

Summer 8-9-2016

Household Waste Disposal Laws in the Federal Republic of Nigeria

Omenka Helen Uchendu

Georgia State University School of Public Health; Georgia State University College of Law

Follow this and additional works at: https://scholarworks.gsu.edu/iph_capstone

Recommended Citation

Uchendu, Omenka Helen, "Household Waste Disposal Laws in the Federal Republic of Nigeria." , Georgia State University, 2016.
https://scholarworks.gsu.edu/iph_capstone/38

This Capstone Project is brought to you for free and open access by the School of Public Health at ScholarWorks @ Georgia State University. It has been accepted for inclusion in Public Health Capstone Projects by an authorized administrator of ScholarWorks @ Georgia State University. For more information, please contact scholarworks@gsu.edu.

ABSTRACT

HOUSEHOLD WASTE DISPOSAL LAWS IN THE FEDERAL REPUBLIC OF
NIGERIA

By

OMENKA HELEN UCHENDU

M.P.H., Georgia State University School of Public Health

J.D., Georgia State University College of Law

B.A., Emory University

July 27, 2016

This capstone analyzes the public health problem of a lack of waste disposal and trash collection in major cities in Nigeria. It describes the waste disposal problem and how it affects the health of the environment, as well as the magnitude of the problem. Then, the capstone investigates the land use laws in Nigeria that address or should address the issue of lacking waste disposal. Finally, the capstone explores feasible policy interventions to remedy the negative effects of inadequate waste disposal in Nigeria.

HOUSEHOLD WASTE DISPOSAL LAWS IN THE FEDERAL REPUBLIC OF
NIGERIA

by

OMENKA HELEN UCHENDU

M.P.H., Georgia State University School of Public Health

J.D., Georgia State University College of Law

B.A., Emory University

A Capstone Submitted to the Graduate Faculty
of Georgia State University in Partial Fulfillment
of the
Requirements for the Degree

MASTER OF PUBLIC HEALTH

ATLANTA, GEORGIA

30303

APPROVAL PAGE

HOUSEHOLD WASTE DISPOSAL LAWS IN THE FEDERAL REPUBLIC OF
NIGERIA

by

OMENKA HELEN UCHENDU

Approved:

Dr. Douglas Roblin
Committee Chair

Dr. Christine Stauber
Committee Member

July 26, 2016
Date

Author's Statement Page

In presenting this capstone as a partial fulfillment of the requirements for an advanced degree from Georgia State University, I agree that the Library of the University shall make it available for inspection and circulation in accordance with its regulations governing materials of this type. I agree that permission to quote from, to copy from, or to publish this capstone may be granted by the author or, in his/her absence, by the professor under whose direction it was written, or in his/her absence, by the Associate Dean, School of Public Health. Such quoting, copying, or publishing must be solely for scholarly purposes and will not involve potential financial gain. It is understood that any copying from or publication of this capstone which involves potential financial gain will not be allowed without written permission of the author.

OMENKA HELEN UCHENDU

Signature of Author

TABLE OF CONTENTS

LIST OF FIGURES.....	7
I. INTRODUCTION.....	8
II. NIGERIA’S GOVERNMENT AND STRUCTURE: A CRITICAL BACKDROP....	12
III. STATE OF AFFAIRS: CURRENT DOMESTIC WASTE DISPOSAL, TRASH COLLECTION, AND RECYCLING PRACTICES IN NIGERIA.....	15
A. Current Practices in Lagos State in Nigeria.....	17
B. Current Practices in Abia State in Nigeria.....	20
IV. HEALTH EFFECTS: LACK OF TRASH COLLECTION AND DOMESTIC WASTE DISPOSAL AS AN ENVIRONMENTAL HEALTH ISSUE.....	23
A. Threats to Public Health When Household Waste is not Disposed of Properly....	23
B. Ramifications on the Environment of Waste Disposal and Land Use Systems.....	26
V. EXISTING NIGERIAN LAWS RELATED TO HOUSEHOLD WASTE DISPOSAL	27
A. Federal Laws in Nigeria related to household waste disposal and regulatory measures.....	28
B. State Laws in Nigeria related to household waste disposal and regulatory measures	32
C. Municipal Laws in Nigeria related to household waste disposal.....	36
VI. CHALLENGES TO PROPER WASTE DISPOSAL AND COMPLIANCE.....	37
VII. PROPOSED SOLUTIONS FOR IMPROVEMENTS TO HOUSEHOLD WASTE DISPOSAL IN NIGERIA.....	43
A. Implementation of the National Policy on Municipal and Agricultural Waste (MAW) Management.....	43
B. Utilization of the Waste Management Society of Nigeria (WAMASON) By State and Local Governments.....	45
C. Becoming a “Zero Waste City”.....	47
D. Dry waste collection centers.....	48
E. Recognition and utilization of informal recyclers and “waste-pickers”.....	50
F. Health promotion activities: education to induce behavioral changes.	51

VII. CONCLUSION.....53

List of Figures

Figure 1: Trash Outside of Ariaria International Market, Aba, Nigeria.....	9
Figure 2: Map of Nigeria	13
Figure 3.1: Trash Outside of Ariaria International Market, Aba, Nigeria.....	21
Figure 3.2: Trash Outside of Ariaria International Market, Aba, Nigeria.....	22
Figure 4: Burning Household Waste in Aba, Nigeria.....	25
Figure 5: Edo State Environmental and Waste Management Board Garbage Truck.....	38
Figure 6: Dumpsite seen while driving from Lagos, Nigeria to Aba, Nigeria.....	52

HOUSEHOLD WASTE DISPOSAL LAWS
IN THE FEDERAL REPUBLIC OF NIGERIA

Omenka Helen Uchendu¹

INTRODUCTION

Nigeria welcomes her visitors with roasting weather in the dry season and sopping humidity in the rainy season, kaleidoscopic Ankara fabric, roosters crowing like clockwork in the mornings, and a *mélange* of over two-hundred-and-fifty ethnic cultures walking as one. Unfortunately, Nigeria, specifically southeastern Nigeria, also welcomes her visitors with never-ending seas of domestic waste, also known as household waste or residential waste, and colloquially known as “trash.” Trash litters the streets in droves, clogging the gutters and growing soggy in fetid water. There are piles of it, heaps and hills of it, beside huts, beside corrugated tin stalls, beside apartment flats, and behind houses. Large cities and state capitals are blanketed by trash, their government-owned waste management agencies and private waste collectors to no avail.² Trash is ubiquitous to the landscape - so common is it that after a while the plastic bags, paper wrappers,

¹ Law Student, Georgia State University College of Law; Masters in Public Health Candidate, Georgia State University School of Public Health.

² Imoh Ukpong & Emmanuel Udofia, *Domestic Solid Waste Management in a Rapidly Growing Nigerian City of Uyo*, JOURNAL OF HUMAN ECOLOGY, 36(3): 229-235 (2011), available at <http://www.krepublishers.com/02-Journals/JHE/JHE-36-0-000-11-Web/JHE-36-3-000-11-Abst-PDF/JHE-36-3-229-11-2094-Ukpong-I-E/JHE-36-3-229-11-2094-Ukpong-I-E-Tt.pdf>.

bottle caps and scraps merge with the palm trees, the guava trees, the pawpaw, plantain, and udara trees (Figure 1).



Figure 1: Trash Outside of Ariaria International Market, Aba, Nigeria. (Omenka Helen Uchendu, 2016).

The ubiquity of trash in Nigeria is a public health issue, an environmental health issue, and, consequently, an environmental health law issue. The environment is everything that determines the quality of a person’s surroundings: the air one breathes, the water one drinks and uses, and the food one eats—as well as the chemicals, radiation, and microbes with which one comes into contact.³ Environmental health laws and policies are created to regulate and safeguard the environment because a person’s interactions with the environment are complex and can be unhealthy.⁴

³ *Environmental Health Law*, CDC.gov, <http://www.cdc.gov/phlp/publications/topic/environmental.html>.

⁴ *Id.*

In the context of domestic waste disposal in southeastern Nigeria, local, state, and/or federal laws should be in place to prevent health issues that stem from improper trash disposal. This paper will focus on residential and neighborhood trash collection in southeastern Nigeria. The terms trash and domestic waste disposal will be used interchangeably. Domestic waste is solid waste comprised of garbage and rubbish (e.g. bottles, cans, clothing, compost, disposables, food packaging, food scraps, newspapers and magazines, and yard trimmings) that originate from private homes or apartments.⁵ It may also contain household hazardous waste such as automotive products (e.g. antifreeze, fluids, motor oil, oil filters, gasoline, polish and wax), batteries (home and vehicle), electronics (e.g. TVs, computers, laptops, cell phones, printers, fax machines, MP3 players, DVD/CD/tape players), light bulbs, household cleaners, mercury-containing items such as thermometers and thermostats, paint products, garden chemicals (pesticides, herbicides, fertilizers, insecticides), and swimming pool chemicals.⁶ Nigerian urban domestic waste is characterized by polythene (plastic) materials, glass and plastic bottles, aluminum cans, papers or foil wrappings and other throwaways—all potentially recyclable products.⁷

Ideally, municipalities should have regular systems in place to prevent domestic waste pollution. As will be discussed further, improper disposal of domestic waste can cause a risk to public health by attracting pests that carry germs, contaminating crops and

⁵ *Household Waste*, BusinessDictionary.Com, <http://www.businessdictionary.com/definition/household-waste.html#ixzz441sbCCOy>.

⁶ *Household Hazardous Waste Disposal*, Waste Management, <http://www.wm.com/enterprise/municipalities/residential-solutions/household-hazardous-waste.jsp>.

⁷ I. Abdullahi, M. Ajibike, A. Man-ugwueje, O. Ndubu, *Environmental Impact of Indiscriminate Waste Disposal: "A Case study of Nigerian Air force Base Kaduna,"* INTERNATIONAL JOURNAL OF ENGINEERING AND APPLIED SCIENCES 1:1, (2014).

groundwater, and contributing to respiratory diseases. But, there can be obstacles to forming and maintaining a functioning system of trash collection. For developing countries, some typical problem areas in municipal waste management are: (1) inadequate service coverage and operational inefficiencies of services, (2) limited utilization of recycling activities, (3) inadequate landfill disposal, and (4) inadequate management of hazardous and healthcare waste.⁸ In addition, there is a need to understand the benefits of community participation and community-based initiatives, and to implement effective programs.⁹ As a developing country, Nigeria has extensive issues with household waste disposal, due to a combination of the four reasons listed above. This paper takes the perspective that innovative government initiatives and policies, as well as effective enforcement are essential for resolving these concerns.

This Capstone consists of four Parts. Part I provides a brief primer on Nigeria's federal system of government. Part II will describe the current waste disposal practices in Nigeria, and will focus on Lagos State and Abia State, as those are states that the author has visited. Part III will describe the public health implications of a lack of domestic waste disposal. Part IV will summarize the laws surrounding household waste disposal in southeastern Nigeria, discuss challenges to implementation, and make suggestions for improvement. This paper focuses on environmental health law issues in southeastern

⁸ Odile Schwarz-Herion, Abdelnaser Omran, Hans Peter Rapp, *A Case Study on Successful Municipal Solid Waste Management in Industrialized Countries by the Example of Karlsruhe City, Germany*, ANNALS OF THE FACULTY ENGINEERING HUNEDOARA – JOURNAL OF ENGINEERING, (2008), <http://annals.fih.upt.ro/pdf-full/2008/ANNALS-2008-3-46.pdf>. See also CHRIS ZURBRUGG, *Solid Waste Management in Developing Countries*, EAWAG, (2003), http://www-eawag.emp-eaw.ch/fileadmin/Domain1/Abteilungen/sandec/publikationen/SWM/General_Overview/Zurbruegg_2002_SWM_DC.pdf

⁹ *Id.*

Nigeria in order to inspire dialogue and solutions surrounding domestic waste disposal. 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 Nigerian municipalities to diseases.

I. NIGERIA' S GOVERNMENT AND STRUCTURE: A CRITICAL BACKDROP

Nigeria, with a population of 173.6 million as of the year 2013, is a federal republic with a presidential system. The constitution, modeled after the U.S. Constitution, provides for separation of powers among the executive, legislative, and judicial arms of government. The president, who is simultaneously chief of state and head of government, holds executive power.¹⁰ The National Assembly makes up the legislative branch, consisting of a 109-member Senate and a 360-member House of Representatives. Nigeria's legal system is based on a combination of statutory (legislative) law, English common law, customary law, and, in the north, Islamic law (Sharia law).¹¹ Nigeria's federal and state courts apply statutory and English common law, whereas local courts recognize the legitimacy of customary and Islamic law.¹² The Supreme Court is the highest court of the land, followed by the Court of Appeal, the Federal High Court, Magistrate Court, Area Court, and Customary Court. At the state level, the Legislature is known as the House of Assembly.¹³

¹⁰ *Government and Politics*, Nigerian Embassy - Rome, <http://www.nigerianrome.org/about-nigeria/government-politics>.

¹¹ *Id.*

¹² *Id.*

¹³ *NIGERIA: PAST, PRESENT AND FUTURE*, Nigerian Embassy USA, <http://www.nigeriaembassyusa.org/index.php?page=nigeria-past-present-and-future>.

Nigeria is divided administratively into the Federal Capital Territory of Abuja and 36 states, which are organized into six geopolitical zones.¹⁴ This paper will focus on two important urban centers in Nigeria: the city of Lagos in Lagos State in the South-West Zone, and the city of Aba in Abia State in the South-East Zone (Figure 2).

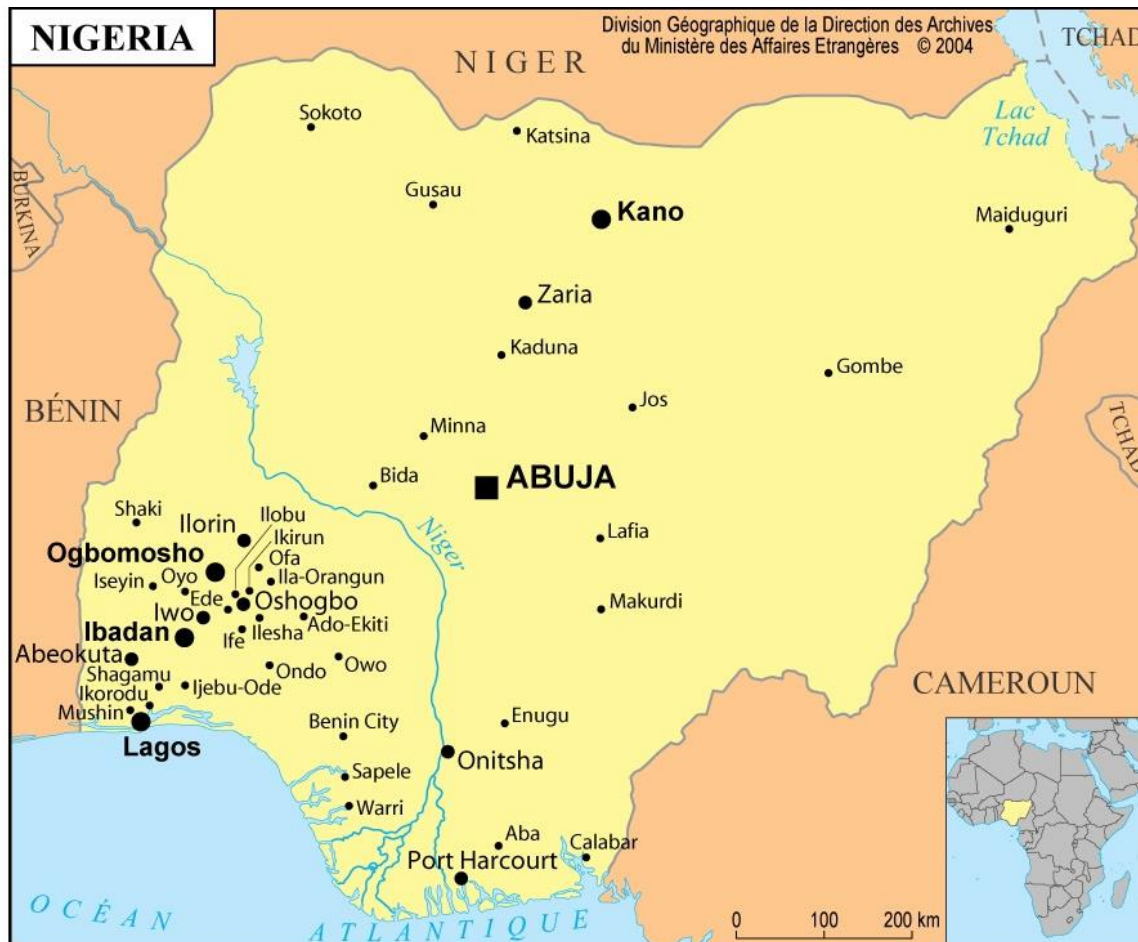


Figure 2: Map of Nigeria.

Each of Nigeria’s 36 states has an elected governor and a House of Assembly. Nigeria’s states are subdivided into 774 local government areas, each of which is governed by a

¹⁴ *Government and Politics*, Nigerian Embassy - Rome, <http://www.nigerianrome.org/about-nigeria/government-politics>.

council that is responsible for supplying basic needs. The local government councils, which are regarded as the third tier of government below the federal and state levels, receive monthly subsidies from a national “federation account.”¹⁵ It is these municipal governments that are primarily responsible for urban solid waste management.¹⁶

In Nigeria, there are several governmental entities that are responsible for public health and environmental health and safety. The Department of Public Health within the Federal Ministry of Health coordinates the formulation of public health policies and guidelines and supports the implementation and evaluation of these policies and guidelines through health promotion, surveillance, prevention, and control of diseases.¹⁷ The Federal Ministry of Environment counts pollution and effective waste management as one of its key environmental issues.¹⁸ The Federal Ministry of Lands, Housing and Urban Development counts among its mandate and mission “maintenance of a conducive living environment” and facilitating “the provision for all Nigerians, in both the urban and rural areas, [of a] secure, healthy and decent environment.”¹⁹

¹⁵ *Government and Politics*, Nigerian Embassy - Rome, <http://www.nigerianrome.org/about-nigeria/government-politics>.

¹⁶ Agboje Ifeoma Anestina, Adeoti Adetola, & Irhivben Bright Odaf, *Performance Assessment of Solid Waste Management following Private Partnership Operations in Lagos State, Nigeria*, *JOURNAL OF WASTE MANAGEMENT* (2014), available at <http://www.hindawi.com/journals/jwm/2014/868072/>.

¹⁷ *Department of Public Health*, Federal Ministry of Health, <http://www.health.gov.ng/index.php/department/public-health>.

¹⁸ *About Us*, Federal Ministry of Environment, <http://environment.gov.ng/index.php/about-moe>.

¹⁹ *About FMLHUD*, Federal Ministry of Lands, Housing and Urban Development, <http://www.landsandhousing.gov.ng/index.php/about-us>.

II. STATE OF AFFAIRS: CURRENT DOMESTIC WASTE DISPOSAL, TRASH COLLECTION, AND RECYCLING PRACTICES IN NIGERIA

Case studies in most Nigerian cities show that over 72% of houses do not have any formal arrangement for waste collection and disposal, meaning that no public or private waste services are available to the majority of residential houses and their neighborhoods.²⁰ Consequently, in Nigeria, household waste is usually disposed of illegally beside houses, in gutters, pits, and empty spaces. In other words, the common method of disposal is “open dump.” These garbage “dumps” are located everywhere, including on the sides of streets, roads, and highways, and at the fringe of cities and slums. Waste is also dumped indiscriminately in streams or river channels. When not dumped illegally, waste is taken to dumpsites owned by the government or a private owner.²¹ Lagos State has five approved dumpsites in total, the largest of which is the Olusohun dumpsite.²²

The typical city in Nigeria utilizes semi-formal designated dumpsites that are unmanaged and have no designated area for any category of waste.²³ The wastes are simply tipped onto the surface of any vacant available space of land. When the waste pile becomes large enough to be unmanageable, the waste is usually disposed of in any

²⁰ Federal Republic of Nigeria, *National Policy on Municipal and Agricultural Waste (MAW) Management*, (Aug. 2012),

<http://www.upops.org.ng/Portals/0/Final%20Draft%20%20National%20Policy%20on%20MAW.pdf>

²¹ Edith Tobore Iriyaga, *Solid Waste Management in Nigeria*, D-WASTE.COM (Nov. 15, 2012),

<http://www.d-waste.com/new-infographics/item/124-solid-waste-management-in-nigeria.html?start=1>

²² *Id.*

²³ Federal Republic of Nigeria, *National Policy on Municipal and Agricultural Waste (MAW) Management*, (Aug. 2012),

<http://www.upops.org.ng/Portals/0/Final%20Draft%20%20National%20Policy%20on%20MAW.pdf>.

nearby burrow pit and leveled off with a bulldozer.²⁴ As a result, the unmanaged dumpsites of municipal waste may spontaneously catch fire or they are intentionally burned, generating large quantities of organic pollutants.

Organized waste collection service, which is rarely offered in Nigeria, is most times provided by the public sector though some state governments operate waste collection through some level of formal public-private participation.²⁵ It is not, however, uncommon to see informal waste collectors using local vehicles (push carts) for door-to-door collection services in some parts of Nigerian cities, earning pay collected from local inhabitants.²⁶ Organized waste collection service is mostly exclusive to urban cities and is largely inefficient with the exceptions of Lagos and Calabar (in Cross Rivers State).²⁷ Waste collection services are very rarely available in rural areas and urban slums.

Recycling activities are present in some Nigerian cities and towns, but recycling is often informal and focused on selected valuable materials.²⁸ Participants are either itinerant waste buyers or scavengers who target valuable materials such as plastics, paper, used electronic equipment, glass, metal etc. Their activities can have an impact in the reduction of the net volume of disposed waste. However significant their importance,

²⁴ Federal Republic of Nigeria, *National Policy on Municipal and Agricultural Waste (MAW) Management*, (Aug. 2012), <http://www.upops.org.ng/Portals/0/Final%20Draft%20%20National%20Policy%20on%20MAW.pdf>. This process may be paid for by state or municipal government or even by a private company for its own purposes (e.g. land utilization, etc.).

²⁵ Edith Tobore Iriyaga, *Solid Waste Management in Nigeria*, D-WASTE.COM (Nov. 15, 2012), <http://www.d-waste.com/new-infographics/item/124-solid-waste-management-in-nigeria.html?start=1>.

²⁶ *Id.*

²⁷ *Id.* Lagos's environmental success relative to other Nigerian states can be traced to the level of cost recovery from the public and strong political will supporting good waste management practices.

²⁸ *Id.*

there is no formal integration of recycling programs into the public waste collection system except in Lagos State.

The next section describes general waste disposal practices in the Nigerian cities of Lagos and Aba. These brief summaries of improper household waste disposal are specific examples of the environmental problems facing urban dwellings across Nigeria.

A. Current practices in Lagos State in Nigeria

Lagos is the largest city in Nigeria, as well as the largest city on the African continent. It is one of the fastest growing and the most populous cities in the world. A major financial center in Africa, Lagos has the highest GDP in Africa, and also houses Apapa Port, one of the largest and busiest ports on the African continent. Lagos was the capital of Nigeria at its amalgamation in 1914. However, the federal capital moved to Abuja in 1991. Even though Lagos is still widely referred to as a city, the present day Lagos is an urban agglomeration or conurbation,²⁹ consisting of 16 local government areas.³⁰ The exact population of metropolitan Lagos is disputed, but Lagos State's 2006 federal census data estimates it at 8 million people. However, as of 2015, unofficial figures put the population of the area at approximately 21 million.³¹

²⁹ An urban agglomeration is an extended city or town area comprising the built-up area of a central place (usually a municipality) and any suburbs linked by continuous urban area. A conurbation is a region comprising a number of cities, large towns, and other urban areas that, through population growth and physical expansion, have merged to form one continuous urban and industrially developed area. In most cases, a conurbation is a polycentric urban agglomeration, in which transportation has developed to link areas to create a single urban labor market or travel to work area.

³⁰ *ABOUT LAGOS*, LAGOS STATE GOVERNMENT, <http://www.lagosstate.gov.ng/about-lagos/>.

³¹ "Metro Lagos (Nigeria): Local Government Areas," CITY POPULATION, (Mar. 21, 2015), <http://www.citypopulation.de/php/nigeria-metrolagos.php>.

Presently, the rate of waste generation in Lagos is 9,000 tons/day.³² The Lagos State Waste Management Authority (LAWMA) provides 240 liter bins for households after annual payment of the Land Use charge through the Land Records Company.³³ The Land Use charge is a property tax, providing revenue for development of the state and the provision of infrastructure and social amenities. The charge is imposed on the property owner, but may be assessed on a tenant where the owner is not in possession of the property.³⁴ If the Land Use charge is unpaid, interest accrues according to a scale that increases the longer the payment is overdue.³⁵ After 135 days, there may be an appointment of a receiver over the property in question until outstanding taxes, penalties and administrative charges are fully paid.³⁶ Penalties of up to ₦100,000.00 Naira (\$327.60 USD) or three months imprisonment can also be assessed for non-compliance.³⁷ Generally, all waste streams are stored together in either bags or containers (such as used buckets) and plastics waste bins.³⁸

The Lagos State Government through LAWMA engages, coordinates and evaluates the activities of private sector participants (which number over 300) in

³² Edith Tobore Iriyuga, *Solid Waste Management in Nigeria*, D-WASTE.COM (Nov. 15, 2012), <http://www.d-waste.com/new-infographics/item/124-solid-waste-management-in-nigeria.html?start=1>.

³³ *Id.*

³⁴ Akinlolu Akintayo, *WHO SHOULD BE RESPONSIBLE FOR PAYMENT OF LAND USE CHARGE*, LINKEDIN.COM (April 30, 2015), <https://www.linkedin.com/pulse/who-should-responsible-payment-land-use-charge-akinlolu-akintayo>. The Land Use Charge Law, No. 11 of 2001 was passed into Law by the Lagos State Government on June 22, 2001. Section 10 and 11 of the Law state that local governments may declare any person, including any occupier of chargeable property, to be the agent of the property owner and that such person will become liable for payment of the Land Use Charge on behalf of the owner.

³⁵ *Id.*

³⁶ *Id.*

³⁷ Lagos State Government Ministry of Finance, *History: Land Use Charge Lagos State*, <http://landusecharge.lagosstate.gov.ng/historyland-user-charge-lagos-state/>.

³⁸ Edith Tobore Iriyuga, *Solid Waste Management in Nigeria*, D-WASTE.COM (Nov. 15, 2012), <http://www.d-waste.com/new-infographics/item/124-solid-waste-management-in-nigeria.html?start=1>.

municipal solid waste collection.³⁹ Collection frequency is either once or twice a week and usually on a door-to-door basis.⁴⁰ This is difficult in densely populated areas; it not uncommon that collection is infrequent. Lagos State is the only state in Nigeria that has a waste transfer station, a processing site for the temporary deposition of waste.⁴¹

LAWMA introduced recycling banks in some areas where households are encouraged to deposit recyclables like plastics, cans, and bottles, while organic waste components are collected from door-to-door.⁴² Some of the informal waste collectors (“scavengers”) in Lagos State are employed by LAWMA to be the resource managers of the recycling banks.⁴³ The resource managers, in addition to the income received from the Authority, are also given the recyclables to trade to supplement their income.⁴⁴ The wages paid to them are an incentive to dissuade them from scavenging dumpsites on their own, where they can be injured by harmful materials. However, the numbers of the recycling banks are not sufficient enough to provide income for the numbers of scavengers in the city. Hence, some of them are still allowed to scavenge materials at the site but are encouraged to use protective equipment.⁴⁵

Further examples of recycling activities in Lagos State include:⁴⁶

³⁹ Edith Tobore Iriuga, *Solid Waste Management in Nigeria*, D-WASTE.COM (Nov. 15, 2012), <http://www.d-waste.com/new-infographics/item/124-solid-waste-management-in-nigeria.html?start=1>.

⁴⁰ *Id.*

⁴¹ *Id.* Transfer stations are often used as places where local waste collection vehicles will deposit their waste cargo prior to loading into larger vehicles. These larger vehicles will transport the waste to the end point of disposal in an incinerator, landfill, or hazardous waste facility, or for recycling. Transfer stations are sometimes colocated with material recovery facilities and with localized mechanical biological treatment systems to remove recyclable items from the waste stream.

⁴² *Id.*

⁴³ *Id.*

⁴⁴ *Id.*

⁴⁵ *Id.*

⁴⁶ *Id.*

- A compost plant at Ikorodu for the treatment of market waste, which generated a minimum of 24,000 tons and maximum of 42,000 tons of compost in the second half of 2011;
- A waste-to-energy plant at Ikosi Market, which generates biogas from the market waste that is used to operate a 2KVA generator at the market;
- A plastic recycling plant at Olushosun for the conversion of empty plastic water packets into garbage bags; and
- Initiating recycling clubs in secondary schools to instill recycling habits in young people.

B. Current practices in Abia State in Nigeria

Umuahia, the capital of Abia State, has a population of about 1.2 million people and produced 350 metric tons of waste in 2007 daily. Despite this massive load, the city has only 76 refuse bins.⁴⁷

Aba accounts for six of the seventeen Local Government Areas in Abia State: Aba North, Aba South, Osisioma Ngwa, Obi Ngwa, Isiala Ngwa North, and Isiala Ngwa South.⁴⁸ Known as the “Japan of Africa,” Aba is the commercial and industrial center of

⁴⁷ Onwughara Innocent Nkwachukwu, Nnorom Innocent Chidi & Kanno Okechukwu Charles, *Issues of Roadside Disposal Habit of Municipal Solid Waste, Environmental Impacts and Implementation of Sound Management Practices in Developing Country “Nigeria,”* INTERNATIONAL JOURNAL OF ENVIRONMENTAL SCIENCE AND DEVELOPMENT, Vol.1, No.5, December 2010. <http://ijesd.org/papers/79-D477.pdf>.

⁴⁸ Local Government, ABIA STATE GOVERNMENT, <http://www.abiastate.gov.ng/state-profile/local-government/>. For a digital map and profile of all the local government areas in Nigeria, see NIGERIA: Administrative Division (States and Local Government Areas), CITYPOPULATION, <http://www.citypopulation.de/php/nigeria-admin.php>.

southeastern Nigeria because there is a concentration of large-scale industries and four major markets.⁴⁹ The town is a major economic hub for the sale of textiles, pharmaceuticals, plastics, timbers, and cosmetics, as well as for shoe manufacturing industries and the Ariaria International market, which is the biggest outdoor market in West Africa (Figure 3.1; Figure 3.2).⁵⁰ The city also has brewery, distillery and other handicrafts.



Figure 3.1: Trash Outside of Ariaria International Market, Aba, Nigeria. (Omenka Helen Uchendu, 2016).

⁴⁹ Ajero, C.M.U and Chigbo,U.N. *A Study on the Evaluation of Industrial Solid Waste Management Approaches in Some Industries in Aba, South Eastern Nigeria*. Department of Environmental Biology Imo State University. <http://www.ajol.info/index.php/wajiar/article/viewFile/86898/76691>.

⁵⁰ Ukpog, E. C., Udo, E. A., & Umoh, I. C., *Characterization of Materials from Aba Waste Dumpsites*, International Journal of Engineering and Applied Sciences 6:3, (2015), available at. [http://eaas-journal.org/survey/userfiles/files/V6i301%20Civil%20Engineering\(2\).pdf](http://eaas-journal.org/survey/userfiles/files/V6i301%20Civil%20Engineering(2).pdf).



Figure 3.2: Trash Outside of Ariaria International Market, Aba, Nigeria. (Omenka Helen Uchendu, 2014).

The solid waste management in Aba is carried out by private organizations and the Abia State Environmental Agency.⁵¹ The landfill is situated at the outskirts of the town; however, there are numerous dump sites in residential areas.⁵² Most roads are filled with refuse which leads to flooding especially during the rainy season. In Aba, daily trash is generated faster than the rate of removal to final disposal sites, so mammoth trash heaps litter the town for days.⁵³ The offensive odor from the city's many putrefying heaps disturbs residents and visitors.⁵⁴ From personal experience, Aba is known for its poor

⁵¹ Ukpong, E. C., Udo, E. A., & Umoh, I. C., *Characterization of Materials from Aba Waste Dumpsites*, International Journal of Engineering and Applied Sciences 6:3, (2015), available at. [http://eaas-journal.org/survey/userfiles/files/V6i301%20Civil%20Engineering\(2\).pdf](http://eaas-journal.org/survey/userfiles/files/V6i301%20Civil%20Engineering(2).pdf).

⁵² *Id.*

⁵³ U.M. Nwosu, R.A. Eke, & K.A. Uwakwe, *Scaling up the practice of sanitary refuse disposal in Aba, South Eastern Nigeria*, Journal of Medical Investigations and Practice (2014), 9:2, 70-73, available at <http://www.jomip.org/article.asp?issn=9783-1230;year=2014;volume=9;issue=2;spage=70;epage=73;aualast=Nwosu>.

⁵⁴ *Id.*

waste management practices among southeastern Nigerians. Trash dumping is ubiquitous throughout the city, resulting in negative health effects for all of Aba's citizens.

III. HEALTH EFFECTS: LACK OF TRASH COLLECTION AND DOMESTIC WASTE DISPOSAL AS AN ENVIRONMENTAL HEALTH ISSUE

This Part considers what is at stake when household waste is not disposed of properly: impaired human health and environmental health. This brief examination of the impacts of improper household waste disposal shows the potential impact of dumped garbage and, consequently, how important this issue should be to municipal, state, and federal authorities. Ultimately, proper waste disposal methods are necessary, especially in urban settings, to maintain public and environmental health.

A. Threats to Public Health when household waste is not disposed of properly

Nigerian cities and towns face serious environmental problems arising from poor household waste management.⁵⁵ Generation of waste in Nigeria has been of great concern to the government, posing multiple problems that prove to be beyond the scope of local

⁵⁵ U.M. Nwosu, R.A. Eke, & K.A. Uwakwe, *Scaling up the practice of sanitary refuse disposal in Aba, South Eastern Nigeria*, *Journal of Medical Investigations and Practice* (2014), 9:2, 70-73, available at <http://www.jomip.org/article.asp?issn=9783-1230;year=2014;volume=9;issue=2;spage=70;epage=73;aulast=Nwosu>.

and city councils.⁵⁶ Part of the problem is the fact that major streets are continually polluted by garbage from varying sources.⁵⁷ This waste is generated at a rate that is beyond the ability of the city authorities to handle,⁵⁸ resulting in poor waste management that portends serious environmental crises in most Nigerian towns and cities.⁵⁹

Improper disposal of household waste can cause a risk to public health by attracting pests that carry germs (e.g. flies, mosquitoes and rats) and allowing them to breed.⁶⁰ Such breeding may encourage the spread of diarrheal diseases, and diseases like dengue fever, yellow fever, and bubonic plague.⁶¹ For instance, house flies that enter kitchens after landing on waste dumps can transfer bacteria by landing on food, increasing the incidence of diarrhea.⁶² Thrown away tins, glass bottles, plastic bags, and containers can also hold water where mosquitoes and other insects can breed.⁶³ Batteries, old medicines, used motor oil and other dangerous waste such as dirty kerosene and fuel can be dangerous to human health if dumped on the ground and leached into

⁵⁶ N. C. Anyanwu & Dr. J. O. Adefila, *Nature and Management of Solid Waste in Karu Nasarawa State, Nigeria*, American International Journal of Contemporary Research 4(11) (2014), available at http://www.ajcrnet.com/journals/Vol_4_No_11_November_2014/12.pdf.

⁵⁷ *Id.*

⁵⁸ *Id.*

⁵⁹ *Id.*

⁶⁰ World Health Organization, *Solid Waste Disposal*, http://www.who.int/water_sanitation_health/hygiene/emergencies/fs3_12.pdf, available for download at http://www.who.int/water_sanitation_health/hygiene/emergencies/envsanfactsheets/en/index2.html.

⁶¹ *Id.*

⁶² Ifeoma Modebe, Uzochukwu Onyeonoro, Nkiru Ezeama, Chukwuanugo Ogbuagu & Ngozi Agam, *Public Health Implication Of Household Solid Waste Management In Awka South East Nigeria*, THE INTERNET JOURNAL OF PUBLIC HEALTH, 2009, Volume 1 Number 1, available at <http://ispub.com/IJPH/1/1/12847>.

⁶³ World Health Organization, *Solid Waste Disposal*, http://www.who.int/water_sanitation_health/hygiene/emergencies/fs3_12.pdf, available for download at http://www.who.int/water_sanitation_health/hygiene/emergencies/envsanfactsheets/en/index2.html.

groundwater, or if dumped in rivers or streams and ingested by persons swimming, playing, or collecting drinking water.⁶⁴

Burning of waste, another form of improper garbage disposal, has a well-documented association with the incidence of respiratory health symptoms among adults and children (Figure 4).⁶⁵



Figure 4: Burning Household Waste in Aba, Nigeria. (Omenka Helen Uchendu, 2016).

⁶⁴ World Health Organization, *Solid Waste Disposal*, http://www.who.int/water_sanitation_health/hygiene/emergencies/fs3_12.pdf, available for download at http://www.who.int/water_sanitation_health/hygiene/emergencies/envsanfactsheets/en/index2.html.

⁶⁵ *Public Health Implication of Household Solid Waste Management In Awka South East Nigeria*, supra note 28. For a recent public health study on burning of household waste, see Akpinar-Elci M1, Coomansingh K, Blando J, Mark L., *Household bush burning practice and related respiratory symptoms in Grenada, the Caribbean*, 65(9) *J Air Waste Manag Assoc.*, 1148-52 (Sep. 2015). The authors of this study concluded that the common practice of bush burning in the Caribbean is associated with respiratory symptoms and demonstrates the need for better management of residential yard waste.

In addition, burning organic waste produces chemicals such as dioxins and furans, which are suspected carcinogens that damage the nervous and immune systems and are harmful even in minuscule quantities.⁶⁶

B. Ramifications on the Environment of Waste Disposal and Land Use Systems

Household waste can also cause a risk to public health by damaging the environment. For example, smoke from garbage incineration (e.g. bush burning) not only causes respiratory problems, but may also carry toxic metals and acids from waste materials into the atmosphere, and nitrogen and sulfur in smoke contribute to acid rain.⁶⁷ Dumping of waste in the gutters and drains can cause flooding by blocking water drainage, especially in the rainy season in tropical climates, contributing to the growth of mosquito populations.⁶⁸

Landfills are a standard method for disposing of waste in the developed world, however improperly built landfills can cause environmental health and public health problems. Densely packed organic matter produces methane as it rots, which can catch fire or cause explosions.⁶⁹ Release of methane into the air also harms the atmosphere because methane is a greenhouse gas that is twenty-one times stronger than carbon

⁶⁶ *Down in the dumps*, THE ECONOMIST, Feb. 26, 2009, <http://www.economist.com/node/13135413>.

⁶⁷ *Id.*.

⁶⁸ *Public Health Implication of Household Solid Waste Management In Awka South East Nigeria*, *supra* note 28.

⁶⁹ *Down in the dumps*, THE ECONOMIST, Feb. 26, 2009, <http://www.economist.com/node/13135413>.

dioxide, a gas used as a reference point when measuring global warming.⁷⁰ The decaying process of organic matter produces ammonia, which in sufficient concentrations can poison fish and amphibians and render water undrinkable.⁷¹ The bacteria that break down rotting waste produce acids, and these acid by-products can be concentrated enough to dissolve poisonous heavy metals such as lead and cadmium.⁷² Water leaching through the landfill can carry such toxins into the groundwater or nearby bodies of water, and from there into drinking water and the food chain.⁷³

Modern household waste is full of dangerous chemicals. For example, many paints and batteries contain lead, and electronic goods carry hazardous substances. As aforementioned, when waste is improperly disposed of, dangerous chemicals can damage the environment and, consequently, human health. Governments have a responsibility to protect the environment and their citizens by implementing appropriate waste disposal measures.

IV. EXISTING NIGERIAN LAWS RELATED TO HOUSEHOLD WASTE DISPOSAL

This Part summarizes federal, state, and municipal laws related to household waste disposal in Nigeria, as well as some compliance measures sanctioned by those

⁷⁰ *Down in the dumps*, THE ECONOMIST, Feb. 26, 2009, <http://www.economist.com/node/13135413>. Greenhouse gases cause global warming by absorbing energy and slowing the rate at which the energy escapes to space, insulating the Earth like a heated blanket. *See also Understanding Global Warming Potentials*, US EPA, <https://www3.epa.gov/climatechange/ghgemissions/gwps.html>.

⁷¹ *Id.*

⁷² *Id.*

⁷³ *Id.*

laws. This brief examination shows that there are already laws in place to address the pervasive problem of domestic waste. An adequate *legal* infrastructure exists to address this public health issue. However, the practical reality of inadequate trash disposal in Nigeria shows that implementing sanitation measures is still a huge challenge for Nigeria's local governments.

A. Federal Laws in Nigeria related to household waste disposal and regulatory measures

As mentioned above, waste management in Nigeria, including household waste management and trash disposal, is a responsibility of local governments. However, the federal government has issued laws and policies that are related to waste management.

1. Federal laws related to household waste disposal

The basis of environmental policy in Nigeria is contained in the 1999 Constitution of the Federal Republic of Nigeria.⁷⁴ According to Section 20 of the Constitution, the federal government is empowered to protect and improve the environment and safeguard the water, air and land, forest and wildlife of Nigeria.⁷⁵ The federal government of Nigeria has promulgated various laws and regulations to safeguard the Nigerian environment.

⁷⁴ Oghogho Makinde & Temitayo Adeyoke, *Nigeria: Environment Law In Nigeria*, MONDAQ (2011), http://www.mondaq.com/article.asp?article_id=53804&signup=true.

⁷⁵ *Id.*

The Federal Ministry of Environment (FME) administers and enforces environmental laws in Nigeria. It took over this function in 1999 from the Federal Environmental Protection Agency (FEPA), which was created under the Federal Environmental Protection Agency Act of 1988 (FEPA Act).⁷⁶ Current established legislations relating to waste management are:

- The National Environmental Standards and Regulations Enforcement Agency Act, 2007 (repealed the Federal Environmental Protection Act of 1988);
- The Environmental Impact Assessment Act, 1992; and
- The Harmful Waste Act, 1988.

Relevant regulations are:

- The National Environmental Regulations, 2009; and
- The National Environmental Protection Regulations.

The Harmful Waste Act of 1988 prohibits and declares unlawful all activities relating to the purchase, sale, import, transport, deposit, or storage of harmful wastes.⁷⁷

Under the Harmful Waste Act, “harmful waste” is defined as “any injurious, poisonous, toxic or waste-emitting radioactive substance if the waste is in such quantity, whether with any other consignment of the same or of different substance, as to subject any

⁷⁶ Oghogho Makinde & Temitayo Adeyoke, *Nigeria: Environment Law In Nigeria*, MONDAQ (2011), http://www.mondaq.com/article.asp?article_id=53804&signup=true.

⁷⁷ Nicholas A. Robinson, Lin Heng Lye, & Elizabeth Burleson, *Comparative Environmental Law and Regulation* (2011), 40:170.

person to the risk of death, fatal injury or incurable impairment of physical and mental health; and the fact that the harmful waste is placed in a container shall not by itself be taken to exclude any risk which might be expected to arise from the harmful waste.”⁷⁸

The National Environmental Regulations of 2009 provides the legal framework for the adoption of sustainable and environment-friendly practices in environmental sanitation and waste management to minimize pollution.⁷⁹ However, the management of non-hazardous wastes in the country is a matter for state and local governments in Nigeria.

The federal government has published three policy guidelines on waste management and sanitation. The Federal government’s *National Policy Guidelines on Solid Waste Management* aims to “improve and safeguard public health and welfare through efficient sanitary Solid Waste Management methods that will be economical, sustainable and guarantee sound environmental health.”⁸⁰ The *National Policy Guidelines on Sanitary Inspection of Premises* seeks to promote a clean and healthy environment for the populace.⁸¹ Finally, the *National Environmental Sanitation Policy* seeks to “stimulate, promote and strengthen all government regulations concerned with housing and urban development ... sanitation related endemic diseases and illnesses ... and environmental education.”⁸²

⁷⁸ Nicholas A. Robinson, Lin Heng Lye, & Elizabeth Burleson, *Comparative Environmental Law and Regulation* (2011), 40:170.

⁷⁹ Laws & Regulations, NESREA, <http://www.nesrea.gov.ng/nesrea/regulations/index.html>.

⁸⁰ Federal Ministry of Environment, *ENVIRONMENTAL POLICIES* 9, (Jan. 30, 2014), available for download at <http://environment.gov.ng/index.php/downloads/3-environmental-policies>.

⁸¹ *Id.*

⁸² *Id.*

2. Relevant Compliance and Regulatory Measures

The FEPA Act empowers the FME to examine any license or permit granted to any person, to enter and search any land or building, and to arrest any person who violates any environmental regulation, including the Act itself.⁸³ The FEPA Act also gives authorized officers of the FME powers to enter and search any vehicle, tent, vessel, or floating craft; and seize any item or substance used in violation of the Act.⁸⁴

Attached to the Environmental Impact Assessment Act of 1992 is a schedule of activities and industries for which environmental impact assessments are mandatory, including assessments for the “Waste Treatment and Disposal” industry.⁸⁵ Any person who fails to comply with the provisions of the EIA Act commits an offense and is liable on conviction to a fine or to imprisonment for up to five years.⁸⁶ Fines are also imposed on guilty firms or corporations.⁸⁷

The FEPA Act provides that a person who breaches the provisions of the Act commits an offense and is liable on conviction to a fine, or imprisonment, or both.⁸⁸ The FEPA Act also provides that where there has been a discharge of any hazardous substance in violation of environmental laws/permits, the person or organization responsible for the discharge is liable for removal and cleanup costs.⁸⁹ Such a person or

⁸³ Oghogho Makinde & Temitayo Adeyoke, *Nigeria: Environment Law In Nigeria*, MONDAQ (2011), http://www.mondaq.com/article.asp?article_id=53804&signup=true.

⁸⁴ *Id.*

⁸⁵ *Id.*

⁸⁶ *Id.*

⁸⁷ *Id.*

⁸⁸ *Id.*

⁸⁹ *Id.*

organization may, upon conviction, be subject to a fine and/or imprisonment for up to ten years.⁹⁰

The Harmful Wastes Act provides that any person found guilty of purchase, sale, import, transport, deposit, or storage of harmful waste shall on conviction be sentenced to imprisonment for life.⁹¹

B. State Laws in Nigeria related to household waste disposal and regulatory measures

Pursuant to the FEPA Act, each state and local government in Nigeria may set up its own environmental protection body for the protection and improvement of the environment within the community. Each State is also empowered to make laws to protect the environment within its jurisdiction. All the States have environmental agencies and State laws. This Article will focus on Lagos State and Abia State, as those are states that the author has visited.

1. State laws related to household waste disposal

In Lagos State, the Lagos State Environmental Protection Agency Law was enacted in 1996 to establish the Lagos State Environmental Protection Agency

⁹⁰ *Id.* In case of an organization, a term of imprisonment would likely be served upon the person in the organization who is most culpable.

⁹¹ *Id.*

(LASEPA).⁹² LASEPA's functions include monitoring and controlling the disposal of waste in Lagos State and advising the State Government on all environmental management policies.⁹³ Under the LASEPA Law, LASEPA is required to carry out public educational programs to inform the public on methods of environmental sanitation and management.⁹⁴ The Environmental Pollution Control Law, also enacted in 1996, provides for control of pollution and protection of the environment from abuse due to poor waste management.⁹⁵ The Pollution Control Law also requires the Ministry of Environment and Physical Planning to educate the general public on the types of disposal methods acceptable by the State Government for domestic and industrial wastes.⁹⁶

The Lagos State Environmental Sanitation Law, passed in 2000, requires citizens to clean their property on the last Saturday of the month.⁹⁷ For three hours, typically from 7am-10am, human and vehicular movements are restricted except for those related to sanitation activities such as waste removal or sweeping debris from the entrance to one's dwelling place.⁹⁸ Violators of the restriction order are arrested by agents of the Environmental Sanitation task force and summarily tried in a special court named the "Special-Offences Court," which was established to try such offenders.⁹⁹ In 2015, Lagos enacted the Lagos Waste Management Authority Law to establish the Lagos State Waste

⁹² LAGOS STATE ENVIRONMENTAL PROTECTION AGENCY LAW (1996) (available at http://www.lasepa.gov.ng/pdf/LASEPA_LAW.pdf).

⁹³ Oghogho Makinde & Temitayo Adeyoke, *Nigeria: Environment Law In Nigeria*, MONDAQ (2011), http://www.mondaq.com/article.asp?article_id=53804&signup=true.

⁹⁴ *Id.*

⁹⁵ *Id.*

⁹⁶ *Id.*

⁹⁷ Dayo Benson & Bartholomew Madukwe, *Lagos Environmental Sanitation Law: What the constitution says*, VANGUARD NIGERIA, <http://www.vanguardngr.com/2015/03/lagos-environmental-sanitation-law-what-the-constitution-says/>.

⁹⁸ *Id.*

⁹⁹ *Id.*

Management Authority.¹⁰⁰ This authority has the power to fine violators of the Lagos Waste Management Authority Law.¹⁰¹

In Abia State, the most recent state law addressing household waste management is the Abia State Basic Environmental Law of 2004. According to the Abia State Basic Environmental Law, the responsibility to ensure basic environmental practice lies with the Ministry of Environmental and Solid Mineral Resources, the Abia State Environmental Protection Agency, and the local government authorities.¹⁰² The law addresses several environmental law issues. In part, the law states that dumping of refuse into streets or drains or open spaces is prohibited.¹⁰³ The law also states that landlords and tenants are liable for refuse around their houses.¹⁰⁴ The law states that owners or occupiers of tenements must provide and maintain waste bins for refuse of any description that can only be brought out of the tenement for garbage disposal.¹⁰⁵ Importantly, the law states in Clause 38 that the Abia State Environmental Protection Agency must designate and develop refuse disposal sites for final disposal of waste all over the State.¹⁰⁶ Any person or organization who fails to comply with the clauses outlined in the Law or who obstructs any agent of the Abia State Environmental

¹⁰⁰ Edith Tobore Iruaga, *Solid Waste Management in Nigeria*, D-WASTE.COM (Nov. 15, 2012), <http://www.d-waste.com/new-infographics/item/124-solid-waste-management-in-nigeria.html?start=1>.

¹⁰¹ *Id.*

¹⁰² ABIA STATE BASIC ENVIRONMENTAL LAW (2004), 7.

¹⁰³ “No person shall dump/deposit on any street, open space, gutter, drain or drainage system or tenement whether occupied or not any can litter, loose refuse or waste of any description excepts [sic] as such places as authorised by the Ministry (Ministry of Lands).” THE ABIA STATE BASIC ENVIRONMENTAL LAW (2004), 15.

¹⁰⁴ “Landlords/occupies [sic] of tenements and market leaders shall be held responsible for anything dumped around the areas they occupy for which, they are unable to show evidence of appropriate report to the Ministry.” THE ABIA STATE BASIC ENVIRONMENTAL LAW (2004), 18.

¹⁰⁵ ABIA STATE BASIC ENVIRONMENTAL LAW (2004), 17.

¹⁰⁶ ABIA STATE BASIC ENVIRONMENTAL LAW (2004), 14.

Protection Agency from doing his or her job can be subject to fines ranging from ₦250.00 (\$0.79 USD) or ₦500.00 (\$1.59 USD) a day to one-time fines of ₦2,000.00 (\$6.34 USD) to ₦10,000.00 (\$31.72 USD).

Interestingly, the Abia State Basic Environmental Law has a section on “Environmental Health.” Clause 48(a) and (c) in this section defines a nuisance in part as “any premises in such a condition to be injurious to health,” and as “any ... other thing in such a state or condition as to be injurious to health,” including refuse pits, gutters, and ditches.¹⁰⁷ As will be discussed further, these clauses specifically apply to the process of household waste disposal because trash heaps and illegal dumps qualify as “nuisance” and are in violation of these laws.

2. Relevant Compliance and Regulatory Measures

Like the FEPA Law, the LASEPA Law contains provisions authorizing officers to search and seize offending items and to arrest violators of the law.¹⁰⁸ Some examples of offenses under the LASEPA Law include the discharge of raw, untreated human waste into any public drain, gorge, or any land in Lagos State, and the discharge of any form of oil into any public drain, water-course, water gorge, or road.¹⁰⁹

The Abia State Basic Environmental Law (2004) states that sanitary officers in each local government council within Abia State are authorized to notify persons that

¹⁰⁷ ABIA STATE BASIC ENVIRONMENTAL LAW (2004), 20.

¹⁰⁸ LAGOS STATE ENVIRONMENTAL PROTECTION AGENCY LAW (1996), 14.

¹⁰⁹ *Id.* at 12.

perpetuate environmental nuisance and require them to remedy the nuisance.¹¹⁰

Regarding offenders of the law, clause 26 states that “any corporate body or a member of a partnership or firm or business ... shall on conviction be liable to a fine as provided in schedule 2 of [the] law.”¹¹¹ These fines may be assessed on a one-time or a daily basis.

Clause 45 states that a Chief Health Officer may also prosecute a person who fails to remedy a nuisance or who violates the law.¹¹² Finally, clause 54 of the law sets up environmental sanitation courts for each local government area in Abia State.¹¹³

C. Municipal Laws in Nigeria related to household waste disposal

In Nigeria, waste disposal is essentially the statutory function of municipal councils. However, the rapid increase in volume and types of solid and hazardous waste, due to continuous economic development, urbanization and industrialization, stifles effective waste management because the waste is generated faster than local governments have the capacity to handle.¹¹⁴ As of the writing of this paper, no readily-available, published municipal laws regarding household waste disposal were found for either Lagos City or Aba.

¹¹⁰ ABIA STATE BASIC ENVIRONMENTAL LAW (2004), 16.

¹¹¹ *Id.* at 14.

¹¹² *Id.* at 20.

¹¹³ *Id.* at 25.

¹¹⁴ N. C. Anyanwu & Dr. J. O. Adefila, *Nature and Management of Solid Waste in Karu Nasarawa State, Nigeria*, American International Journal of Contemporary Research 4(11) (2014), available at http://www.ajcrnet.com/journals/Vol_4_No_11_November_2014/12.pdf.

V. CHALLENGES TO PROPER WASTE DISPOSAL AND COMPLIANCE

Nigeria's federal and state governments have enacted numerous laws regarding household waste disposal. Yet, in the majority of urban environments in Nigeria, roadside dumping of personal trash remains. Clearly, the issues surrounding proper waste disposal are not solely legal. This Part considers the many challenges to implementing successful waste disposal practices at the local level in Nigeria. This discussion of the following challenges to waste management service delivery shows that environmental problems in Nigeria—as they are worldwide—are multifactorial and complex. Ultimately, Nigerian governments need to implement multiple approaches to establish clean environments for Nigerians, as will be discussed further in Part V.

Solid waste management in Nigeria is characterized by a lack of funding, inefficiency, and inadequacy. One challenge to waste management is operational capacity. In rapidly urbanizing cities, solid waste is generated at a rate beyond the capacity of the city authorities to handle in order to maintain a sustainable urban environment.¹¹⁵

Capacity

Most municipal governments do not have enough machinery or the modern technology necessary to cope with the amount of waste coming from their inhabitants. Umuahia is an example of this problem. This city of over 1.2 million people generates

¹¹⁵ N. C. Anyanwu & Dr. J. O. Adefila, *Nature and Management of Solid Waste in Karu Nasarawa State, Nigeria*, American International Journal of Contemporary Research 4(11) (2014), available at http://www.aijcrnet.com/journals/Vol_4_No_11_November_2014/12.pdf.

350 metric tons of waste daily, but has only 76 garbage bins. Another example is the waste management agency, Karu Zone in the city of Karu in central Nigeria. The agency has only three functional garbage vans for the collection and transportation of solid wastes, and one truck for compacting the waste before burning (Figure 5).¹¹⁶



Figure 5. Edo State Environmental and Waste Management Board Garbage Truck. (Omenka Helen Uchendu, 2014).

Another issue is that waste management facilities such as garbage vans may be available, but are either broken down or not able to carry out the job of trash collection effectively.¹¹⁷ Capacity issues stem from funding constraints or other financing issues, which will be discussed below.

¹¹⁶ N. C. Anyanwu & Dr. J. O. Adefila, *Nature and Management of Solid Waste in Karu Nasarawa State, Nigeria*, American International Journal of Contemporary Research 4(11) (2014), available at http://www.aijcrnet.com/journals/Vol_4_No_11_November_2014/12.pdf.

¹¹⁷ *Id.*

Manpower

Manpower is another issue. For example, the staffing strength of the waste management agency, Karu Zone is very low: it has only twenty-eight staff instead of the one hundred staff that is estimated to be required for effective waste management in the area.¹¹⁸ Inadequate staffing for not only physical pickup and disposal of trash, but for administrative and technical issues, means that there is not enough human resources to implement waste disposal measures properly.¹¹⁹

Enforcement

The federal government, states, and municipalities may have laws and policies in place for waste disposal, but poor planning by agencies at all levels of government can mean that *enforcement* of those laws never comes to fruition. Poor planning can include low or nonexistent data collection (e.g. on resident waste management practices) and data management.¹²⁰ It can also include poor city planning and development, leading to rapid urban population growth without proportional increase in collection methods, coverage of the collection system, and purchasing of efficient and modern technology and equipment for waste management.¹²¹

¹¹⁸ N. C. Anyanwu & Dr. J. O. Adefila, *Nature and Management of Solid Waste in Karu Nasarawa State, Nigeria*, American International Journal of Contemporary Research 4(11) (2014), available at http://www.aijcrnet.com/journals/Vol_4_No_11_November_2014/12.pdf.

¹¹⁹ Edith Tobore Iriuruaga, *Solid Waste Management in Nigeria*, D-WASTE.COM (Nov. 15, 2012), <http://www.d-waste.com/new-infographics/item/124-solid-waste-management-in-nigeria.html?start=2>.

¹²⁰ *Id.*

¹²¹ Imoh Ukpong & Emmanuel Udofia, *Domestic Solid Waste Management in a Rapidly Growing Nigerian City of Uyo*, JOURNAL OF HUMAN ECOLOGY, 36 (3): 229-235 (2011), available at <http://www.krepublishers.com/02-Journals/JHE/JHE-36-0-000-11-Web/JHE-36-3-000-11-Abst-PDF/JHE-36-3-229-11-2094-Ukpong-I-E/JHE-36-3-229-11-2094-Ukpong-I-E-Tt.pdf>.

Public Attitudes

Indirectly related to poor planning is another challenge: lack of needed political will.¹²² Lack of political will concerns the prevailing attitudes of government officials who do not prioritize waste disposal when allocating government funding. It could also be manifest as lack of enforcement of the existing environmental regulations by federal, state, and local governments.¹²³ Communities may also lack political will, such as a lack of demand from citizens on state and local environmental agencies to finance or enforce sanitation measures.

A lack of pressure from citizens on their state and local environmental agencies for better waste disposal implementation can be a symptom of the challenge of a wrong attitude of the public towards waste disposal.¹²⁴ Attitudes and perception of the public on environmental issues affect how citizens obey environmental policies and recommendations and engage with environmental initiatives. A person who does not think proper trash disposal is important to their personal, or community, health may not comply with trash collection, even if all other factors were in place. For example, a study of 650 randomly selected Port-Harcourt city residents found correlation between respondents' knowledge of waste management and their practices of waste management.¹²⁵ The survey asked questions such as, "To what extent do you worry about solid wastes in your environment?" and "How satisfied are with the way solid wastes are

¹²² Edith Tobore Iriuruaga, *Solid Waste Management in Nigeria*, D-WASTE.COM (Nov. 15, 2012), <http://www.d-waste.com/new-infographics/item/124-solid-waste-management-in-nigeria.html?start=2>.

¹²³ *Id.*

¹²⁴ *Id.*

¹²⁵ M.O. Agwu, *Issues and Challenges of Solid Waste Management Practices in Port-Harcourt City, Nigeria- a behavioural perspective*, *Am. J. Soc. Mgmt. Sci.*, 2012, 3(2): 83-92.

handled by Port-Harcourt city waste contractors?”¹²⁶ A chi-square analysis of survey answers versus a group of several demographic characteristics (e.g. age, gender, education) demonstrated that a significant relationship existed between the residents’ demographics and their awareness, knowledge and waste collection practices.¹²⁷ This association suggests that the residents’ awareness, knowledge and practices were related to their personal characteristics.¹²⁸ A nonchalant attitude towards waste disposal and collections—an attitude that trash can be thrown anywhere and that such behavior is normal—is an impediment to implementing proper trash disposal measures: participation by citizenry is necessary for implementation.¹²⁹

Financing

Finally, financing of waste management can be the most serious challenge to proper waste disposal practices.¹³⁰ Household waste management is mainly financed through the annual budgets of the national, state and local governments.¹³¹ Local governments are supposed to allocate a substantial portion of their development budget to finance waste collection and sanitation measures.¹³² This financing is usually cross-subsidized by the profit-making avenues of local governments (e.g. local taxes, levies,

¹²⁶ M.O. Agwu, *Issues and Challenges of Solid Waste Management Practices in Port-Harcourt City, Nigeria- a behavioural perspective*, Am. J. Soc. Mgmt. Sci., 2012, 3(2): 83-92.

¹²⁷ *Id.*

¹²⁸ *Id.*

¹²⁹ N. C. Anyanwu & Dr. J. O. Adefila, *Nature and Management of Solid Waste in Karu Nasarawa State, Nigeria*, American International Journal of Contemporary Research 4(11) (2014), available at http://www.aijernet.com/journals/Vol_4_No_11_November_2014/12.pdf.

¹³⁰ Edith Tobore Iruuaga, *Solid Waste Management in Nigeria*, D-WASTE.COM (Nov. 15, 2012), <http://www.d-waste.com/new-infographics/item/124-solid-waste-management-in-nigeria.html?start=2>.

¹³¹ Federal Republic of Nigeria, *National Policy on Municipal and Agricultural Waste (MAW) Management*, Aug. 2012,

<http://www.upops.org.ng/Portals/0/Final%20Draft%20%20National%20Policy%20on%20MAW.pdf>

¹³² *Id.*

and/or fines).¹³³ Occasionally, there may be additional subsidies from the national government.¹³⁴ Without financial resources to fund purchase of garbage trucks and waste bins, build and maintain trash sorting facilities, local government areas would be totally incapable of operating successful waste management operations. Another cause or symptom of insufficient financing is low private sector investment.¹³⁵

It is worth noting that the challenges listed above are not only challenges to implementing proper waste management operations, but are also challenges to compliance with environmental health laws. Liability for non-compliance with environmental health laws (as discussed in Part III above), ideally, is a deterrent to violations and an incentive for proper waste disposal. However, challenges such as lack of enforcement of environmental regulations are also challenges to compliance. Persons or organizations will not adhere to regulations if they know that they will not be caught or held liable. Seeking redress for non-compliance can also be challenging when local governments do not prosecute cases or promulgate policies. However, challenges to compliance with environmental health laws and implementing proper waste disposal can be overcome with improvements in policy and practice.

¹³³ Federal Republic of Nigeria, *National Policy on Municipal and Agricultural Waste (MAW) Management*, Aug. 2012, <http://www.upops.org.ng/Portals/0/Final%20Draft%20%20National%20Policy%20on%20MAW.pdf>.

¹³⁴ *Id.*

¹³⁵ Edith Tobore Iruaga, *Solid Waste Management in Nigeria*, D-WASTE.COM (Nov. 15, 2012), <http://www.d-waste.com/new-infographics/item/124-solid-waste-management-in-nigeria.html?start=2>.

VI. PROPOSED SOLUTIONS FOR IMPROVEMENTS TO HOUSEHOLD WASTE DISPOSAL IN NIGERIA

This Part proposes specific policy recommendations for improving Nigerian waste management service delivery. This Part also considers mechanisms for, and the feasibility of, implementing those recommendations. Although this list is by no means conclusive, creative solutions to current problems are included. Hopefully, both private and public sectors can work together to implement some of these recommendations so that the majority of Nigerians can inhabit the clean environments they deserve.

A. *Implementation of the National Policy on Municipal and Agricultural Waste (MAW) Management*

Although the National Environmental Regulations, passed in 2009, provides a legal framework for sustainable waste management practices, a more recent policy may be a promising roadmap for the future. In August 2012, the National Policy on Municipal and Agricultural Waste Management (the Policy) was created by the United Nations Development Program, Global Environment Facility, and the Nigerian government.¹³⁶ Notwithstanding existent environmental health laws, the policy acknowledges that a major challenge to the effective management of municipal and agricultural waste in Nigeria is the absence of policy framework for implementation of *specific* aspects of municipal and agricultural waste management (e.g. no policy on composting, waste

¹³⁶ Edith Tobore Iriugaga, *Solid Waste Management in Nigeria*, D-WASTE.COM (Nov. 15, 2012), <http://www.d-waste.com/new-infographics/item/124-solid-waste-management-in-nigeria.html?start=2>. See the Policy at <http://www.upops.org.ng/Portals/0/Final%20Draft%20%20National%20Policy%20on%20MAW.pdf>.

minimization, recycling, etc.).¹³⁷ The Policy covers generation and sorting, storage, collection, transportation, resource recovery, treatment/disposal, and minimization of the release of organic pollutants.¹³⁸ It is intended to apply to “all persons generating, handling, storing, transporting, shipping, treating and disposing of Municipal and Agricultural Wastes,” which, in essence, is everyone.¹³⁹

The significance of this Policy is in its breadth, relevance, and thoroughness. In addition to listing 33 specific goals and objectives for the Policy, the Policy includes strategic points to create or implement the following in Nigeria:

- Integrated waste management across all states, municipalities, farms, and commercial and industrial facilities;
- Strengthen legislative systems and waste management systems;
- Develop and implement a waste information system;
- Develop information, education, and communication materials;
- Capacity building;
- Community education and advocacy;
- Financial allocation and mobilization;
- Supportive infrastructure;
- Stakeholder collaboration; and

¹³⁷ Federal Republic of Nigeria, *National Policy on Municipal and Agricultural Waste (MAW) Management*, Aug. 2012, <http://www.upops.org.ng/Portals/0/Final%20Draft%20%20National%20Policy%20on%20MAW.pdf>.

¹³⁸ *Id.*

¹³⁹ *Id.*

- Develop a monitoring and evaluation system.

The Policy makes specific recommendations for all of these points that address some of the challenges to waste disposal mentioned in the previous sections. For example, policy recommendations for “Financial allocation and mobilization” are to “identify development partners, private institutions and other relevant stakeholders as potential sources of financial and technical assistance” and to “establish realistic and sustainable funding mechanisms from land use charges... fines, and levies.”

The Policy also includes indicators for success that relate to specified goals, guidelines for engaging academic institutions, and a plan for funding mechanisms. Because of its thoroughness, the Policy is an excellent tool to guide and inspire development of effective waste management plans across Nigeria.

B. Utilization of the Waste Management Society of Nigeria (WAMASON) By State and Local Governments

The Waste Management Society of Nigeria (WAMASON) is a resource that can and should be utilized by state and local governments. WAMASON is a non-governmental professional organization incorporated in 2005. Its vision, among others, is to protect public health and promote waste-to-wealth initiatives. Most importantly, WAMASON is interested in the professional practice of waste management in Nigeria. The organization pursues this interest through:

- Development of appropriate human capital through training and certification;
- Building consensus with Government and creating public awareness;
- Development of practice standards and;
- Research and development of best practices.¹⁴⁰

WAMASON has membership all over Nigeria in both the public and private sector (including members of academia), and has over fourteen State Council offices in Nigeria. In addition, the organization is partnered with the United Nations Environmental Programme and the International Solid Waste Association, in addition to other corporate partners.

WAMASON members can engage in data management, data collection, waste management planning, and public education. Having recognized the manpower gap in the Waste Management Sector, WAMASON members may be required to develop professional training courses to meet the need for manpower in the waste industry.¹⁴¹ WAMASON has developed two types of training courses: Foundation Courses and Specialization Courses. These courses are designed for management and vocational levels of man-power in the waste management industry. The training is conducted twice a year at three cities in Nigeria: Ibadan, Kano and Port Harcourt.¹⁴² WAMASON also enables educational campaigns to enlighten the public on proper waste handling.¹⁴³

¹⁴⁰ *About Us*, WAMASON, <http://www.wamason.org/1/index.php/home/about-wamason>.

¹⁴¹ Edith Tobore Iruaga, *Solid Waste Management in Nigeria*, D-WASTE.COM (Nov. 15, 2012), <http://www.d-waste.com/new-infographics/item/124-solid-waste-management-in-nigeria.html?start=2>.

¹⁴² *Training*, ENVIRONMENTAL XPRT, <https://www.environmental-expert.com/training/training-142164>.

¹⁴³ Edith Tobore Iruaga, *Solid Waste Management in Nigeria*, D-WASTE.COM (Nov. 15, 2012), <http://www.d-waste.com/new-infographics/item/124-solid-waste-management-in-nigeria.html?start=2>.

In 2008, WAMASON and the Association of Waste Management of Nigeria presented an award to the Lagos Waste Management Authority in recognition of the Authority's initiative in establishing a unique model to manage and recycle waste in Nigeria.¹⁴⁴ It would be wise for state and local governments that are lacking in manpower to take advantage of WAMASON, a policy group that is enthusiastic about solving several of the challenges mentioned in Part V.

C. Becoming a "Zero Waste City"

A model waste disposal program can be found in Kamikatsu, a small town in south-eastern Japan that is a "zero waste city."¹⁴⁵ There are no community waste collections from households at all because people have to take full responsibility for everything they throw away. Kitchen waste has to be composted, and non-food waste is processed either in local shops which accept goods for recycling or in Kamikatsu's Zero Waste Centre. In the Centre, people have to sort their unwanted items into 34 different boxes for recycling. This waste management scheme was adopted when councilors realized it was much cheaper than incineration, even if the incinerator was used to generate power.

To implement a zero waste center, local government areas in Nigeria would have to build enough waste centers to adequately support the waste demands of their populations. This idea is feasible because building costs in Nigeria are not expensive. Rather than spending millions of Naira on an incinerator, LGAs could simply build one-

¹⁴⁴ Achievement/Awards, LAWMA CARES, http://www.lawma.gov.ng/insidelawma_achievement.html.

¹⁴⁵ *Living in a Zero-Waste City*, PLANETIZEN (July 15, 2008), <http://www.planetizen.com/node/33997>.

story flats, distributed conveniently among communities, containing labeled boxes for recycling. Local governments would properly dispose of the waste after it has been collected and sorted. To dispose of garbage after sorting, a city needs recycling machines and/or a garbage incinerator, both of which a city may lack due to budget constraints. For cities without garbage incinerators or recycling machines, the detailed collecting and sorting commensurate with a zero waste center could be a waste of time, because there would be no way to permanently dispose of the garbage.

To finance the process, LGAs will need federal funding to build recycling centers. LGAs could work out the transport of waste on trucks or lorries to a recycling center in a city nearby, perhaps paying the city for use of their machines in cash or in other resources. In addition to promoting the use of the recycling centers, LGAs could contract with trucking vendors to collect recyclables and pay vendors a fair share of revenues received from sale of the community's recyclables.

D. Dry waste collection centers

Related to the idea of a zero waste center is the idea of a dry waste collection center. At present, informal waste-pickers endanger themselves by scavenging in trash heaps and landfills, where hazardous chemicals and used feminine napkins could be mixed in. A dry waste collection center is a ventilated location to which trash haulers bring dry waste, including paper, plastic and glass (wet waste, such as food and organic

matter, goes to compost and biogas units).¹⁴⁶ At these centers, salaried waste-pickers sort through the dry trash and distribute valuable materials to scrap dealers and other specialized recyclers.

A model example of a dry waste collection is the dry waste collection center in Bangalore, the capital of the Indian state of Karnataka. At this collection center, waste-picker employees receive government-issued ID cards that entitle them to benefits like health care and scholarships for their children, and can be promoted to waste-center managers.¹⁴⁷ The state government of Karnataka even passed regulations to ensure the use of the facility. This policy intervention promises to engender public participation and support by pressuring inhabitants to comply and showing political solidarity behind proper waste management. In September 2012, the highest court in Karnataka ruled that city residents must segregate dry and wet waste or face a fine, further exemplifying political commitment to implementing proper waste collection in the city.¹⁴⁸

Successfully implementing a dry waste center hinges on public education. One problem facing the center in Bangalore is that residents have trouble adjusting to separating their wet and dry wastes.¹⁴⁹ To implement a dry waste center in Nigeria would also hinge on acclimating the public to taking extra time with their garbage, as opposed to

¹⁴⁶ Sumit Chakraberty, *How Bangalore's New Recycling Plan Helps Its Poorest Residents*, CITYLAB (Apr. 15, 2014), <http://www.citylab.com/work/2014/04/how-bangalores-new-recycling-plan-helps-its-poorest-residents/8887/>.

¹⁴⁷ *Id.*

¹⁴⁸ Mark Bergen, *The Developing World's Most Innovative City for Trash Management Is ... Bangalore?*, CITYLAB (Oct 15, 2012), <http://www.citylab.com/cityfixer/2012/10/developing-worlds-most-innovative-city-trash-management-bangalore/3540/>.

¹⁴⁹ Sumit Chakraberty, *How Bangalore's New Recycling Plan Helps Its Poorest Residents*, CITYLAB (Apr 15, 2014), <http://www.citylab.com/work/2014/04/how-bangalores-new-recycling-plan-helps-its-poorest-residents/8887/>.

taking a “nonchalant” stance. Another challenge to implementing a dry waste center (and by extension, a zero waste center) is the fact that, even if the waste is separated, there is no guarantee that garbage collectors won’t mix it all together anyway and/or dump it in a landfill. Traditionally, garbage contractors in Bangalore were paid by the amount of garbage they transported and the distances covered. So, until new agreements between the city and private contractors were in place, some haulers had an incentive to take trash to the landfills rather than the dry waste centers.

E. Recognition and utilization of informal recyclers and “waste-pickers”

Local government areas in Nigeria enable programs to incentivize informal recyclers (e.g. street sweepers, waste-pickers, scavengers, scrap metal traders, etc.). Connecting informal recyclers with private contractors who are able and willing to pay salaries and commission on collected waste may provide some of the manpower necessary to accelerate recycling and trash collection. Another beneficial initiative would be establishing “waste exchange” programs, where household waste can be sold or given to informal recyclers or private businesses that can reuse the waste products. For example, clean five-gallon plastic bags that one family would have thrown away could be given to an informal recycler who may then sell or recycle those bags for a profit.

F. Health promotion activities: education to induce behavioral changes

Health promotion is the development of individual, group, institutional, community and systemic strategies to improve health knowledge, attitudes, skills and behavior, as well as the living and working conditions of the community.¹⁵⁰ Educational campaigns regarding waste disposal and effective and proper disposal of household waste could be a key component in a strategy to change how most Nigerians approach environmental health and their daily lives.

U.M. Nwosu et al. (2014) designed an intervention study in the city of Aba, Nigeria to determine the effects of a health promotion intervention on sanitary refuse disposal.¹⁵¹ The study was conducted in Aba from March 2013 to September 2013. Two communities, Ogbor and Ndiegoro, were randomly selected from Aba North and Aba South Local Government Areas respectively for a survey. A sample size of 443 persons was systematically selected from a population of 4,443 households. The majority of respondents were within the age bracket of 35-44 years. About 40% had no formal education, and the majority of the respondents were traders. About 80% of them lived below ₦60,000.00 per month (\$193.00 USD). The study found that, among the two communities, factors contributing to low level practice of sanitary refuse disposal in Aba were broadly categorized into four themes: (1) ignorance, (2) inadequate sanitary refuse

¹⁵⁰ *What is Health Promotion & Behavior?*, University of Georgia College of Public Health, <https://www.publichealth.uga.edu/hpb/what-health-promotion-behavior>.

¹⁵¹ U.M. Nwosu, R.A. Eke, & K. A. Uwakwe, *Scaling up the practice of sanitary refuse disposal in Aba, South Eastern Nigeria*, JOURNAL OF MEDICAL INVESTIGATIONS AND PRACTICE 9:70-3 (2014) (available at <http://www.jomip.org/text.asp?2014/9/2/70/139166>).

bins at homes and collection centers, (3) poor attitude toward sanitation, and (4) delay in refuse evacuation.

Based on the survey results, the researchers developed a program of health promotion intervention activities. The program activities involved a community awareness campaign program about health implications of indiscriminate refuse disposal. The activities were disseminated through the community council hall, market square, and primary schools. Sanitary refuse bins were distributed to participants at affordable price. Central collection bins that were formerly open were lined with thick plastic or tarpaulin. The amount of those bins was doubled so as to offset the problem of dumping refuse on the ground and roadsides. Environmental health officers were deployed to ensure regular house-to-house garbage collection and proper dumping inside the bulky bins and not on the ground, gutters, roadsides, streets and inside Aba River. The health officers were instructed to apprehend defaulters and ensure compliance.

After three months, the study showed that knowledge of the health implications of unsanitary refuse disposal was positively associated with the practice of sanitary refuse disposal. As residents learned about proper waste disposal techniques and the impacts of disposal behaviors, their rates of practicing proper waste disposal increased. Overall, the intervention increased the practice of putting household waste into sanitary refuse bins or central collection bins (as opposed to dumping the trash by the roadside) by 62%, showing that health promotion intervention is a strong tool for scaling up the practice of sanitary refuse disposal in urban areas.

VII. CONCLUSION

Poor management of municipal waste in Nigeria causes disease epidemics, blockages of drainages and waterways, flooding and subsequent loss of life and property, road blockages due to trash heaps, and the release of dioxins and furans from the burning of municipal and agricultural waste (Figure 6).¹⁵² Considering the deleterious health effects of improper waste management, policy changes to encourage proper waste management are potentially beneficial to urban dwellers. Possible benefits include reduced infectious disease rates and reduced mortality, as well as an improved quality and outlook on life, based on a clean environment.



Figure 6: Dumpsite seen while driving from Lagos, Nigeria to Aba, Nigeria. (Omenka Helen Uchendu, 2013).

¹⁵² Federal Republic of Nigeria, *National Policy on Municipal and Agricultural Waste (MAW) Management*, Aug. 2012, <http://www.upops.org.ng/Portals/0/Final%20Draft%20National%20Policy%20on%20MAW.pdf>.

However, as aforementioned, adequate financing of policy changes and environmental health initiatives to improve waste disposal and public safety is lacking in most cities in Nigeria. Success in implementation of environmental health initiatives would hinge on procuring appropriate finances for a project. Solid waste management in Nigeria is mainly financed through annual budgets of the federal, state, and local governments.¹⁵³ However, due to the large investments that many initiatives require, there is a need for additional resource streams. Administrative policies and procedures—as well as the infrastructure to support these improvements—could be financed in several ways.

First, local governments could identify development partners, private institutions, and other relevant stakeholders as potential sources of financial and technical assistance. Private sector investments can be encouraged through incentive mechanisms such as social impact bonds. A municipal government can save time, money, and energy by utilizing volunteer resources like WAMASON and tapping into funding from large organizations like UNEP. State and local governments can also establish reasonable fines and levies for violations of environmental laws, which, after being collected, would be used for environmental health initiatives. Finally, state and local governments can generate revenue via regular taxation and user charges. User charges are fees for solid waste collection that is paid by a commercial, industrial, or residential tenant per

¹⁵³ Federal Republic of Nigeria, *National Policy on Municipal and Agricultural Waste (MAW) Management*, Aug. 2012, <http://www.upops.org.ng/Portals/0/Final%20Draft%20%20National%20Policy%20on%20MAW.pdf>.

month.¹⁵⁴ For example, the user charge for a duplex house is ₦500.00 Naira (\$1.59 USD) in Lagos state and ₦5000.00 Naira (\$15.86 USD) in the Federal Territory of Abuja.¹⁵⁵ For some context, a recent survey by Renaissance Capital of 1,004 middle-class Nigerian residents (40% of whom lived in Lagos, and 30% of whom lived in Abuja) showed that the average monthly income of those surveyed ranged between ₦75,000.00 and ₦100,000.00 (US\$480.00 and \$645.00).¹⁵⁶ While helpful, this survey only sheds light on the income of a sliver of the Nigerian population; as of 2011, 54.4% of Nigerians live below the international poverty line of US\$1.25— ₦372.81 Naira—per day.¹⁵⁷

Challenges to public financing and taxation exist in Nigeria. Some of these barriers include corruption by government officials who pilfer revenue generated by taxes and erode public confidence in the government, lack of administrative infrastructure, and lack of a personal identification system that holds every single citizen accountable to a tax authority (similar to the Social Security Number in the United States).¹⁵⁸ Adequate infrastructure and manpower also needs to be in place for federal, state, and local governments to prosecute violators of environmental laws so that fines can be collected.

¹⁵⁴ Federal Republic of Nigeria, *National Policy on Municipal and Agricultural Waste (MAW) Management*, Aug. 2012, <http://www.upops.org.ng/Portals/0/Final%20Draft%20%20National%20Policy%20on%20MAW.pdf>.

¹⁵⁵ *Id.*

¹⁵⁶ Renaissance Capital, *A survey of the Nigerian middle class*, (Sept. 26, 2011) http://www.fastestbillion.com/res/Research/Survey_Nigerian_middle_class-260911.pdf. *See also*, Femi Adewunmi, *Nigeria's middle-class: How we live, and what we want from life*, (Oct. 2, 2011), <http://www.howwemadeitinafrica.com/nigerias-middle-class-how-we-live-and-what-we-want-from-life/>.

¹⁵⁷ UNICEF, *At a Glance: Nigeria*, http://www.unicef.org/infobycountry/nigeria_statistics.html.

¹⁵⁸ Richard Gregory Asuquo, *Tax System in Nigeria: Issues and Challenges*, (Mar. 24, 2014), <http://www.vanguardngr.com/2014/03/tax-system-nigeria-issues-challenges/>. *See also*, Leyira Christian Micah, Chukwuma Ebere, Asian Asian Umobong, *Tax System in Nigeria – Challenges and the Way Forward*, *Research Journal of Finance and Accounting*, Vol 3, No 5, (2012), <http://www.iiste.org/Journals/index.php/RJFA/article/viewFile/2119/2100>.

Eradicating the current challenges to public financing and taxation will take time, but I believe that doing so is possible.

Héctor Castillo Berthier, sociologist and expert on Mexico City's sanitation system, said that "cities have to think of the garbage as something that circulates in a closed environment, where what we throw away will find its way back to us at some point, possibly in another form."¹⁵⁹ This quote embodies the importance of proper waste disposal measures in urban environments. Trash never "disappears." It is integrated into our ecosystem and affect our lives in ways that we do not know. Hopefully the implementation of various environmental health initiatives and financing mechanisms in Nigeria will lead to a day where citizens can roam the streets of their cities, towns, and villages without a speck of garbage in sight.

¹⁵⁹ Lauren Villagran, *Garbage for the Future - As Mexico City Modernizes, A Debate Emerges: Who Owns the Trash?*, NextCity (Jul. 16, 2012), <https://nextcity.org/features/view/garbage-for-the-future>.