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URBANIZATION AND SOLID WASTE MANAGEMENT IN LAGOS MEGACITY, NIGERIA

Abstract. In the past two decades, Nigeria has witnessed rapid and unprecedented urbanization. Urbanization has resulted in a huge increase in the volume of waste being generated daily in developing countries like Nigeria. There is the problem of inadequate infrastructure and solid waste management which have constituted serious impediments to the development of some major cities in developing countries. This study, therefore, examines the effect of urbanization on solid waste management in Lagos megacity. It adopts a descriptive research method. Data were collected through primary and secondary sources. The main instrument of data collection was a structured questionnaire. The collected data was presented and analyzed using descriptive statistics while the stated hypotheses were tested using correlation coefficient with the aid of Statistical Package for Social Sciences (SPSS). Secondary data was sourced from waste management agencies, web pages, publications, articles in journals, environmental organization reports and books. The findings reveal that the mass exodus of people from rural to urban areas has accounted for the increase in solid waste generation and environmental pollution in the Lagos megacity. The study recommends among others that there should be an environmental education and public participation option as these will lead to increased awareness of environmental threats. These are important for the continued sustainable economic development of the state.

Keywords: economics development, megacity, pollution, solid waste, management, urbanization

INTRODUCTION

In recent time, the world has experienced unprecedented urban growth (Ugwuanyi and Isife, 2012). For the first time, the world population was evenly divided between urban and rural areas. More developed nations were about 74 percent urban, while 44 percent of residents of less developed countries live in rural areas (Population Reference Bureau (PRB), 2014). It is expected that 70 percent of the world population will be urban

by 2050 and most urban growth will occur in less developed countries (Satterthwar, 2009; Ugwuanyi and Isife, 2012). In Nigeria, the population rate has continued to increase on a daily basis. PRB (2014) reveals further that by 2020, the population of Nigeria would be 200 million. Nigeria has 36 states and 774 local government areas and Federal Capital City (FCC). Over 70 percent of the states still find it difficult to transform due to inadequate infrastructural development and the inability to manage waste generated in such environments.

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Lagos is the most populous city among Nigeria's 36 states. The reason for the excess population in Lagos megacity is the migration from every corner of the country for greener pasture. This has resulted in uncontrollable waste generation in the state. As the population increases, the challenge of managing waste remains a major concern for the Lagos state government (Lagos Population Growth, 2018). This study, therefore, aims to examine the effect of urbanization on solid waste management in Lagos megacity. The study looks at the pertinent issues through empirical review and survey, and focuses on those issues which made it stand out from previous studies conducted on the generation and management of solid waste in Lagos state.

STATEMENT OF THE PROBLEM

Lagos State is experiencing urbanization and this exodus is causing serious solid waste pollution. Improper disposal of waste has also caused air pollution which continues to threaten the health of Lagos residents (Ugwuanyi and Isife, 2012). Residences and homes where people live are some of the major sources of solid waste. The garbage from these places includes food waste, plastics, paper, glass, leather, cardboard, metals, yard wastes, ashes and special waste such as bulky household items like electronics, tires, batteries, old mattresses and used oil (Vipeak, 2018). Solid wastes from industries are a source of toxic metals, hazardous wastes, and chemicals. When released into the environment, solid waste can cause biological and physicochemical problems to the environment and may affect or alter soil productivity in that particular area. During the process of collecting solid waste, hazardous wastes usually mix with ordinary garbage and other flammable wastes making the disposal process even harder and riskier. When hazardous wastes such as pesticides, batteries containing lead, mercury or zinc, cleaning solvents, radioactive materials, e-waste and plastics are mixed up with paper and other scraps and burned, they produce dioxins and gasses. These toxic gases have the potential of causing various diseases including cancer.

There is no doubt that it has become very challenging for the Lagos state government to manage waste generated by the residents in recent years. This development eventually has made the government to be committed to sustainable waste management and the initiative has made Lagos state a model for other states in the country

(Iriruaga, 2013). The vision of the "Megacity" attracts many innovations such as skill development, technology advancement, and transformation of agricultural produces, etc. which eventually influence the population of Lagos megacity. However, inconsistency is observed in the management of waste and infrastructure, a development which has impeded the success of the various innovations introduced by succeeding regimes in ensuring efficient waste management in Lagos megacity. During the tenure of a former governor of Lagos State, Mr. Babatunde Raji Fashola, spirited efforts were made in managing waste in the state using the Public-Private Partnership approach. The Lagos State Waste Management Authority (LAWMA) is an agency established to regulate waste management and to ensure the cleanness of the state through Private Sector Participation (PSP). During his tenure as Governor, Lagos state was named the cleanest state in Nigeria (Iriruaga, 2013).

However, the policy of the past administration in the state was discarded by the immediate past Governor (Mr. Akinwumi Ambode) and the "Vision Clean Lagos" was introduced instead. It is imperative to note that since the introduction of a new authority for waste management; the policy has not achieved enough. There was a public outcry over the waste dumped along major roads in the Lagos metropolis which many believe may affect the health of the residents leading to, for example, an outbreak of cholera and other diseases in the Megacity. The recovery and recycling of items such as bottles, plastics, nylon, etc. which could be reproduced or used to manufacture other products, have been neglected. Instead, these are left to block drainages and cause serious flooding, and damage newly constructed roads.

Sanitary Landfill is the most popular modern technique of solid waste disposal. This could be an alternative method in managing solid waste in Lagos instead of polluting the environment with dirt and waste. Several research have been carried out on solid waste management in Nigeria (Ugwuanyi and Isife, 2012), and numerous studies have been conducted on the rural-urban drift, waste management and sustainable economic development in Nigeria. Also, some previous works exist in the extant literature on urbanization, such as Ugwuanyi and Isife (2012), Chukeyemeka et al. (2013), Amuda et al. (2014), Abass (2014); Ayeni (2017) etc. These works are plausible in their own right, while the discourse on waste generation challenges in Nigeria has largely lacked adequate emphasis on its implications on the residents'

health. This study, therefore, focuses on the consequences of the rural-urban drift on solid waste management in Lagos megacity with special emphases on recycling bin and sanitary landfill in Lagos megacity.

Objectives of the study

The main objective of this study is to examine the effect of Urbanization on Solid Waste Management in Lagos megacity. Other specific objectives include:

1. To evaluate the influence of Rural-Urban Drift on the Recovery and Control of Recycling Items in Lagos megacity;
2. To ascertain the influence of Population on Sanitary Landfill of Solid Waste in Lagos megacity.

Research questions

An attempt will be made to provide answers to the following research questions

1. Does Rural-Urban Drift influence the Recovery and Control of Recycling Items in Lagos megacity?
2. To what extent has Population influenced the Sanitary Landfill of Solid Waste in Lagos megacity?

Research hypotheses

This study is geared towards testing the following hypotheses

1. H_0 : Rural-Urban Drift does not influence the Recovery and Control of Recycling Items in Lagos megacity.
2. H_0 : Population does not have any significant influence on the Sanitary Landfill of Solid Waste in Lagos megacity.

LITERATURE REVIEW

It is undeniable that urbanization is indeed one of the most significant trends in several decades, providing the foundation and momentum for global change. According to Eduardo (2017), urban centers have become a positive and potent force for addressing sustainable economic growth, development and prosperity. They drive innovation, consumption and investment in both developed and developing countries. Adewole (2009) reveals that the management of waste in Lagos has assumed a new shape and the management of waste has regulated improper disposal of waste in the state. The abovementioned author argued that several areas still need to be improved if the objectives of sustainable development

to be achieved. He pointed out that most of the industries around the Isolo area of Lagos still do not have pollution reduction programs in place. Hence, the Lagos lagoon absorbs 10,000 m³ of industrial effluent daily.

Despite attempts to organize a collection system in Lagos, Kofoworola (2007) argues that there are still inadequate facilities for waste management in the state. He found that some inhabitants of the state use illegal methods of waste disposal, such as dumping along the streets and motorways. A study (Afon, 2007) of two local governments in Lagos state reveals that residents store waste in small containers. Types of containers include unused plastic and metal buckets, bowls, polythene and nylon bags. The study pointed out that the use of such small storage containers helps residents to get a good bargain by paying less to informal waste collectors for the disposal of their waste. He added that this storage system attracts disease vectors such as flies and rats (Ebikapade and Jim, 2017).

Kofoworola (2007) observed that Lagos does not have an integrated approach to waste management and the problems associated with the current system of management are evident. Afon (2007) reveals that dumping waste into the drainage channels and in public places are common practices among residents. Currently, no treatment is carried out for collected waste which is transported to landfill sites and burnt for volume reduction. Kofoworola (2007) added that this burning process releases harmful gases to the ecosystem. Hence et al. (2009), advised that a management approach that emphasizes waste reduction, recycling and reuse should be adopted. Another major problem with waste management in Lagos is that wastes are not segregated. A study of leachate characteristics in a Lagos landfill reveals that industrial and household waste is dumped together at the Olusosun landfill. This is particularly hazardous to the environment as the wastes are dumped on the landfill without treatment. Adewole (2009) argues that since most landfills in Lagos are not engineered, leachate will percolate into streams and groundwater sources. He also suggests that an approach with an organized system of collection from industrial and domestic sources should be adopted. Solomon (2009) suggested that there is a need for landfills in Nigerian cities to be built to the required standard (Ebikapade and Jim, 2017).

However, Solomon (2009) observed that some progress is being made in terms of solid waste in Lagos. He stated that, since a large percentage of solid waste

generated in Lagos is put irascible, a private company recently established a composting plant capable of treating 1500 tons of solid waste per day. In addition to this, Ezeah and Roberts (2013) stated that the Lagos state agency responsible for waste management was recognized for its effort by the Federal Ministry of Commerce and Industry in 2010. The said authors added that other organizations such as the United Nation Development Program, Clinton Foundation and USAID have recognized the effort of the agency through awards or sponsorships. However, the gap in this study could be due to the fact that the generation of waste in the state rests on two important issues: (1). It brings about air pollution hazards (2). It adds value to the economy if properly controlled through recycling. This study, therefore, focuses on the two areas and suggests how waste can be best managed in the state.

THEORETICAL REVIEW

This study is situated within the context of Stakeholder Theory which was formulated by Freeman in 1984 (Mitchell et al., 1997; Frooman, 1999; Hendrich, 2008). He defined and identified stakeholders as any group or individual who can affect or is affected by the achievement of organizational objectives (Muthoni, 2014). The objectives have been extended to accommodate the elements of an organization, for example, its actions, decisions, policies, practices or goals (Carroll and Buchholtz, 2000). However, Freeman's definition was broader as it accommodated many stakes in the long run (Mitchell et al., 1997). But in the process of narrowing it down, most literature has differed mostly in the identification, type, level, classification and management depending on the area of study (Kasperson, 2006). The theory explains and predicts how an organization influences stakeholders and vice-versa (Frooman, 1984). In this paper, the author uses Freeman's (1984) definition of stakeholders at the starting point but has elaborated the definition further with the assistance of several other studies in the stakeholder theory (Muthoni, 2014). The criterion used as the basis for this literature is that it has attempted to identify and classify stakeholders depending on research objectives. The issue has caused a debate without consensus on which model and classification is suitable to use as far as solid waste is concern but it is up to the organization to determine the class of its stakeholders. Despite this vast study and the application of the

stakeholder approach in numerous fields, the approach and influence in the field of solid waste management have been underresearched especially in developing countries. In the literature, for instance, Guerrero et al. (2013); Heidrich et al. (2008); Contreras et al. (2008); Tadesse et al. (2007); Kurian (2006); Srivastava et al. (2005), among others, have recommended stakeholder approach amongst other recommendations in tackling solid waste problems in developing countries. However, only a few of them have weighed on one or two stakeholders through involving them in solid waste management (Muthoni, 2014).

METHODOLOGY

Study area

This study pertains to Lagos megacity. There are five divisions in Lagos; these divisions include Epe, Ikorodu, Ikeja, Lagos Island and Badagry represented by the acronym IBILE. This study focuses on a particular area in each of the divisions. The focus areas are Ibeju-Lekki; Agric; Mushin; Oyingbo and Ojo. The selected areas are known to be densely populated. Also, an interview was conducted in the Lagos State Ministry of Environment on the effectiveness of waste management in Lagos megacity.

Research method

A survey research design was employed in this study with the use of a structured questionnaire administered to some selected residents and Private Sector Partnership (PSP) in the five divisions of the state as well as some selected staff of the Lagos State Ministry of Environment in the state. The researchers used both purposive and accidental sampling techniques to select participants for the study. A sample of 175 respondents was selected for the study comprising 25 respondents from each of the five divisions, 25 in the Ministry of Environment and 25 at PSP across the five divisions in Lagos. The questionnaire was designed on a five-point Likert scale. The questionnaire was administered in two formats that addressed questions related to urbanization and waste management in the Lagos megacity. 110 copies of the questionnaire were returned by the respondents across the five divisions of the state. Data collected from the respondents who were residents, PSP and employees of the Ministry of Environment, and further tested using Pearson coefficient correlation.

Discussion of findings

From the analyses above, there is a positive association of Urban-rural drift and waste management control also between the population and sanitary landfill method in the Lagos megacity.

The first hypothesis result, as shown with the use of Pearson Coefficient Correlation, where $R = 0.612$; P value = 0.000 which is less than 0.01 level of significance, asserts that “there is a significant influence of rural-urban drift on waste management in the Lagos megacity.

The calculated P value is = 0.000, we therefore accept H_1 and reject H_0 . The findings are in tandem with the findings of Ebikapade and Jim (2017) and Solomon (2009). According to Ebikapade and Jim (2017), the population of an area is a major factor that determines the volume of waste generated in an area. Ebikapade and Jim (2017) added that there was an increase of about 25.4% in the volume of waste generated in Lagos megacity. Ebikapade and Jim (2017) concluded that solid waste management agencies should adopt an approach that charges residents according to the volume of waste they generate. Ebikapade and Jim (2017) suggested that such an approach will ensure a healthy environment. According to Solomon (2009), the increasing population constitutes a major reason for solid waste generation. However, some progress is being made in terms of solid waste in Lagos. Ebikapade and Jim (2017) stated that, since a large percentage of solid waste generated in Lagos is challenging a private company recently established a composting plant capable of treating 1500 tons of solid waste per day. The first hypothesis consistent with the findings from previous researches showed that population rate constitutes a major solid waste generation factor in the Lagos megacity. Infrastructural development that could have influenced sustainable economic development in the state has been dealt with due to the inability to manage waste. The argument is concomitant with a work by Kofoworola (2007). Kofoworola observed that Lagos does not have an integrated approach to waste management and the problems associated with the current system of management are evident.

However, the result revealed that the Lagos state government through the residents can generate substantial revenue from solid waste by recovering and recycling the waste to produce other materials. The findings also discovered that if the government can involve residents in the task, it will reduce poverty and unemployment rate in the state.

From the second hypothesis, the result, with the use of the Pearson Coefficient Correlation can be stated as follows: $R = 0.720$, P value = 0.000 which is less than 0.01 level of significance, thus: “population has a significant influence on sanitary landfill in the Lagos megacity”.

The calculated P value is = 0.000 < 0.01, we therefore accept H_1 and reject H_0 . The findings showed that despite the efforts of PSP and government agencies in the management of solid waste, disposal of waste is still alarming. The second hypothesis tested the influence of population on the sanitary landfill of waste in the Lagos megacity. It is imperative to note that the management of waste in Lagos is a concern that will pose a challenge unless the government educate the residents on alternative ways to manage individually. This argument is supported by a work by Afon (2007) who argues that residents store waste in small containers. The types of containers include plastic and metal unused buckets, bowls, and polythene and nylon bags. The study pointed out that the use of such small storage containers helps residents to get a good bargain by paying less to informal waste collectors for the disposal of their waste. He added that this storage system attracts disease vectors such as flies and rats. He therefore suggested that residents should be encouraged to landfill their generated waste as this will reduce air pollution which could cause disease and health challenges.

CONCLUSION AND RECOMMENDATIONS

In conclusion, this study has examined the effect of urbanization on solid waste management in the Lagos megacity. Apparently, the ineffectiveness in managing solid waste in Lagos is a result of the uncontrolled drift of people from every corner of the country. The upsurge in population growth in urban areas has resulted in environmental pollution caused by waste and consequently increases the vulnerability of residents to various health hazards. From the findings of this study, analysis has shown that one of the methods of managing waste in the populated megacity is by recovery and recycling of waste generated by the residents. This method will not only reduce disposable waste but also increase the internally generated revenue of the state. However, there are some wastes that cannot be recycled, and such waste can cause air pollution and can cause damage to human health. Therefore this study concludes that sanitary

landfills should be an alternative for disposing of waste generated in the state.

This study, therefore, offered the following recommendations as a panacea for sustainable solid waste management in Lagos megacity:

1. Lagos state government needs to organize orientation programmes for the residents on the best way to manage solid waste. The government should make use of the advantage of recovery and recycling of waste and a certain percentage should be given as compensation to any resident who is involved in the task as this will reduce hunger, increase employability in the megacity and promote sustainable development in Nigeria.
2. There should be an environmental education and public participation option on the alternative ways in which waste can be disposed of in Lagos megacity. The government should educate the residents on how waste can be disposed properly as these will lead to increased awareness of environmental issues. These are important for the continued sustainable economic development of the state.

REFERENCES

- Abass, A.D. (2014). The Impact of Municipal Solid Waste Disposal In Ado Ekiti Metropolis, Ekiti State, Nigeria. *Afr. J. Environ. Sci. Technol.*, 1(3), 186–189. <https://doi.org/10.5897/AJEST09.075>
- Adekola, P.O. (2017). Migration, Urbanization and Environmental Problems in Nigeria. In: J.L. Oyefara (ed.), *Migration and urbanization in contemporary Nigeria: policy, issues and challenges*. Lagos: UNILAG Press.
- Adewole, A.T. (2009). Waste Management, Towards Sustainable Development in Nigeria: a case study of Lagos state. *Int. NGO J.* 4(1) 173–179.
- Afon, A.O.(2007). Informal sector initiative in the primary sub-system of Urban Solid Waste Management in Lagos, Nigeria. *Habitat Int.*, 3(1), 193–204.
- Amadu, M.B. (2017). Urbanization and waste management challenges in Nigeria. *J. Creat. Writing*, 1(4), 45–56.
- Amuda, A., Jimoda, A. (2014). Rural-Urban drift in Nigeria: Prospects and Challenges. *Arabian J. Bus. Manag. Rev.* (Oman Chapter), 5(3), 18–26.
- Ayeni, O.A. (2017). Increasing population, urbanization and climatic factors in Lagos State, Nigeria: The Nexus and implications on water demand and supply. *J. Glob. Initiatives: Policy, Pedagogy, Perspective*, 11(2), 69–87.
- Caroll, C., Bucholtz, G. (2000). *Proposing a theory of urbanization: A Comparative Analysis*. Oxford: Oxford University Press.
- Chukwuemeka, E.O., Okoye, N.C., Okechukwu, E. (2013). Management of Rural-Urban Migration and Economic Development In Nigeria: the case of Anambra State (2004–2010). *Eur. Sci. J.*, 9(34), 1857–7881.
- Eduardo, L.M. (2016). Concepts, definitions and data sources for the study of urbanization: the 2030 Agenda for Sustainable Development. United Nations Expert Group Meeting on Sustainable Cities, Human Mobility and International Migration. New York: Department of Economic and Social Affairs.
- Frooman, C. (1984). *The urbanization theory and classification: Problems and Prospects*. Institute for Development and Peace (INEF), University of Duisburg-Essen.
- Guerrero, M. (2013). Stakeholder as a model for Africa's development: is its emergence imminent? *J. Pub. Adminis.*, 4(6), 588–607.
- Hendrick, C. (1990). *Managerialism and Public Services: The Anglo-American Experiences*. Oxford: Basil Blackwell.
- Iriruaga, E.T. (2013). *Solid Waste Management in Nigeria. Waste Management for Everyone*.
- Kasperson, V.D. (2006). *Political Theory*. New Delhi: S. Chand and Company Limited.
- Kofoworola, O.F. (2007). Recovery and Recycling practices in municipal solid waste management in Lagos, Nigeria. *Waste Manag.*, 5(27), 1139–1143.
- Kurian, C. (2006). *MITI and the Japanese miracle: the growth of industrial policy, 1925–1975*. Stanford, CA: Stanford University Press.
- Lagos Population Growth (2018). *Lagos state handbook*.Ikeja, Nigeria: population, fertility and growth. Lagos: Ministry of Information and Culture
- Mitchell, S.H. (1997). *Urbanization in the globalization world*. Accessed on the 20th of October 2018, available from: <http://development%20adm/The%20Developmental%20State%20in%20the%20Globalizing%20World.html>
- Muthoni, J.D. (2014). The theories and practice of the democratic state: a comparative assessment of South Africa and Malaysia' development. Pretoria: Regional Conference on Building Democratic Development States For Economic Transformation in South Africa, 20–22.
- Population Reference Bureau (2014). *World Data Sheet*. Washington, DC: PRB.
- Satterthwarite, D. (2009). The Implications of Population Growth and Urbanization for Climate Change. *Environ. Urban.*, 21(2) 545–567.
- Solomon, U.U. (2009). The state of solid waste management in Nigeria. *Waste Manag.* 5(27), 2787–2788.

Ugwuanyi, R.O., Isife, C.T. (2012). Urbanization and solid waste management challenges in Nigeria. Nsukka: Institute for Development Studies, Enugu Campus, University of Nigeria.

Vipeak, L. (2018). Solid waste and waste management in Nigeria. Available from: <http://www.vipeak.org/> on 6th September 2018.

URBANIZACJA I ZARZĄDZANIE ODPADAMI STAŁYMI W LAGOS MEGACITY (NIGERIA)

Abstrakt. W ciągu ostatnich dwóch dekad w Nigerii nastąpiła gwałtowna i bezprecedensowa urbanizacja, która spowodowała ogromny wzrost ilości odpadów generowanych każdego dnia, co jest typowe nie tylko dla Nigerii, ale też dla większości krajów rozwijających się. Autorzy zauważają narastający problem nieodpowiedniej infrastruktury i gospodarki odpadami stałymi, które stanowią poważne zagrożenie dla rozwoju dużych miast w krajach rozwijających się. W niniejszym opracowaniu zbadano wpływ urbanizacji na gospodarkę odpadami stałymi w megamieście Lagos. Przyjęto opisową metodę badawczą. Wykorzystano dane ze źródeł zarówno pierwotnych, jak i wtórnych. Głównym narzędziem zbierania danych pierwotnych był ustrukturyzowany kwestionariusz badania ankietowego. Zebrane dane zostały przedstawione i przeanalizowane przy użyciu statystyk opisowych. Postawiono hipotezy badawcze, które zostały przetestowane przy użyciu współczynnika korelacji za pomocą Statistical Package for Social Sciences (SPSS). Dane wtórne zostały pozyskane z agencji zarządzających odpadami, stron internetowych, publikacji, artykułów, raportów organizacji ekologicznych i książek. Wyniki badań wskazują, że masowy exodus ludzi z obszarów wiejskich do miast przyczynił się do wzrostu wytwarzania odpadów stałych i zanieczyszczenia środowiska w mieście Lagos. Na podstawie tych badań rekomenduje się między innymi edukację ekologiczną, która powinna doprowadzić do zwiększenia świadomości w zakresie bezpieczeństwa środowiskowego. Jest to ważne dla dalszego zrównoważonego rozwoju gospodarczego kraju.

Słowa kluczowe: rozwój gospodarczy, megamiasta, zanieczyszczenia, odpady stałe, gospodarka, urbanizacja