and a one percent increase in per capita income is associated with a 0.34 percent increase in total solid waste generation (Afroz, 2009). Irrespective of the fact that most of the developing countries are still in the early stage of their urbanization and economic development, it is generally expected that the challenges of solid waste generation and management could be avoidable in such countries considering that most cities in developing countries spends significant portions of their municipal revenue on waste management (Osumanu, 2007), but they are often unable to keep pace with the scope of the problem. Senkoro (2003) indicated that for many African countries, only less than 30% of the urban population has access to proper and regular garbage removal (Altaf & Deshazo, 1996). The current practice of collecting, processing and disposing municipal solid wastes is also considered to be least efficient in the developing countries. The typical problems are ―low collection coverage and irregular collection services, crude open dumping and burning without air and inefficient water pollution control, the breading of flies and vermin, and the mishandling and uncontrolled informal waste picking or scavenging activities (Bartone, 1995).

Solid Waste Collection and Disposal in Anambra State

Waste collection is a part of the process of waste management. It is the transfer of solid waste from the point of use and disposal to the point of treatment or landfill. Waste collection also includes the curbside collection of recyclable materials that technically are not waste, as part of a municipal landfill diversion programme (Wikipedia, 2015). Waste collection is the collection of solid waste from point of production (residential, industrial commercial, institutional) to the point of treatment or disposal (World Bank, 2012).

Ewuim (2012) identified house-to house system and neighborhood/communal depots system as two major solid waste collection systems in many urban centres in Nigeria. According to her, house-to-house system is a waste collection system whereby each household collects its refuse and waste in a refuse bin or in a cellophane bag; and subsequently disposes it through the private refuse collectors or through the government agency that has the responsibility for collecting refuse. However, the greatest problem militating against this system is that, the agency charged with the duties of moving around the cities is often times inefficient; making household refuse to be scattered around the cities by some impatient residents. In the neighborhood/communal depots system, the government and its environmental agency encourage the residents of the urban centres to carry their waste and refuse to a designated community refuse dump. These types of refuse collection points are located in some strategic areas for easy access. The problem of this system is that, most of these temporary dumping sites becomes breeding areas for rodents and flies, and consequently, constitute embarrassing sights for residents and passersby, especially when the refuse are not evacuated on time by the environmental agencies.

Eberinwa (2010) sees solid waste disposal as the final stage of waste management. It is the dumping of solid waste on designated sites. Different methods of waste disposal systems are being practiced throughout the world. The disposal systems can be categorized into on-site and out-site disposal technique. On-site

disposal system involves the use of home grinder, compactors and incinerators which operate like those of out-site disposal system. They are only suitable for a small number of households and are generally more susceptible to pollution because of the use of unskilled manpower. The highly notable waste disposal system includes hog feeding, open dumping, sanitary landfill, composting and pyrolysis (Uchegbu in Eberinwa, 2010).

According to Egunjobi in Agwu (2012), the problem of effective solid waste management has to do with poor social services delivery efforts which cause unnecessary delays in solid waste clearance. It is either broken down machinery, non-maintenance of dumpsters, poorly maintained urban streets and roads and irregularities in the designation of sanitary landfill sites. Nigerians seem to be permanently accustomed to dirt. Evidence of this can be seen every day by way of indiscriminate discharge of garbage into drains and at times on the highways**.** Studies have revealed that household account for about half of the solid wastes generated, that is, by weight in the third world cities.

According to the World Bank (2001), waste generation is greatly influenced by a country's development. Generally, the more economically prosperous a country is, the more waste it generates per capita but the factor that seem to bridge the gap between waste generation and it's resultant effect is the method or efficiency of waste management strategy adopted by such country. A typical example could be seen when comparing the waste situation in developed countries like; Britain, United States of America, Canada where there exist much economic activities that generate more waste but with a corresponding well organized waste management system compared to the situation in developing countries like; Nigeria, Ghana and Cameroun with their steady increase in population and a corresponding increase in their rate of waste generation from industrial and human activities but without an efficient waste management system. It is realized that the waste situation in developed countries are much better than that of the developing countries irrespective of the volume of waste they generate due to the waste management strategy they practice or employ.

Solid Waste Recycling in Anambra State

It is wasteful to throw away anything that could be made use of, particularly when there is a desperate need for it elsewhere. Waste recycling is an interesting approach to achieve an efficient, integrated manner of management of municipal solid waste. However, MSW recycling is restricted to well segregated materials. This is partly due to the fact that most of the industries do not actively promote take-back recycling as practiced in developed countries such as in Japan. However, if the raw materials scavenged from wastes are recycled, it is expected that there will be a reduction in the energy associated costs by industries during production because recycling provides easily obtainable manufacturing feedstock (Otitoju, 2014). According to Ewuim (2012), solid waste recycling is a scientifically converted to other good uses; through this method waste and refuse are categorized and sorted out before they can be converted to other good uses. However, the method is capital intensive as financial, material (technological) and human resources are needed.

The practice of recycling solid waste is an ancient one. Metal implements were melted down and recast in prehistoric times. Today, recyclable materials are recovered from municipal refuse by a number of methods, including shredding, magnetic separation of metals, air classification that separates light and heavy fractions, screening, and washing. Increasingly, municipalities and private refuse-collection organizations are requiring those who generate solid waste to keep bottles, cans, newspapers, cardboard, and other recyclable items separate from other waste. Special trucks pick up this waste and cart it to transfer stations or directly to recycling facilities, thus lessening the load at incinerators and landfills (Sharma, 2009).

Solid waste recycling in Anambra State is usually carried out by the employees of the waste management agency, private waste contractors and the informal sector. Otitoju (2014) stated that, often times, some individual stores unlimited amount of recyclables such as cans, bottles, plastics, newspapers at their residents hoping to sell it to itinerant buyers, or to house-to house collectors of which only few lucky individuals get their recyclable materials sold to these itinerant buyers. As soon as they get frustrated of these piles of waste, they open burnt them at their resident thereby causing air pollution and also open dump some materials like cans, glass, etc. This recyclables have significant potentials for recovery if there is

effective waste recycling (collection) strategy. Such sorting is carried out by the informal sector most dominated by the scavengers with the use of carts for collections, both from street bins and at the dumpsite. Scavengers normally have no formal education, vocational training or access to appropriate equipment and do not normally have alternative employment opportunities in the formal sector. The scavengers and other informal sector recyclers generally sell their recovered materials to middlemen, who in turn sell to small and large scale processing and manufacturing industries. For instance, collected glass is processed and recycled locally as cullet for use in the glass industry; whole/complete glass bottles are cleaned and reused as syrup, drinks and juice containers; the base of broken bottles are sold to small scale industries that cut and polish the glass to manufacture items such as ash trays and candle holders (Cheeseman, Imam & Mohammed, 2008).

Recycling option according to Onwughara, Nnorom & Kanno (2010) is the use or reuse of a waste as a substitution for a commercial product or as a feedstock to an industrial process. These include on-site or off-site reclamation of useful fractions of a waste or removal of contamination from a waste to allow its reuse. There are different techniques of recycling;

a. Reuse: This is using item again after their initial consumer use in past either return to original process as re-manufacturing, examples as with copier machines or automobile alternators and as material substitute for another process. Example, reuse of old wood furniture.

b. Reclamation: This is recovery material from waste products so that it can be used again either processed for resource or processed as a by-product. Example, reclaiming glass from old bottles.

This recycling option has been set nationally, unfortunately, the definitions of recycling, rates of recycling and appropriate components of solid waste vary. It has been found to be costly for most municipalities compared to landfill disposal. Recycling is a good option only if environmental impacts and the resources, used to collect, sort and recycle a material to provide equivalent virgin material plus the resources needed to dispose of the post-consumer material safely. Before recycling can occur, the materials must be collected from consumers, a reversal of the logistics system that distributed products to consumers. One of this method of reverse logistics system that is universal, cheap and reliable is curbside pickup system with it peculiar advantages, other method of reverse logistic system include consumer taking recyclable to a central collection point and returning them to the retailer as part of a deposit-refund system (Onwughara, Nnorom & Kanno, 2010).

Public Enlightenment on Sanitary practices in Anambra State

The role of people in solid waste management in Anambra State is crucial. The solid waste disposal habit of the people goes a long way to determine the extent to which the environment is clean. The sanitary state of an area is largely influenced by the handling practices of the residents and the measures in place to safe waste evacuation and disposal (Modebe, Onyeonoro, Ezeana, Ogbuagu & Agam, 2009; Onyanta, 2012; Chukwuemeka, Ugwu & Igwebe, 2012, and Uma, Nwaka & Enwere, 2013). Most people have nonchalant attitude towards waste disposal. This kind of person could be perceived as one who litters the environment like no man's business with no regards or respect to the environment. They do not consider the need to appraise or talk to people and neighbour around them for positive or negative behaviour. They do not consider living in a clean environment as essential. They play passive role in sanitation activities and need to cooperate with others in cleaning up residential surroundings because of their negative attitude. The main reason for the incessant growth of waste volumes in our urban centre is as a result of the ignorance of some dwellers towards the effect of indiscriminate dumping of refuse and carefree attitude of most of the dwellers who know what should be done, but they are careless about it (Afangideh, Joseph & Atu, 2012).

The incidence of poor sanitary practices in Anambra State is a perplexing problem. Solid wastes are generated in large quantity from commercial, agricultural, industrial, institutional and domestic activities, with little or no effort by those generating these solid wastes to properly dispose them. The government and its waste management agency (ASWAMA) have devised several strategies to achieve effective service delivery in solid waste management, yet the poor sanitary practices of the people have negatively hampered the government efforts. Some of the strategies include; providing receptacles in strategic sites to curtail indiscriminate solid waste disposal, encouraging commercial vehicle drivers to have solid waste bins in

their vehicles; carrying out sensitization or public awareness programmes on the need to keep Anambra State clean; and most recently, enforcing the public to dispose their solid waste in nylon bags before final disposal to the receptacles. Despite these strategies, the poor sanitary disposition of the public towards waste management still persists. Solid wastes are still disposed indiscriminately; passengers dispose their solid waste on the road while the vehicles are in motion; commercial vehicle drivers hardly have waste bins in their vehicles, even when they have, the passengers unconsciously dispose waste on the roads because it has become the value of the society; and most often, solid wastes are disposed in nylon bags before putting them in the receptacles.

These poor sanitary practices by the residents of Anambra State have led to environmental pollution and degradation capable of posing serious threat to public health. Momodu, Dimuna & Dimuna (2010) and Agwu (2012) revealed that the World Health Organisation (WHO) and United Nations International Children Education Fund (UNICEF) reported that about 2.4 billion people will likely face the risk of needless disease and death by the target of 2015 because of bas sanitation. The report also noted that bad sanitation-decaying or non-existent sewage system and toilets fuels the spread of disease like cholera and basic illness like diarrhoea, which kills a child every 21 seconds. The harvest hit by bad sanitation is rural poor and resident of slum areas in fast-growing cities, mostly in Africa and Asia. This critical report underscores the dangers of poor public sanitary habits and the inevitability of effective implementation environmental protection laws in Anambra State.

Solid waste collection, disposal processing, treatment, recycling and utilization have defied solution as a result of the attitude of some Nigerians. It is believed that the waste disposal habit of the people, corruption, work attitude, inadequate plants and equipment among others are the major factors militating against effective solid waste management.

Empirical Review

Ndumbu (2013) examines the factors affecting success of private sector participation in solid waste management in Mombasa County. The aim of the study was to come up with knowledge that will assist the municipal councils in Kenya to address those factors so that the cities could be clean. Data collection was collected using questionnaires and interviews schedules from the respondents in the area of study. Purposive random sampling was used to collect primary data from the residents. The data were analyzed using Pearson correlation. Findings found that there was a relationship or correlation between the success of PPPs in solid waste management and the capacity of the garbage collection companies, monitoring and evaluation, transparent and competitive procurement, and public participation. The study established that there was inadequate capacity in the Mombasa City Council to effectively collect and dispose of solid waste hence leaving their responsibility to the private companies which have also been ineffective due to challenges with regards to capacity to effectively meet the demands of the bulging population. The study therefore that engaging private practitioners in garbage collection is the possible solution to the solid waste management challenges facing Mombasa city.

Kassim (2009) examined sustainability of private sector in municipal solid waste collection in Dar es Salaam, Tanzania. Content analysis was adopted for the study. Kassim (2009) examined sustainability of private sector in municipal solid waste collection in Dar es Salaam, Tanzania.Findings show that the involvement of the private sector in solid waste management has proved to be possible and promising alternative in the solid waste management services leading to the improvement of sanitation in developing countries. In Dar es Salaam, the study noted solid waste collection leads to increased performance efficiency and environmental protection and has created employment to many. The study concluded that, for the sustainability of private sector, there rise a need to develop mechanisms which guarantee a long term service and efficient performance. Firstly, it needs a favourable working condition, and secondly, the commitment of the private sectors itself in the service. The success of the private sector and sustainability is justified by the arrangement which offers the correct incentives, sufficient flexibility in management and the need to compete in a market. Going along with this argument the private sector needs the appropriate financial and

human resources and technological knowhow. However, more support is needed from the government and other institutions to the sector.

Yoada, Chirawurah & Adongo (2014) investigated domestic waste disposal practice and perceptions of private sector waste management in urban Accra. The study utilized a mixed-method approach. A cross-sectional survey questionnaire and in-depth interview were used to collect data. A total of 364 household heads were interviewed in the survey and six key informants were interviewed with the in-depth interviews. The results of the study revealed that 93.1% of households disposed of food debris as waste and 77.8% disposed of plastic materials as waste. The study also showed that 61.0% of the households disposed of their waste at community bins or had waste picked up at their homes by private contractors. The remaining 39.0% disposed of their waste in gutters, streets, holes and nearby bushes. Of those who paid for the services of private contractors, 62.9% were not satisfied with the services because of their cost and irregular collection. About 83% of the respondents were aware that improper waste management contributes to disease causation; most of the respondents thought that improper waste management could lead to malaria and diarrhoea. The study concluded that proper education of the public, the provision of more communal trash bins, and the collection of waste by private contractors could help prevent exposing the public in municipalities to diseases.

Alakinde (2012) examines private participation in solid waste management in Nigerian cities taking Ibadan South West Local Government Area as a case study. The study employs questionnaire as instrument of data collection while descriptive statistics was used to analyse the data collected. The result shows that 28% and 20.4% of the residents generated leaves and waterproof bag used in wrapping food respectively. The study also shows that majority of the residents in high density zones are using unhygienic means for the storage of their waste compared to what is operating in the medium and low densities zones in the study area. Result of the analysis also shows that the population enjoying private firm participation is comparatively smaller than those disposing their waste in unauthorized places and is mostly found in medium and low density zones. Other problems facing private firms that are managing waste in Ibadan South West are finance, conveyance, charges among others.

Theoretical Standpoint for this study

The study adopted the New Public Management (NPM) theory propounded by Hood (1991). As a new paradigm in public sector management, the New Public Management theory points to the failures and inadequacies of public sector performance over time and the problems lying squarely in the nature and processes of public sector activity and traditional public administration. The New Public Management theory is the transition from traditional public administration theories to an arrangement that is workable, practicable and result oriented. It places emphasis on efficiency, effectiveness, corporate governance, technological innovation and democratization. New Public Management theory is a relentless effort in the direction of greater cost reduction, transparency and accountability in resource allocation and performance management through the quality of service.

Therefore the tenets of New Public Management theory are;

i. Explicit standards and measures of performance: Management by objectives (MBO) that is goals and targets defined and measurable as indicators of success. Justification: Accountability means clearly stated aims, efficiency requires “hard look” at objectives
ii. Shift to decentralization or disaggregation of units in the public sector: Disaggregate public sector into corporatized units of activity, organized by products, with devolved budgets. Units dealing at arm’s length with each other. Justification: Make units manageable, split provision and production, use contracts or franchises inside as well as outside the public sector;
iii. Emphasis on private sector styles of management practice: Move away from traditional public ethics to a more flexible pay, hiring rules etc. Justification: Need to apply “proven” private sector management tools in the public sector;
iv. Paradigm shift to greater competition in the public sector: Move to contracting out/out sourcing public sector tendering procedures and introduction of market disciplines and customer oriented

public sector. Justification: Rivalry via competition as the key to lower costs and better standards. (Hood, 1996).

The New Public Management theory is very critical to the study as it helps to explain the role of private contractors in solid waste management in Anambra State. Solid waste management has emerged as one of the greatest challenges facing state and local environmental protection agencies in Nigeria. The volume of solid waste being generated continues to increase at a faster rate than the ability of the agencies to improve on the financial and technical resources needed to parallel this growth (Ogweleke, 2009). As a result of this, governments have had a rethink on this issue and have contracted the processes involved in solid waste management to private sector organizations. It is believed that with the participation of private waste contractors, the issue of solid waste collection, transportation, treatment, monitoring, recycling and disposal will be adequately dealt with. Hence the emphasis on accountability, transparency, efficiency, outsourcing, effectiveness and service delivery based on this theory enable us have the basis for examining the effect of private contractors in solid waste management in Anambra State.

Consequently the following hypotheses were formulated for the study:

(i) Private waste contractors in Anambra State have not contributed significantly to solid waste collection and disposal.

(ii) Private waste contractors in Anambra State have not contributed significantly to solid waste recycling.

(iii) Private waste contractors in Anambra State have not contributed to public enlightenment on good sanitary practices.

Research Methodology

This research was carried out in Anambra state, specifically in Awka, Onitsha and Nnewi metropolises. These areas were selected because they constitute the busiest and urbanized areas in Anambra State, hence characterized with the generation of large metric tonnes of solid waste. Survey research method was adopted for the study. The sources of data for the study were mainly from the primary and secondary sources.

The instruments used for gathering relevant data for the study are questionnaire and personal interview. A 40– item questionnaire with open-ended questions was designed for the study in accordance with the research objectives, research questions and hypotheses. The questionnaire consisted of two sections; Part A; demographic data of the respondents such as; gender, educational qualification and age bracket of the respondents; while the part B consists of the core research questions. A structured 5 Likert-scale questionnaire was designed based on; Strongly Agree (SA), Agree (A), Undecided (U), Disagreed (D) and Strongly Disagree (SD). The questionnaire was designed to illicit information for the study. The researcher also conducted interview on the staff of Anambra State Waste Management Agency, Anambra State Ministry of Environment, LAGA International Limited and Africa Public Health Enterprise, as well as the inhabitants of Awka, Nnewi and Onitsha metropolises. The data obtained from personal interview significantly complemented the data from the questionnaire.

A sample size of 400 respondents was chosen for the study. Out of the four hundred (400) copies questionnaires produced and administered, three hundred and eighty-six (389) were returned and found to have been properly filled. The questionnaire return ratio was 97.25.

Simple random and purposive sampling techniques were used in the study. Test and re-test method was used to establish the reliability of the instrument. Data collected from the field, were presented using descriptive statistics such as tables, means, frequencies, standard deviation and simple percentage. The hypotheses were tested using inferential statistics such as Regression analysis with the aid of statistical Package for Social Sciences (SPSS) version 20.

Model Specification:

The estimated regression model is given as:

$Y = a + bx + Ч_i$

Where:

Y = dependent variable

X = independent variable
A = intercept
b = slope
Ч$_i$ = Error term or stochastic variable
Hence the regression models for the study are;
Y (SWC&D) = a + X (PWCs) - - - - - - - - - - 1
Y (SWR) = a + X (PWCs) - - - - - - - - - - - - 2
Y (PE&GSP) = a + X (PWCs) - - - - - - - - - -3
* SWC&D = Solid Waste Collection and Disposal.
* SWR = Solid Waste Recycling.
* PEGSP = Public Enlightenment and Good Sanitary Practice.
* PWCs = Private Waste Contractors.

Analysis of Research Question

The hypotheses were tested using the Pearson's correlation.
The responses of the sampled respondents are presented in table 1 below.

Table 1: Roles of Private waste contractors (PWC) in Solid Waste Management (SWM)

N = 389

S/N	Items	FX	Mean (x)	Remark
1	Private waste contractors in Anambra State have helped to preserve the aesthetic beauty of the environment and ensure favourable living and working conditions for man.	1079	2.77	Disagreed
2	Private waste contractors have helped to avoid pollution by directly or indirectly altering the physical biological and thermal properties of any part of the environment	1250	3.21	Agreed
3	Private waste contractors have helped to avoid allowing refuse to accumulate in excessive or dangerous amount or to create a condition which is hazardous to public health and safety or welfare to animals and plants	1315	3.38	Agreed
4	Private waste contractors have helped to reduce the incidence of epidemics and diseases, which often results from failure or delay in disposing wastes.	1295	3.33	Agreed
5	Private waste contractors have helped to reduce the calamitous effect of un-cleared and untreated solid wastes on the urban landscape.	1338	3.44	Agreed
6	Private waste contractors have helped to stem the tide of complete blockages of drainage channels by undisposed solid wastes	984	2.53	Disagreed
7	Private waste contractors have helped in remediating land where contamination presents a significant risk of harm to health or the environment	1364	3.51	Agreed
8	Private waste contractors have helped in reducing, re-using, recycling and recovering waste and minimizing the generation of waste.	895	2.30	Disagreed
9	Private waste contractors have helped to ensure that people are aware of the impact of waste on their health, wellbeing and the environment	943	2.42	Disagreed
10	Private waste contractors have helped to achieve integrated waste management reporting and planning, and also ensure effective delivery of waste services.	1275	3.28	Agreed

Source: Field Survey, 2015.

Data from table 1 shows that six out of the ten listed items showed a mean score of 3.0 and above. Hence the respondents agreed that, during the period under review, Private waste contractors have; helped to avoid pollution by directly or indirectly altering the physical biological and thermal properties of any part of the environment (3.21); helped to avoid allowing refuse to accumulate in excessive or dangerous amount or to create a condition which is hazardous to public health and safety or welfare to animals and plants (3.38); helped to reduce the incidence of epidemics and diseases, which often results from failure or delay in disposing wastes (3.33); helped to reduce the calamitous effect of un-cleared and untreated solid wastes on the urban landscape (3.44); helped in remediating land where contamination presents a significant risk of harm to health or the environment (3.51) and helped to achieve integrated waste management reporting and planning, and also ensure effective delivery of waste services (3.28).

On the contrary, four items in table 1 have mean scores below 3.0. This revealed that private waste contractors in Anambra State have not helped; to preserve the aesthetic beauty of the environment and ensure favourable living and working conditions for man (2.77); to stem the tide of complete blockages of drainage channels by undisposed solid wastes (2.53); in reducing, re-using, recycling and recovering waste and minimizing the generation of waste (2.30); to ensure that people are aware of the impact of waste on their health, wellbeing and the environment (2.42).

Research Question 1: Have the private waste contractors contributed significantly to solid waste collection and disposal in Anambra State?

The responses of the sampled respondents are presented in table 2 below.

Table 2 Solid Waste Collection and Disposal in Anambra State

N = 389

S/N	Items	FX	Mean (x)	Remark
11	Private waste contractors in Anambra State have adequate compactors for solid waste collection in designated disposal sites.	1040	2.67	Disagreed
12	Private waste contractors in Anambra State have adequate chain up vehicles to effectively convey solid waste to disposal sites.	885	2.28	Disagreed
13	Solid wastes generated in Anambra State are promptly collected by the private waste contractors.	869	2.23	Disagreed
14	Solid waste receptacles are promptly returned to designated depot after disposal of wastes.	953	2.45	Disagreed
15	The private waste contractors have complemented the State Government effort on solid waste management.	1229	3.16	Agreed
16	The private contractors handling solid waste in Anambra State have adequate equipment to achieve effective solid waste management.	1074	2.76	Disagreed
17	Offensive odours associated with solid wastes are treated by the private waste contractors before they are transported to the disposal sites.	1027	2.64	Disagreed
18	Solid waste receptacles are adequate in Awka, Onitsha and Nnewi metropolises of Anambra State to cater for tonnes of solid waste generated daily.	902	2.32	Disagreed
19	Private waste contractors have adequate manpower to effectively convey waste to disposal sites.	919	2.36	Disagreed
20	The waste management agency in Anambra State has modern technologies for effective management of solid waste	1062	2.73	Disagreed

Source: Field Survey, 2015.

Data from table 2 shows that only one out of the ten listed items showed a mean score above 3.0. This revealed that private waste contractors have complemented the State Government effort on solid waste management. However, the remaining nine items have mean scores have means scores below 3.0. This shows that private waste contractors in Anambra State does not have adequate; compactors for solid waste collection in designated disposal sites (2.67); and chain up vehicles to effectively convey solid waste to disposal sites. Solid wastes generated in Anambra State are not promptly collected by the private waste contractors (2.23). Solid waste receptacles are not promptly returned to designated depot after disposal of wastes (2.45). Private contractors handling solid waste in Anambra State do not have adequate equipment to achieve effective solid waste management (2.76). Offensive odours associated with solid wastes are treated by the private waste contractors before they are transported to the disposal sites (2.64). Solid waste receptacles are adequate in Awka, Onitsha and Nnewi metropolises of Anambra State to cater for tonnes of solid waste generated daily (2.32). Private waste contractors have adequate manpower to effectively convey waste to disposal sites (2.36) and waste management agency in Anambra State does not modern technologies for effective management of solid waste (2.73).

Research Question 2: Have the private waste contractors contributed significantly to solid waste recycling in Anambra State?

The responses of the sampled respondents are presented in table 3 below.

Table 3 Solid Waste Recycling in Anambra State

N = 389

S/N	Variable	FX	Mean (x)	Remark
21	The involvement of the private waste contractors in solid waste management have improved the recycling of solid waste in Anambra State.	968	2.49	Disagreed
22	Private waste contractors in Anambra State use composting, anaerobic digestion, and microbial fuel cell to recycle solid waste in Anambra State.	835	2.15	Disagreed
23	Private waste contractors and Anambra State Waste Management Agency often educate the public on how to recycle their solid waste.	1055	2.71	Disagreed
24	Private waste contractors in Anambra State have recycling plants to convert waste to wealth and minimize the tonnes of waste disposal.	874	2.25	Disagreed
25	Pyrolysis and waste recovery methods are used by Private waste contractors in Anambra State	958	2.46	Disagreed
26	Private waste contractors manually sort solid wastes at collection points before final disposal.	1401	3.60	Agreed
27	Private waste contractors have recycling plants for the recycling of solid wastes to enhance economic gains and employment opportunities.	965	2.48	Disagreed
28	Private waste contractors rely on scavengers to greatly assist them recycle solid waste in Anambra State.	1516	3.90	Agreed
29	Private waste contractors in Anambra State often sensitize corporate organizations and companies to recycle their commercial and industrial waste.	898	2.31	Disagreed
30	The Private waste contractors in collaboration with the Ministry of Environment organize seminars and conferences on solid waste recycling in Anambra State.	815	2.10	Disagreed

Source: Field Survey, 2015.

Table 3 shows that 2 out of the 10 listed items have mean scores of 3.0 and above. This shows that the respondents agreed that, during the period under review, private waste contractors manually sort solid

wastes at collection points before final disposal (3.60); they also rely on scavengers to greatly assist them to recycle solid waste in Anambra State. The remaining 8 items have mean scores less than 3.0. This shows that; the involvement of the private waste contractors in solid waste management have not improved the recycling of solid waste in Anambra State (2.49); private waste contractors in Anambra State do not use composting, anaerobic digestion, and microbial fuel cell to recycle solid waste in Anambra State (2.15); private waste contractors and Anambra State Waste Management Agency often do not educate the public on how to recycle their solid waste (2.71); private waste contractors in Anambra State do not have recycling plants to convert waste to wealth and minimize the tonnes of waste disposal (2.25); pyrolysis and waste recovery methods are not used by private waste contractors in Anambra State (2.46); private waste contractors do not have recycling plants for the recycling of solid wastes to enhance economic gains and employment opportunities (2.48); private waste contractors in Anambra State do not often sensitize corporate organizations and companies to recycle their commercial and industrial waste (2.31); and private waste contractors do not collaborate with the Ministry of Environment to organize seminars and conferences on solid waste recycling in Anambra State.

(i) **Research Question 3:** To what extent have private waste contractors contributed to public enlightenment on good sanitary practices in Anambra State?

The responses of the sampled respondents are presented in table 4 below.

Table 4: The role of PWC in public enlightenment on good sanitary practices in Anambra State
N = 389

S/N	Variable	FX	Mean (x)	Remark
31	The sanitary habit of the inhabitants in Awka, Onitsha and Nnewi metropolises pose serious problem to solid waste management in Anambra State.	1545	3.97	Agreed
32	Proper monitoring of solid waste disposal habit of the people is instrumental to achieving quality service delivery in solid waste management in Anambra State	1755	4.51	Agreed
33	Private waste contractor carryout public awareness programmes on the dangers of poor sanitary practice in Awka, Onitsha and Nnewi metropolises of Anambra State.	1013	2.60	Disagreed
34	Public awareness of the inhabitance of the people on maintaining good sanitary practices have been significantly increased by the private waste contractors.	720	1.85	Disagreed
35	Private waste contractor have helped to drastically curtail poor sanitary habits of the public.	942	2.42	Disagreed
36	Poor sanitary habits of the inhabitants of Awka, Onitsha and Nnewi are traceable to inadequate information on the consequences of their actions.	1805	4.64	Agreed
37	Littering of residential areas, markets, motor parks and other public places are mainly caused by the poor sanitation habit of the people	1537	3.95	Agreed
38	Private waste contractors in Anambra State have provided the public with relevant information to curtail indiscriminate refuse dumps.	885	2.28	Disagreed
39	Private waste contractors monitor and report violators of sanitation laws to the appropriate authorities.	1184	3.04	Agreed
40	The public enlightenment programmes of private waste contractors in Anambra State have made the people to adopt good sanitary practices.	839	2.16	Disagreed

Source: Field Survey, 2015.

Table 4 shows that 5 out of the 10 listed items have mean scores of 3.0 and above. This shows that the respondents agreed that, during the period under review, the sanitary habit of the inhabitants in Awka, Onitsha and Nnewi metropolises pose serious problem to solid waste management in Anambra State (3.97); proper monitoring of solid waste disposal habit of the people is instrumental to achieving quality service delivery in solid waste management in Anambra State (4.51). poor sanitary habits of the inhabitants of Awka, Onitsha and Nnewi are traceable to inadequate information on the consequences of their actions (4.64); littering of residential areas, markets, motor parks and other public places are mainly caused by the poor sanitation habit of the people (3.95); and private waste contractors monitor and report violators of sanitation laws to the appropriate authorities (3.04).

The remaining 5 items have mean scores less than 3.0. This shows that private waste contractors do not carry out public awareness programmes on the dangers of poor sanitary practice in Awka, Onitsha and Nnewi metropolises of Anambra State (2.60); public awareness of the people on maintaining good sanitary practices have not been significantly increased by the private waste contractors (1.85); private waste contractor have not helped to drastically curtail poor sanitary habits of the public (2.42); private waste contractors in Anambra State have not provided the public with relevant information to curtail indiscriminate refuse dumps (2.28); the public enlightenment programmes of private waste contractors in Anambra State have not propelled the people to adopt good sanitary practices (2.16).

Data Analysis

This section focuses on the test of three hypotheses formulated for the study. The hypotheses were tested with the aid of regression analysis.

Test of Hypothesis One

(i) H_o**:** Private waste contractors in Anambra State have not contributed significantly to solid waste collection and disposal.

H_i**:** Private waste contractors in Anambra State have contributed significantly to solid waste collection and disposal.

This hypothesis was tested using the responses of respondents in tables 1 and 2 above. The result of the analysis is presented in table 5 below.

Table 5: Test of Hypothesis One

Descriptive Statistics

	Mean	Std. Deviation	N
Solid Waste Collection & Disposal	77.8000	46.76341	50
Private Waste Contractors	76.3000	37.49136	50

Correlations

		Solid Waste Collection & Disposal	Private Waste Contractors
Pearson Correlation	Solid Waste Collection & Disposal	1.000	.239
	Private Waste Contractors	.239	1.000
Sig. (1-tailed)	Solid Waste Collection & Disposal	.	.047
	Private Waste Contractors	.047	.
N	Solid Waste Collection & Disposal	50	50

Private Waste Contractors	50	50

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Private Waste Contractors[b]	.	Enter

a. Dependent Variable: Solid Waste Collection & Disposal
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.239[a]	.057	.038	45.87645

a. Predictors: (Constant), Private Waste Contractors

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	6130.882	1	6130.882	2.913	.094[b]
	Residual	101023.118	48	2104.648		
	Total	107154.000	49			

a. Dependent Variable: Solid Waste Collection & Disposal
b. Predictors: (Constant), Private Waste Contractors

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	55.036	14.832		3.711	.001
	Private Waste Contractors	.298	.175	.239	1.707	.094

a. Dependent Variable: Solid Waste Collection & Disposal

From the analysis in table 5, the correlation coefficient (r) was .239. It implies that there is positive weak relationship between private waste contractors and solid waste collection and disposal. The coefficient of determination (r2) was .038 which implies that about 03.8% variations in solid waste collection and disposal could only be explained by private waste contractors. The regression equation is Y = 55.036 + .298. The table also reveals that probability value of (0.09) is greater than the alpha value (0.05) implying that the null hypothesis is upheld that private waste contractors in Anambra State have not contributed significantly to solid waste collection and disposal.

Test of Hypothesis Two

(i) H_o**:** Private waste contractors in Anambra State have not contributed significantly to solid waste recycling.

H_i**:** Private waste contractors in Anambra State have contributed significantly to solid waste recycling.

This hypothesis was tested using the responses of respondents in tables 1 and 3 above. The result of the analysis is presented in table 6 below.

Table 6: Test of Hypothesis Two

Descriptive Statistics

	Mean	Std. Deviation	N
Solid Waste Recycling	77.8000	48.88387	50
Private Waste Contractors	76.3000	37.49136	50

Correlations

		Solid Waste Recycling	Private Waste Contractors
Pearson Correlation	Solid Waste Recycling	1.000	-.239
	Private Waste Contractors	-.239	1.000
Sig. (1-tailed)	Solid Waste Recycling	.	.047
	Private Waste Contractors	.047	.
N	Solid Waste Recycling	50	50
	Private Waste Contractors	50	50

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Private Waste Contractors[b]	.	Enter

a. Dependent Variable: Solid Waste Recycling

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.239[a]	.057	.038	47.95585

a. Predictors: (Constant), Private Waste Contractors

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	6703.369	1	6703.369	2.915	.094[b]
	Residual	110388.631	48	2299.763		
	Total	117092.000	49			

a. Dependent Variable: Solid Waste Recycling

b. Predictors: (Constant), Private Waste Contractors

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	101.604	15.504		6.553	.000
	Private Waste Contractors	-.312	.183	-.239	-1.707	.094

a. Dependent Variable: Solid Waste Recycling

From the analysis in table 6, the correlation coefficient (r) was -.239. It implies that there is a negative relationship between private waste contractors and solid waste recycling. The coefficient of determination (r2) was .038 which implies that about 03.8% variations in solid waste collection and disposal could only be explained by private waste contractors. The regression equation is Y = 101.604 + -.312. The table also reveals that probability value of (0.09) is greater than the alpha value (0.05) implying that the null hypothesis is upheld that private waste contractors in Anambra State have contributed significantly to solid waste recycling.

Test of Hypothesis Three

(i) Private waste contractors in Anambra State have not contributed to public enlightenment on good sanitary practices.

***H_i*:** Private waste contractors in Anambra State have contributed to public enlightenment on good sanitary practices.

This hypothesis was tested using the responses of respondents in tables 1 and 4 above. The result of the analysis is presented in table 7 below.

Table 7Test of Hypothesis Three

Descriptive Statistics

	Mean	Std. Deviation	N
Public Enlightenment on Good Sanitary practice	79.0000	60.86921	50
Private Waste Contractors	76.3000	37.49136	50

Correlations

		Public Enlightenment on Good Sanitary practice	Private Waste Contractors
Pearson Correlation	Public Enlightenment on Good Sanitary practice	1.000	.186
	Private Waste Contractors	.186	1.000
Sig. (1-tailed)	Public Enlightenment on Good Sanitary practice	.	.098
	Private Waste Contractors	.098	.
N	Public Enlightenment on Good Sanitary practice	50	50
	Private Waste Contractors	50	50

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Private Waste Contractors[b]	.	Enter

a. Dependent Variable: Public Enlightenment on Good Sanitary practice
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.186[a]	.035	.015	60.42564

a. Predictors: (Constant), Private Waste Contractors

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	6287.612	1	6287.612	1.722	.196[b]
	Residual	175260.388	48	3651.258		
	Total	181548.000	49			

a. Dependent Variable: Public Enlightenment on Good Sanitary practice
b. Predictors: (Constant), Private Waste Contractors

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	55.946	19.536		2.864	.006
	Private Waste Contractors	.302	.230	.186	1.312	.196

a. Dependent Variable: Public Enlightenment on Good Sanitary practice

From the analysis in table 7, the correlation coefficient (r) was .186. It implies that there is a low and negligible relationship between private waste contractors and public enlightenment on good sanitary practice. The coefficient of determination (r2) was .015 which implies that about 0.15% variations in solid waste collection and disposal could only be explained by private waste contractors. The regression equation is Y = 55.946 + .302. The table also reveals that probability value of (0.19) is greater than the alpha value (0.05) implying that the null hypothesis is upheld that private waste contractors in Anambra State have contributed to public enlightenment on good sanitary practices.

Summary of Findings

The summary of the findings of the study are that;

i. Private waste contractors in Anambra State did not significantly contribute to solid waste collection and disposal (Y = 55.036 + .298, 0.09 > 0.05). Approximately 4 million tonnes of municipal solid waste (MSW) is generated annually in the cities and yet there are not enough receptacles provided to effectively cover the state. Even those receptacles that were strategically positioned in the cities by waste management organizations for waste collection are most times not promptly evacuated.
ii. Private waste contractors in Anambra State did not significantly contribute to solid waste recycling (Y = 101.604 + -.312, 0.09 > 0.05). This is because private waste contractors in Anambra State did

not have waste recycling plants for achieving solid waste minimization and converting wastes to wealth.

Private waste contractors in Anambra State did not significantly contribute to public enlightenment on good sanitary practices (Y = 55.946 + .302, 0.19 > 0.05). This result is that the populace are commonly exposed to serious health challenges. Hence the insensitivity of the populace to healthy sanitary practices is a major issue in municipal waste disposal.

Conclusion

Based on the findings, the study has demonstrated that presently, the private sector participation in solid waste management did not significantly address the poor state of solid waste management in Anambra State. Inadequate finance and technical commitment adversely affected the participation of private waste contractors in this regard. Hence strategies to improve solid waste management in Anambra State must take into consideration these identified deficiencies with a view to achieve effective solid waste management.

Recommendations

Based on the findings, the following recommendations are made;

i. Anambra State Government should thoroughly review its existing contractual agreement with private waste contractors handling solid waste collection and disposal in the urban areas, to ensure that those without adequate finance, manpower, and appropriate technologies are screened out, in order to appoint private waste contractors that can effectively and efficiently assist the State waste management agencies in solid waste management.

ii. The State Government and private waste contractors should establish waste recycling plants which will adequately minimize the tonnes of solid waste dumps at disposal sites. The establishment of these plants will not only achieve solid waste minimization, but will also provide employment opportunities and enhance wealth creation.

iii. Private waste contractors should complement the State Government effort in the area of public enlightenment programmes on healthy sanitary habits. Private waste contractors should also monitor the waste disposal habits of the populace and report violators of sanitation laws to the sanitation enforcement agency.

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