

**A POST-NORMAL SCIENCE APPROACH TO UNDERSTANDING THE REAL ISSUES,
CHALLENGES AND CONTEXTS OF MUNICIPAL SOLID WASTE (MSW) MANAGEMENT
IN DEVELOPING COUNTRIES – A CASE STUDY OF ABA-URBAN IN ABIA STATE,
NIGERIA.**

By

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ABSTRACT

Effective management of waste is a complex task requiring appropriate technical solutions, sufficient organisational capacity and the collaboration of a wide range of stakeholders. The more advanced, high-income economies and developed nations of the world have evolved their current systems in a series of steps. It is now widely recognised that it is counterproductive for developing countries to use strategies and policies developed for high-income economies. There are no quick fixes. Therefore, it is unrealistic for a developing country to expect to go from uncontrolled dumping of waste to a 'modern' state of the art waste management system in one great leap. Rather, the process should be locally sensitive, critical and creative and owned by the community of concern. By adopting this approach, many cities and small towns in other developing countries have recorded considerable progress while the same cannot be said of cities in Nigeria, where there appears to be a lack of understanding and appreciation of the enormity of the challenges posed by MSW.

The main aim of this study therefore, is to understand the real issues, challenges and contexts of MSW management in developing countries, using the Nigerian city of Aba as a case study. The study adopted a purely qualitative methodology, and by utilising the approach of Post Normal Science (PNS) and Adaptive Methodology for Ecosystem Sustainability and Health AMESH), particular attention was given to the oral testimonies and lived experiences of the participants drawn from the wider peer community of stakeholders of MSW management in the city.

The results provide the first historical review of MSW management in Aba and show that, over the period reviewed; the MSW management processes remained rudimentary, often involving the evacuation of refuse from one point to another. It also shows that currently, indiscriminate dumping, littering and illegal dumping of refuse is common in the city. Further analysis of the data revealed the inadequacies in the national sanitation policy and the current MSW management system implemented by ASEPA – the agency responsible for MSW management in the city. The level of planning and organisation of MSW management activities was found to be shambolic and there were shortages in manpower and availability of equipment needed to effectively collect and dispose waste. The common method of waste disposal was found to be open dumping in dumpsites that were unplanned and unsanitary. Despite these realities, the study found that contrary to

the commonly held popular notion that residents of Aba prefer a dirty environment to a clean one, most participants in this study showed a good understanding of the implication of poor MSW management practices on public health, and expressed willingness to pay higher sanitation fees if it will guarantee a cleaner environment.

To curb most of the conflicts that currently exist between ASEPA and other stakeholder groups and move towards sustainable MSW management as indicated in the sustainable development goals (SDGs) and millennium development goals (MDGs), the direction of travel of MSW management in the city must change from a modernisation approach of expending scarce public resources on imported sophisticated refuse collection and transportation vehicles, that are unsuitable and does not stand the test of time for various reasons; to adopting a local approach that encourages genuine participation of all relevant stakeholders in the policy decision making, design, implementation and evaluation of the MSW management system. Such approach will help improve the livelihood of informal waste workers who are currently maligned, intimidated and harassed by MSW management authorities.

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DEDICATION

I heartily dedicate this work to God almighty, the author and finisher of my faith.

DECLARATION

I declare that the work presented in this thesis is, to the best of my knowledge and belief, original except as acknowledged in the text. The work was carried out in accordance with the regulations and code of practice of Queen Margaret University, Edinburgh and the material has not been submitted, in part or in whole, for any other degree at this or any other university.

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LIST OF ABBREVIATIONS

AfDB	African Development Bank
AMESH	Adaptive Methodology for Ecosystem Sustainability and Health
ANC	African National Congress
ASEPA	Abia State Environmental Protection Agency
BMW	Biodegradable Municipal Waste
BSC	Balanced Scorecard
BSE	Bovine Spongiform Encephalopathy
CCN	City Council of Nairobi
CEC	Commission of the European Communities
CLO	Compost-Like Output
CVA	Contingent Valuation Approach
DEFRA	Department for Environment, Food & Rural Affairs
DETR	Department of the Environment, Trade and the Regions
DGM	Deputy General Manager
DPSIR	Driving Force-Pressure-State-Impact-Response
EAP	Environment Action Programme
EEA	European Economic Area
EEA	European Environment Agency
EH	Environmental Health
EHD	Environmental Health Department
EHOs	Environmental Health Officers
ESP	Environmental Sanitation Policy

FEPA	Federal Environmental Protection Agency
FME	Federal Ministry of Environment
FRN	Federal Republic of Nigeria
GMO	Genetically Modified Organisms
IDE	Institute of Developing Economie
ISSER	Institute of Statistical, Social and Economic Research
ISWM	Integrated Sustainable Waste Management
KMA	Kumasi Municipal Authority
LGAs	Local Government Areas
MBT	Mechanical Biological Treatment
MCD	Municipal Corporation of Delhi
MDAs	Ministries, Departments & Agencies
MDGs	Millennium Development Goals
MENR	Ministry of Environment and Natural Resources
MGM	Microsoft Groove Music
MOU	Memorandum of Understanding
MSW	Municipal Solid Waste
NDMC	New Delhi Municipal Council
NEPAD	New Partnership for African Development
NGO	Non-Governmental Organisation
NIMBY	Not In My Back Yard
NPC	National Population Census

NPM	New Public Management
PIL	Public Interest Litigation
PNS	Post Normal Science
SDGs	Sustainable Development Goals
SEPA	Scottish Environmental Protection Agency
SMC	Supreme Military Council
SME	Small & Medium Enterprises
SSA	Sub-Saharan Africa
UESP	Urban Environmental and Sanitation Programme
UN	United Nations
UNCED	United Nations Conference on Environment and Development
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UN-HABITAT	United Nations Human Settlement Programme
UNICEF	United Nations International Children Emergency Fund
US EPA	United States Environmental Protection Agency
USA	United States of America
WAI-C	War Against Indiscipline & Corruption
WCED	World Commission on Environment and Development
WHO	World Health Organisation
WtE	Waste to Energy

CHAPTER ONE

Introduction

1.1 Overview

According to the United Nations Environmental Programme (UNEP), “Waste is a global issue. If not properly dealt with, waste poses a threat to public health and the environment. It is a growing issue linked directly to the way society produces and consumes. It concerns everyone” (UNEP 2015, pg. 1). This is particularly the case in low and lower-middle income countries (otherwise known as developing countries) where the unhealthy disposal of solid waste is still one of the greatest challenges (Kofoworola 2007). At the Rio Earth Summit of 1992, the United Nations Conference on Environment and Development (UNCED), among other things, recognised the integral and interdependent nature of the earth. As part of the declarations, specifically principles 4 and 25, state “In order to achieve sustainable development, environmental protection shall constitute an integral part of the development process and cannot be considered in isolation from it” and “Peace, development and environmental protection are interdependent and indivisible” respectively (UNCED 1992).

More recently, United Nations’ 2030 Sustainable Development Agenda recognised the important role of sustainable waste management. Goal 11.6 aims to “By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management” and Goal 12.4 aims to “By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment” (UN 2018). These Sustainable Development Goals (SDGs) are also interdependent.

Our activities on earth have always generated waste but managing the waste was never a major issue when our population was relatively small and nomadic (Giusti 2009). However, the quest for comfort and luxury of postmodern societies and the escalation of urban centres, aided by urban population growth and rural to urban migration has resulted in increasing waste generation and ultimately, a throwaway economy (Bongarts 2009; Turner 2009; Brown 2006). Historically, poor management of waste led to

contamination of water, soil and air, which significantly impacted public health. In medieval times, epidemics associated with contaminated water decimated the population of Europe and more recently, cholera was still a common occurrence. Some direct health impacts of poor waste management are still observed especially in the developing world (Giusti 2009; Wilson 2007).

1.2 Background Information

At the United Nations consultative meeting on expanding waste management services in developing countries held in Tokyo, Japan in 2010, it was recognised that the main challenge regarding waste management has changed perspective – from the older view of ensuring minimum damage to public health and the environment to the manner in which discarded resources are handled such that future generations are not deprived of some or all of its value (Batagarawa 2011; Chandak 2010).

Municipal solid waste (MSW) can be classified based on its origin. The three (3) distinct streams of MSW relevant for this study are:

- i. Domestic waste (waste from households, food centres, markets, and commercial premises)
- ii. Industrial waste (excluding toxic waste that requires special handling)
- iii. Institutional waste (waste from government establishments, schools, hospitals and recreational facilities) (Ezechi et al 2017)

This research is a case study of Aba – a city in south eastern Nigeria known for its markets and the craftsmanship of artisans. The state of MSW management in Aba is typical of most Nigerian cities. City specific data necessary for adequate waste management planning are unavailable. Though there have been several changes in government and in the institutions responsible for the environment, the challenges of waste management have become even more daunting in Aba. With a thriving manufacturing sector, albeit artisans, and an estimated population of almost one million people, Aba is simply the commercial hub of eastern Nigeria (Izugbara and Umoh 2004). Testament to this is the presence of big markets such as Ariaria International Market, Ahia Ohuru (New Market) and Ekeoha Shopping Complex (Aba Shopping Centre) which attract traders from all over Nigeria and beyond. The location of Aba (Fig 2.8 in Pg. 44) and the transport (road) connectivity it provides to several other cities and towns in Nigeria ensures Aba is pivotal to the road

transport network in the region, though poor maintenance, neglect and a lack of investment in infrastructural developments have for long threatened the city's capability of living up to this billing. The Abia State Ministry of Environment through its parastatal ASEPA (Abia State Environmental Protection Agency) is responsible for the environmental upkeep of the city. One of its stated goals is "Pollution Control & Environmental Sanitation" (Abia State Government 2014). Clearly, Pictures 1 and 2 below show a city in dire need of actions to prevent an epidemic such as that which occurred in Accra, Ghana in 2011 where indiscriminate dumping of plastics and uncollected waste blocked drainages and caused flooding resulting in over 100 incidents of cholera and a death toll of fourteen while 17,000 people lost their homes. Roads, waterways and bridges were also destroyed (UNEP 2015). A brief history of the city of Aba and the state of MSW management in the city are provided in Sections 2.9.3 and 2.9.3.1 respectively.



Picture 1: Heap of Garbage at Union Bank Junction, along Aba-Owerri Road, Aba
[Credit: Researcher]



Picture 2: Illegal Public Urinary and Dump at Aba Main Park (Park Road) [Credit: Researcher]

Earlier studies relating to waste management in Nigeria have focused more on issues such as waste composition (Igoni et al 2007; Kofoworola 2007; John et al 2006), perception and awareness (Babayemi and Dauda 2009; Longe et al 2009), state of the environment (Anake et al 2009), regulations and governance (Nzeadibe et al 2010; Kalu et al 2009), assessment of factors (Ezeah 2010) and development of a sustainability appraisal tool (Batagarawa 2011), while other previous studies have also documented a wide range of issues that affect MSW management in low and lower-middle income countries. These include but not limited to: the implications of rapid urbanisation, population growth and increasing poverty in the midst of economic growth (Ezeah 2010; Daskalopolous 1998a); increasing waste generation rates, lack of workforce and transport capacity for waste collection and disposal (leading to inefficient collection of waste) and lack of land in urban centres (Guerrero et al 2013; Sarkhel and Banerjee 2010); family size, education level, household income levels, attitude to waste separation, availability of active support, fee for collection service that is based on waste volume (as

against a flat rate for all service users), gender, peer influence and household location (Scheinberg 2011; Ekere et al 2009; Sujauddin et al 2008; Zhuang et al 2008).

Hazra and Goel 2009, Minghua et al 2009, Moghadam et al 2009 and Burntley 2007, identified lack of finance, poor organisational capabilities, and complexity and system multidimensionality which includes poor route planning, improper bin collection systems, poor or dilapidated infrastructures, poor roads, etc. as some of the challenges facing regulatory authorities responsible for MSW management. The key stakeholders in MSW management include national and local governments, municipal authorities, city corporations, Non-Governmental Organisation (NGOs), households, private contractors, ministries of health, environment, finance and economy, and recycling companies (including informal recyclers and waste pickers) (Tai et al 2011; Geng et al 2009; Shekdar 2009; Sujauddin et al 2008).

Sharholy et al 2008 suggested organising the informal sector and promoting micro-enterprises as an effective way of improving the affordability of waste collection services while the restructuring of the waste management sector and source separation of waste have been recommended as part of the solution to the MSW management problems in Aba, Abia State, Nigeria (Ezechi et al 2017). It is important to mention that most of these studies adopted a purely quantitative approach while Ezeah 2010 and Longe et al 2009 utilised a mixed method.

1.3 Justification

Based on the quantity of work undertaken on MSW management, one would expect a marked improvement on the state of MSW management in developing (low and lower-middles income) countries. However, the situation on the ground is different as developing effective and efficient MSW management systems in developing countries has proved elusive, and hence my interest in the topic.

According to Agwu 2012, a joint World Health Organisation (WHO) and United Nations International Children Emergency Fund (UNICEF) report estimated that about 2.4 billion people faced a risk of needless disease and death occasioned by poor sanitation by 2015. The report also intimated that the spread of diseases such as cholera and diarrhoea, which is fuelled by poor sanitation including decaying or non-existent sewage systems and toilets, kills a child every 21 seconds, the worst hit being residents of fast growing

cities in Africa and Asia. Note that while sanitation may often be used in relation to the safe management of liquid waste (including human excreta) and provision of clean water, the broad definition of sanitation by the WHO include the safe management of solid and animal wastes (“WHO”, n.d.).

The reason for the poor state of MSW management in cities in developing countries is arguably linked to the fact that city-specific data on waste generation and composition is largely unavailable or unreliable (Jha et al 2011; UN-HABITAT 2010a). There are no quick fixes as it is now widely recognised that it is counterproductive for developing countries to use strategies and policies developed for high-income economies (Coffey and Coad 2010; Konteh 2009; Wilson 2007). The traditional consultative methods where the ‘experts’ are required to prescribe solutions before public involvement have also been shown to be grossly ineffective (Henry et al 2006).

Regulatory authorities must therefore embrace public participation, transparency in decision making, networking, collaboration and co-operation with all stakeholders, effective communication and accessibility of information as key elements of successful MSW management systems (Marshall and Farahbakhsh 2013; Zarate et al 2008).

1.4 Analytical Framework

With these in mind and in accordance with principle 10 of the Rio Declaration (UNCED 1992), which states in part that “environmental issues are best handled with the participation of all concerned citizens, at the relevant level” this study was specifically designed to ensure the participation of all identified stakeholder groups in Aba-urban. The first of its kind, the study aimed to understand the real issues and challenges of MSW management in the city, taking into consideration, the different but valid perspectives and contexts from the various stakeholders.

Consequently, and considering that MSW management systems are complex adaptive eco-social systems affected by a huge number of factors, and with far reaching implications on several groups of individuals (stakeholders) (UNEP 2015; UN HABITAT 2010a; Aye and Widjaya 2006; Cheng et al 2012), a post normal science approach was adopted and the adaptive methodology for ecosystem sustainability and health was used to capture and show the different valid perspectives and contexts of waste management in Aba. Data collection was through guided unstructured interviews and researcher

observations. The Integrated Sustainable Waste Management (ISWM) framework and the framework indicators developed by the UN-HABITAT (Wilson et al 2015; Wilson et al 2013a) were used as the guiding analytical framework (details in sections 2.3 and 2.6).

1.5 Research Aims and Objectives

To achieve the set research goals, the following research questions were developed:

- i. What are the current realities and challenges of waste management in Aba?
- ii. What approaches can be used to remedy the situation and to what extent?

To help answer these questions, the following aims and objectives were devised, along with the specific activities

1: To analyse the current realities and challenges of waste collection, disposal and treatment in Aba

- a. To observe and assess the methods of waste disposal and treatment
- b. To determine the main drivers of waste management in Aba

2: To evaluate the history and contexts of waste management from the perspectives of the different stakeholders in the city

- a. To evaluate the stakeholders' perspectives of waste management
- b. To determine and analyse the needs, activities and concerns of all stakeholders' as it relates to MSW management in the city

3: To identify potential areas of conflict between stakeholders

- a. To analyse the relationship between stakeholders in terms of decision-making powers
- b. To assess the level of participation and involvement of the different stakeholders
- c. To assess the existing framework of policies and institutions

4: To articulate a vision and action plan towards an integrated sustainable waste management system

- a. To analyse the findings from objectives 1-3 using the ISWM analytical framework
- b. To draw up an action plan aimed at achieving integrated sustainable waste management in Aba.

1.6 Outline of Thesis

In this chapter, the researcher accomplished the following:

- Present an overview of the problem and challenges of MSW management in low and lower-middle income (developing) countries
- Provide a background information and the statement of the problem of MSW management in Aba, Abia State Nigeria
- Systematically outline his interest on the subject matter, and:
- Explain the goals of his research and how he attempted to achieve them

The remaining chapters have been organised as follows:

Chapter 2 will put this study in the context of available relevant literature

Chapter 3 will provide details of the methodology and methods used.

Chapter 4 will present the evaluation of the history and contexts of MSW management in Aba. It will address the second aims and objective of this study. the data collected and the result of the analyses carried out. This will be divided into 2 sections – history and contexts of MSW management; and the current realities and challenges of MSW management in Aba.

Chapter 5 will address the first aims and objective and will present the analyses of the current realities and challenges of waste collection, disposal and treatment.

Chapter 6 will focus on the ISWM governance and thus humans, institutions and policies involved. Any potential areas of conflict identified will be presented here.

Chapter 7 will present a summary of suggestions by participants towards a better MSW management system. Some of the suggestions are used by the researcher to articulate a vision and action plan aimed at helping the city towards a sustainable MSW management system. The vision and action plan is presented in Annex 1.

Chapter 8 will present the aggregation and discussion of the key results of the research.

Chapter 9 will present the conclusions drawn from the key results, highlight the challenges encountered during the research and present the recommendations for future research works.

CHAPTER TWO

Literature Review

2.1 Introduction

This chapter begins by outlining the definition and characteristics of solid waste, municipal solid waste (MSW) and the management of MSW used in this study. It continues by presenting a historical and contextual review of drivers of MSW management followed by a highlight of the key features of the integrated sustainable waste management (ISWM) including the stakeholders, elements and aspects; and how they are linked to the three key drivers. The chapter concludes by presenting the state of MSW management in the European Economic Area (EEA) and contrasts it with that in other developing countries in Africa including Nigeria. The review follows a traditional review system and is structured around the aims and objectives of this research. Particular references are made to the ISWM framework and the works of the UN-HABITAT on waste management in World's Cities, Wilson, D.C, van de Klundert and WASTE (the NGO), similar studies that emphasise an integrated local approach akin to this study and other studies that relate MSW management to development, especially governance and civic engagement.

2.2 Waste and Solid Waste

There are various definitions of what constitutes waste. However, most definitions agree on the essential ingredients of the definition to include origin or source of the material, characteristics, potential to cause harm to the environment and a negative or zero value to the owner or producer (Ezeah 2010). Igoni et al (2007) defined waste as any material which has no value to the producer which has been designated for disposal while the US EPA (2012) described materials as solid waste if they are abandoned by being:

- a. "Disposed of; or
- b. Burned or incinerated; or
- c. Accumulated, stored, or treated (but not recycled) before or in lieu of being abandoned by being disposed of, burned, or incinerated".

From the definition, materials that are to be recycled, those used in a manner constituting disposal including being placed on a land and those burned for energy recovery (except

commercial products manufactured specifically for such purposes) also constitute solid waste.

2.2.1 Definition of Municipal Solid Waste (MSW)

Definitions of MSW vary between countries (UN-HABITAT 2010a) but a common definition is household waste and any other waste collected by an instituted waste collection authority or its agents, including waste from parks, beaches, commercial establishments, offices, industries and fly tipping (Ezeah 2010; Read 1999). In the EU Landfill Directive (1999), MSW is defined as: waste from households, as well as other waste which, because of its nature or composition, is similar to waste from households. Cointreau (1982) and Igoni et al (2007) defined MSW as all non-air and sewage emissions created and collected by private as well as public authorities within any municipality from domestic, commercial and industrial (non-hazardous) sources. This definition is similar to the working definition for this study which is adopted from the UN-HABITAT (2010a) definition of MSW – “wastes generated by households, and wastes of a similar nature generated by commercial and industrial premises, by institutions such as schools, hospitals, care homes and prisons, and from public spaces such as streets, markets, slaughter houses, public toilets, bus stops, parks, and gardens”. Thus, MSW may comprise of biodegradable components including food and garden waste; paper, wood, textiles, and non-degradable fractions such as glass, plastics, tyres and bottles (Ezeah 2010). This definition includes all commercial and business wastes as MSW except wastes from industrial processes and hazardous wastes. Industrial processes may include agricultural, manufacturing, mining, etc. Hazardous wastes are wastes that require strict controls from the point of production to its movement, management, and recovery or disposal as mismanagement can cause greater harm to the environment and human health than non-hazardous waste (DEFRA 2014a).

2.2.2 MSW Management

As urban populations continue to increase and consumption patterns change, MSW management increasingly becomes an issue of global concern. So too are the health and environmental concerns connected with MSW management (Breza-Boruta 2016; Dolar et al 2016; Talalaj and Biedka 2015; Souza et al 2014; Marshall and Farahbakhsh 2013; Marchand et al 2012). The management of MSW is one of the most important functions of the municipal authority or a city government. It is a key utility service upon which the

public health and the external image of the city depend (Wilson et al 2015). Therefore, collection of waste is regarded as a public good (service), deemed so important that the law requires it is provided to the benefit of the whole society irrespective of whether or not there is interest of the market to supply it or the users' ability or willingness to pay for it (Wilson et al 2013a; Batagarawa 2011; Cointreau-Levine and Program 1994). This perhaps explains why some local authorities and municipalities spend as much as 20% of their entire budget on MSW management (Wilson et al 2012; Wilson et al 2001). In 2012, about 246 million tons of MSW was produced in Europe, an equivalent of 487kg of MSW per person per annum (Berg et al 2018). Caicedo-Concha et al (2016) estimated the average daily global rate of MSW production of 1.2 kg per capita while the World Bank estimates that by 2025, the volume of waste generated globally per annum will rise to 2.2 billion tonnes with an associated estimated cost of collection of \$375.5 billion (The World Bank 2012). This information suggests that if not checked, increases in urban population will usually result in increases in quantities of waste generated, with an attendant waste management costs; and if the waste is not adequately managed, it could result in severe public health implications (Breza-Boruta 2016; Marchand et al 2012). Providing solutions to these MSW management challenges present burning issues which are being debated among scientists and policymakers (Chalhoub 2018; Guerrero et al 2013). Achieving sustainable management of MSW could ensure environmental sustainability as well as contribute to social inclusion and reduction in poverty, especially in developing countries (Ferronato et al 2019; Lino and Ismail 2012). It is therefore of little surprise that in the United Nations SDGs, sustainable MSW management in developing countries is recognised as an avenue to the spread of global sustainable growth (Ferronato et al 2019; Rodic and Wilson 2017).

The current phase of modernisation in solid waste management began in the 1960s and saw the developed countries begin in a series of steps (Wilson 2007). Open dumps were phased out or upgraded to 'controlled disposals' and gradually, the standards of leachates and gas control increased (Rushbrook and Pugh 1999). Gradually, these developed countries have recorded significant improvements through key advancements in technology, improved legislation and regulatory systems in waste management and the adoption of a more sophisticated health surveillance mechanism (Giusti 2009). These successes also involved the use of some kinds of system analyses including engineering

models, analysis platforms and assessment tools targeted mainly at strictly defined engineered systems by MSW management agencies both as a tool for supporting decision making in planning processes and for monitoring and optimising existing MSW management systems (Marshall and Farahbakhsh 2013, Chang et al 2011). However, while there is the explicit recognition and adoption of a systems approach – an appreciation of the different elements of MSW management, their interconnectedness and functions; to MSW management by developed countries, there is a lack of literature on the adoption and application of similar approaches and complex, adaptive system thinking to MSW management in developing countries (Seadon 2010). While this is not by any means, a ‘cure all solution’, according to Waltner-Toews et al 2008, publicly engaged systems thinking can help provide an understanding and create possible ways for coping with complexity. In other words, while developed countries have improved their MSW management systems through the adoption and implementation of advancements in technology, engineering, health surveillance, and legislation, the same cannot be said of their developing counterparts. However, while encouraging public participation may not solve all the problems, Chambers (1983), Richards (1985), and Long (2004) argue that the practical everyday knowledge of ordinary people can enrich ‘science’ and improve development practice.

Public health has often been linked with MSW management, especially the coverage and quality of waste collection services (Wilson et al 2012; Marchand et al 2012; Wilson 2007). Other epidemiological studies identified the existence of an association between human illnesses and proximity to a waste disposal site, or length of residence near such a site (WHO 2015; Giusti 2009). Uncollected solid waste still present serious public health issues in many developing countries. Direct effects include poor child health e.g. diarrhoea caused by deficient hygiene and poor sanitation while indirect effects include blocked drainages with the attendant spread of water borne diseases and flooding (Wilson et al 2013a; Bartram and Cairncross 2010). Besides the public health benefits, a clean city is also attractive to tourists, entrepreneurs and investors. Thus, as well as being a key utility service upon which not only the public but also the financial health of a city depends, the quality of MSW management is a proxy indicator of good governance (Whiteman et al 2001). However, it is now widely recognised that it is counterproductive for developing countries to simply copy and implement strategies developed for their

high income developed counterparts. Schubeler 1996, Henry et al 2006, Konteh 2009, Coffey and Coad 2010 and UN-HABITAT 2010a all advocate for a locally sensitive, creative and critical approach that is 'owned' by the community. They emphasise the importance of the collaboration of a host of legitimate peers to enable the stakeholders to frame their particular context which will help ensure the next appropriate step in MSW management is taken. This context specificity, they said, is critical for the future of MSW management. At the United Nations international consultative meeting on expanding waste management services in developing countries held in Tokyo, Japan, in 2010, it was agreed that the waste management challenge has changed from the older perspective of "ensuring minimum damage to public health and environment in the process of handling waste" to "the manner in which discarded resources will be handled such that future generations are not deprived of some or all of its value" (Batagarawa 2011; Chandak 2010). As much as this statement is true, Wilson 2007 sounds a note of caution when he said "If there is one key lesson that I have learned from 30 years in waste management, it is that there are no 'quick fixes'" (Wilson 2007, p205). He reiterates that all developed countries have evolved their current systems in a series of steps and points out that it is therefore very unrealistic for developing countries to expect to move from uncontrolled dumping of waste to a 'modern' system of waste management in one great leap.

While this may not be an express indictment of the waste hierarchy which prescribes the management option with the least perceived adverse environmental impact, it suggests a progression towards sustainable development where the objectives of waste management systems should reflect the stage at which each community, society or country is at on its journey to development and to a sustainable waste management system (Chalhoub 2018). It also reemphasises the need to adopt a local approach to finding appropriate solutions by ensuring that local conditions and limitations are duly considered in any proposed MSW management options (Hettiarachchi et al 2018). The small and relatively remote city of Ghorahi in Nepal is a good example of what can be achieved with limited local resources if all stakeholders are engaged. Their well sited and managed waste facility incorporates waste sorting, recycling, sanitary landfill with leachate collection and treatment, a buffer zone with forests, gardens and a bee farm to shield the site from surrounding areas (UN-HABITAT 2010a). This is in complete consonance with Principle 1 of the Rio Declaration which states that "human beings are

at the centre of concerns for sustainable development. They are entitled to a healthy and productive life in harmony with nature” (UNCED 1992). The Ghorahi approach is arguably a valid example of doing development differently through a political economy approach (Booth et al 2016) as against the modernisation approach often pursued by developing countries (Wilson et al 2007; Long 2004).

Clearly, achieving sustainable MSW management involves the evaluation and careful management of several factors including but not limited to socio-economic, technological, political, institutional and financial (Chalhooub 2018; Wilson et al 2012; Aye and Widjaya 2006; Cheng et al 2002). Added to the mix is the uncertainty and multiplicity of variables related to different steps and phases of the MSW management system (Berg et al 2018; Wilson et al 2015; De Feo and De Gisi 2010; Funtowicz and Ravetz 1990). Managing all of these factors and variables alongside the actors (stakeholders) involved in MSW management surely requires skills that cut across different spheres of development science including urbanization and urban governance, politics and public policy, and civic engagement (Ferronato et al 2019; Chalhoub 2018; Rodic and Wilson 2017; Nzeadibe and Ajaero 2010; Funtowicz and Ravetz 1993).

The ISWM framework discussed in section 2.4 is an approach to MSW management that satisfies the aforementioned demands and requirements for achieving sustainability in MSW management.

2.3 Drivers of MSW management

By definition, drivers of MSW management simply mean “mechanisms or factors that significantly impact development in solid waste management”. A good understanding of these drivers – past and present, is perhaps the key to understanding how to move forward in developing sustainable waste management systems around the globe (Wilson 2007).

2.3.1 Historical review – drivers of waste management over the last millennium

Drawn mainly from Wilson (2007), Table 2.1 below aims to provide a chronological sequence of development of the drivers of MSW management in the last millennium with particular focus on the UK.

Table 2. 1: A chronology of development of MSW management drivers in the UK

1000 - 1800	<p>Attempts to clean up city streets which were commonly covered with foul smelling mud (soil, household waste, animal and human excrement and stagnant water)</p> <p>'Rakers' employed/bought rights to provide MSW services (Girling 2005)</p> <p>The rich refused to pay to clean up for the poor</p> <p>Scarcity of materials was the main driver and a source of income (Woodward 1985)</p>
1800 - 1850	<p>Resource value of waste played an even more predominant role</p> <p>With the industrial revolution, MSW became a very important raw material</p> <p>Dust-yard system contracts and franchises (Velis 2004)</p>
1850 - 1900	<p>Overlap of the decline of dust trade and rise of public health and sanitation movement</p> <p>Erroneous 'miasma' theory which linked infectious diseases to poor sanitary conditions</p> <p>Public health Act of 1875 required households to place their waste in a 'moveable receptacle' and mandated local authorities to empty the receptacles at least once a week</p> <p>Better public health linked to improved national prosperity</p>
1900 - 1970	<p>Public health legislation continued to be main driver with emphasis on waste collection</p> <p>Disposal was predominantly uncontrolled</p> <p>During and after the two world wars, resource value of materials drove recycling</p> <p>With technological developments, energy from waste became common in Britain and Europe (Girling 2005)</p>

The 1960s and 70s heralded the arrival of waste disposal on the political agenda in the developed world with the emergence of environmental protection as a legitimate driver (Wilson 2007). Figure 2.1 below is a schematic simplification of the four overlapping phases in the development of waste management policy in Europe since 1970.

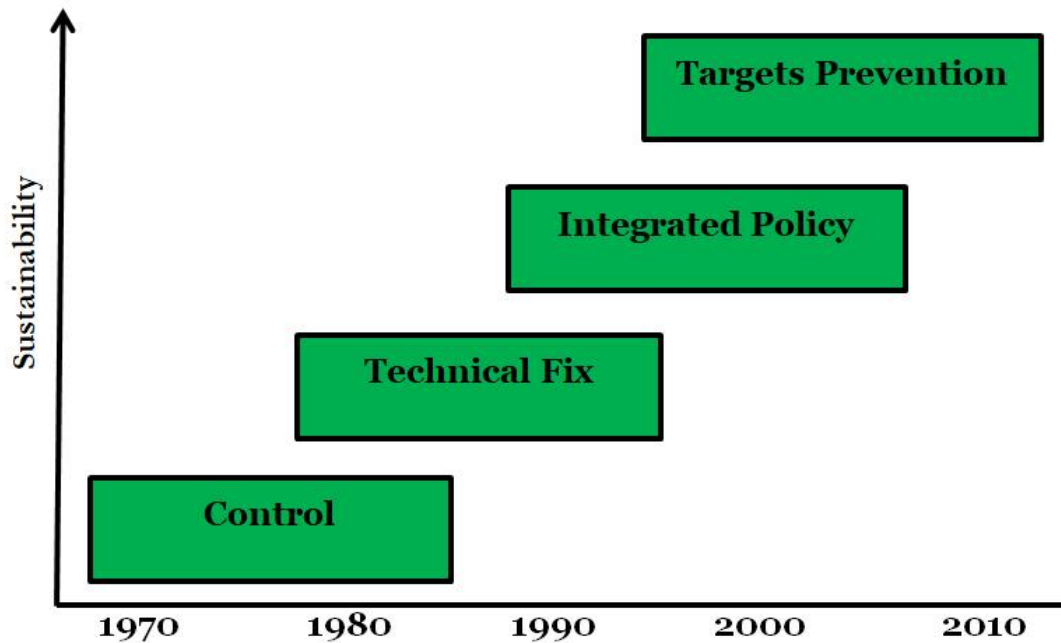


Figure 2. 1: Phases in the development of modern waste management policy (based on Wilson 1999)

Figure 2.1 above shows the gradual advancements in MSW management in the developed world from the phasing out of open dumping (which constituted the control phase) to the retrofitting of incinerators with electrostatic precipitators for dust control (technical fix phase); and to the focus on the use of best available technique (which constituted the integrated phase). In a continuum, the current phase is 'closing the loop' – a system of decoupling waste growth from economic growth, with emphasis on sustainable production and consumption (Wilson 2007).

2.3.2 Historical Review – Drivers of the drivers

The Public Health Act of 1848 and eventually the 1875 Public Health Act were driven by public health concerns and the sanitation movement. However, the very organised and effective dust-yard system which peaked in the 1820s, before the advent of relevant legislation, was not driven by public health concerns but by the resource value of household waste (Velis et al 2009). Early extensive and organised reuse and recycling of waste materials reportedly occurred for many centuries (Cooper 2006; Strasser 2000; Woodward 1985). Melosi 1981, Tarr 1996, Melosi 2000, Miller 2000, Louis 2004 all contain reports of the systematic attention that early waste and resource management received in the United States. Resource efficiency is thus not a new phenomenon even

though it retains a contemporary relevance in 21st century MSW management (Velis 2009; Wilson 2007).

The population of London grew rapidly from 1.1million in 1801 to 1.6million in 1821, and 2.7million in 1851 (Ball and Sunderland 2001). This population increase drove the increased demand for bricks and with the exhaustion of the local raw materials for brick making in the early 19th century, coal ashes and soil became attractive substitutes (Allinson 2003). Recall that household waste was high in coal ash as heating and cooking was predominantly done with coal (Wilson 2007). In 1814 and 1815, soil was shipped to Moscow for the rebuilding of the city after the fire of 1812 (Webb and Webb 1922). This international trade helped sustain the high price and drive the continued demand such that regular supply of soil was needed from northern cities such as Newcastle, to meet local demand in London (Velis 2009).

The fine coal ash from household waste was also just as important in agriculture, as fertiliser and soil improver (Webb and Webb 1922). While this may be partly attributable to the rising urban population who needed to be fed, the Corn Laws of 1815 which taxed imported grains and ensured a rise in the prices of home-grown cereals (Vamplew 1980) helped drive this demand. With the repeal of the Corn Laws in 1846 and changes in land use from cultivated to pasture land, the demand for fine coal ash in agriculture slowed (Brawley 2006; Mayhew 1862) though other recycled materials with higher manure content such as bones and animal-origin rags were still used as fertilisers and soil improvers (Velis 2009; Gordon 1890).

From the narrative above, the importance of the value of waste materials was clearly highlighted along with other drivers such as regulations, population, demand, supply, international trade, etc. All of these and many more could together be loosely described as economic drivers. However, the classification of drivers of MSW management overlaps, and is never straight forward (Contreras et al 2010).

Likewise, public health concerns, public awareness, legislation and developments in technology could be described as the main early social drivers. As early as 2000 BC, concerns for public health, aesthetics and religion laid the foundation for early solid waste management systems in ancient cities (Melosi 1981). By 500 BC, the Greeks had the first organised municipal dump in the western world and had issued the first known

edict prohibiting throwing of garbage on the streets (Louis 2004) while the Chinese had 'disposal police' charged with enforcing disposal laws by 200 BC (Marshall and Farahbakhsh 2013). Similar to the plague or Black Death in 14th century Europe, the recurrence of deadly epidemic diseases and the ineffectiveness of early medical interventions gave rise to evolving debates about the aetiology of the diseases and increasing public concern about the quality of the living environment in the US (Louis 2004; Tchobanoglous et al 1978). Following the American industrial revolution, the environmental conditions worsened as the urban population and number of cities burgeoned. The yellow fever outbreak in Philadelphia in 1793 which claimed about 5600 lives (Pernick 1978) and the cholera epidemics in New York in 1832 and 1849 which claimed about 150,000 lives caused massive public hysteria and created the impetus for the organisation of developed systems for administering public health and urban sanitation in the US (Louis 2004; Neira 1997). Like in Europe, the prevailing belief was that filth, pollution and abject living conditions of the urban poor were primary causes of diseases (Wilson 2007; Louis 2004). One of the main advocates of this now erroneous anti-contagionism or miasmas theory was Sir Edwin Chadwick, whose work, though in London, influenced many including in the US. The enactment of the British Public Health Act and the establishment of State Boards of Health in the US with broad jurisdiction over public health and sanitation were all influenced by the work of Sir Edwin Chadwick (Louis 2004; Pizzi 2002; Melosi 2000; Duffy 1990). After the construction of systems for water supply and sewage management, priority shifted to solid waste management and the earlier systems simply involved the removal of the solid waste away from human senses either by dumping, burial, application on landfills, farm use (as animal feed) or dumping in water (Melosi 1981, Louis 2004). As more people subscribed to the miasmas theory, public awareness of the implications of unhygienic solid waste management grew and more public money was invested in city-wide refuse management systems such as incineration though landfilling of waste was still the most common method of disposal (Wilson 2007; Louis 2004; Melosi 1981). However, prior to the 2000s, even in developed country contexts, MSW management models focused primarily on economics and environmental issues (Morrissey and Browne 2004).

Historically, the urban poor were more concerned with feeding themselves, and the rich objected to paying to clean up for the poor (Wilson 2007). While this statement perhaps

provides an indication as to why social factors were not quite at the forefront of driving early developments in MSW management, one factor that quickly gained prominence and has remained relevant is environmental protection. Following the 2nd world war, rapid growth in consumption from the 1960s resulted in increasing waste streams with high plastic content (Wolsink 2010). Recall that landfilling was still the predominant method of disposal of waste (Wilson 2007). The environmental movements of the 1960s – 1970s ensured that waste disposal became a fixture on the political agenda in developed countries and forced a shift in policy making in MSW management (Marshall and Farahbakhsh 2013; Wolsink 2010; Wilson 2007). Beginning with addressing water pollution and eliminating uncontrolled disposal of waste, the focus of the new legislations driven by the environmental movements moved to raising environmental standards to reduce the contamination of land, air and water (Marshall and Farahbakhsh 2013; UN-HABITAT 2010a; Wilson 2007). Focus on increasing environmental standards continued through the 1980s, and is still ongoing, tackling issues such as landfill gas and leachate control, incinerator gas and dioxin control, and odour control for composting and anaerobic digestion facilities (Marshall and Farahbakhsh 2013). The integrated policy and integrative regulatory approaches encompassing technical, environmental, social, political, economic, financial and institutional elements gained increasing attention from the 1990s when it became evident that in order to realise the environmental protection aims of MSW management, focus on environmental standards alone were not enough (Marshall and Farahbakhsh 2013; Wilson 2007; McDougall et al 2001; van de Klundert and Anschutz 1999).

2.3.3 Contextual Review – current perspectives in developed countries

(a) Public Health

In most of Europe, public health is no longer the main driver and is taken for granted though it's been used in the UK to argue against the introduction of fortnightly collections (Wilson 2007). This is because waste collection which is linked to public health is now somewhat inherent in MSW management systems in Europe. However, while the quantity of waste landfilled in many EU countries continues to decrease as a result of changes in MSW treatment strategies (Berg et al 2018, Brennan et al 2016), figures for 2012 showed that 34% of the total waste generated in the 28 EU countries were sent to landfills (Brennan et al 2016). The effects of landfill sites on the public health of those

who live in close proximity to such sites (Berg et al 2018; WHO 2015; Marchand et al 2012; Giusti 2009) have been highlighted previously in section 2.2.2. Therefore, while countries of small land areas and high population densities such as Japan may find landfilling an unsustainable method of MSW management, other countries with low population densities, sparsely inhabited land and large areas of unused desert may find landfilling a very viable MSW management option (Chalhoub 2018; Huang et al 2017; Zhao et al 2016; Benson 2007).

(b) Environmental Protection

Environmental protection was the main driver behind the phasing out of uncontrolled disposal of waste. The compaction and daily covering of landfills and the retrofitting of waste incinerators with electrostatic precipitators for dust control during the control phase of the 1970s were driven by environmental control (Brennan et al 2016; Wilson 2007). This was then followed by emphasis on gradually increasing technical standards beginning with leachate and gas control from landfills, reduction in dioxin and other trace gas levels from incineration plants and then to things like odour control for anaerobic digestion and in-vessel composting plants.

(c) Resource drivers

Unlike in the 1800s, when resources were scarce and the value of recovered materials from waste was a major driver, the emphasis this time is driven by statutory targets, the notion that it is the 'right thing' to do rather than the value of the recovered material covering the costs of doing so (Wilson 2007). This concept has been mainly driven by the EU Waste Hierarchy (discussed further in section 2.3.5.5), which was first introduced in the EU's 2nd Environment Action Programme (EAP) in 1977 (CEC 1977). It recommends a move away from disposal to the more sustainable options of reduction, reuse, recycling and energy recovery (Berg et al 2018; Brennan et al 2016).

The current concept of resource management is driven by 'closing the loop' – a pattern of sustainable consumption and production; a focus on decoupling waste growth from economic growth; an integrated product policy, and a shift upstream to product design (Chalhoub 2018; Wilson 2007).

(d) Institutional and Responsibility issues

In most countries, the responsibility of managing MSW rest with the public sector (Batagarawa 2011). For example, it is managed by the ministry of environment in

Singapore (Bai and Sutanto 2002); by the municipal authority in Mumbai, India (Rathi 2006); and by the local authorities in Kenya (Henry et al. 2006). In England and Wales, it is the responsibility of the city and county councils in conjunction with the Department for environment, food and rural affairs (DEFRA) while the Environmental Protection Agency (EPA) is responsible in the USA (Leeds 2010).

However, even though the private sector has become much more involved in the provision of waste management services, it has not affected the responsibility of municipalities in this regard. However, due to a change in emphasis from waste collection to a more sophisticated and sound environmental management service delivery, there has been a growth in inter-municipal co-operation in order to achieve economies of scale (Wilson 2007).

As can be seen in Figure 2.1 (pp.15), the 1990s saw the shift to the integrated policy approach which required looking at the political, social, institutional, economic and financial aspects together with the technical and environmental rather than the one dimensional regulatory approach of the technical fix which focused on increasing environmental standards (Wilson 2007).

(e) Public awareness

Public awareness and education can be regarded as a driver in its own right, and an important one too. Considering that negative public perceptions of poor practices in the past such as burning and polluting incinerators have inevitably led to a Not-In-My-Back-Yard (NIMBY) reaction to proposals for new waste management facilities irrespective of how clean or sustainable they may be, it is good to know that environmental issues such as climate change, resource and waste management are now being accorded a place on the political agenda of many countries (Wilson 2007). This is particularly important and has become an active area of applied research and rightly so because the move towards a better resource management including repair and reuse, more recycling, home composting, etc. all require behavioural change (Sharp 2006). Some regard public awareness as the most desirable driving factor in that it implies an increased concern on peoples' standards of living and consumption (Diaz and Otoma 2013).

(f) Climate Change

Climate change is topical and a more recent environmental driver emphasising a move away from the landfilling of biodegradable waste which is a major source of methane emissions and a renewed focus on the recovery of energy from waste (Marshall and Farahbakhsh 2013; UN-HABITAT 2010a). Rising global concern over climate change led to worldwide pressure and advocacy which in-turn led to a shift in MSW management policy focus to waste prevention and target achievement measures such as extended producer responsibility, diversion from landfill, compost and recycling goals, ban on the landfilling of recyclables, etc. (UN-HABITAT 2010a; Wilson 2007).

(g) Plastics Pollution

Since it was first observed and documented in the early 1970s, plastics pollution on the surface of the ocean has increasingly become an issue of great concern (Hajbane and Pattiaratchi 2017; Andrady 2011; Carpenter and Smith 1972). Previous studies cite land-based sources, particularly urban areas as the major source of all marine plastics pollution (Vegter et al 2014; Jambeck et al 2015). The main threats posed to marine life by these pelagic plastics include entanglement, ingestion and the introduction of invasive rafting communities living on the surface of the plastics (Hajbane and Pattiaratchi 2017; Andrady 2011; Gregory 2009). Also, hydrophobic fragments of plastics leach contaminants and attract additional lipid soluble pollutants e.g. persistent organic pollutants (POPs), aqueous metals and endocrine disrupting chemicals (Rochman, 2015; Rochman et al 2014; Cole et al 2011; Derraik, 2002) which can bio-magnify upwards through the marine food chain when ingested by biota, and thus pose great danger to human health through our collective dependence on marine foods (Hajbane and Pattiaratchi 2017; Seltenrich 2015; Erren et al 2015).

2.3.4 Current Perspectives in developing countries

The ISWM framework identifies three key drivers for MSW management. Similar to the three pillars of sustainability – social, environmental and economic; these three key drivers are necessary for any MSW management system to be sustainable. The three key drivers are:

- i. Public health – achieved through a good and effective waste collection service (social)

- ii. Environmental protection – especially during waste treatment and disposal (environment)
- iii. Resource management – ‘closing the loop’ by returning both materials and nutrients to beneficial use (economic)

2.3.4.1 Public Health

Efficient collection and safe disposal of waste are essential to public health (Cointreau-Levine and Program 1994). Alongside the management of human excreta, they constitute the most vital urban environmental services (Wilson et al 2013b). Of concern to these vital services is public health. For instance, cholera epidemics in the nineteenth century led to the development of fairly comprehensive municipal solid waste management services in major cities in Europe and United States of America (USA) (Wilson 2007; Tarr 1984). However, uncollected municipal solid waste is still a huge public health concern in developing countries. In 1994, uncollected waste reportedly caused a major flood in Surat, India resulting in an outbreak of a plague-like disease that killed 56 people and affected over 1000 others. The outbreak was partly attributed to rats breeding on uncollected refuse that was blocking the drainages and waterways (Gupta 2010). The health data from a UN-HABITAT report also showed that children who live in households where solid waste is dumped or burned within the vicinity, reported a significantly higher rate of diarrhoea and acute respiratory infections compared to children who live in the same city but in areas where regular waste collection services are provided (Wilson 2007).

Waste collection is therefore a public good (service) - required by law, due to its importance, that it be provided for the benefit of the entire society irrespective of whether or not there is interest in the market to supply it or if the users’ are willing or able to pay for it (Wilson et al 2013b). The key indicator is thus the collection coverage or the percentage of the population with access to waste collection services. In tropical climates, effective collection generally means providing daily collection services and this may consume 10 – 20% of an already hard-pressed city’s budget (Wilson et al 2001). While figures from the UN-HABITAT report showed a marked improvement in collection coverage in the 20 reference cities compared to older studies, it is noteworthy to mention that these reports do not highlight the huge gaps that still exist between those that have

access to collection services and those that have no access at all (Wilson et al 2013b; Scheinberg et al 2010).

2.3.4.2 Environmental Protection

Before the emergence of the environmental movement in the 1960s, the philosophy of waste disposal was 'out of sight, out of mind'. Most waste was disposed of with very little or no control at all: to land, as open dumping; to air, by burning; or to water, by discharging solid and liquid wastes to surface, groundwater or ocean (UN HABITAT 2014; UN-HABITAT 2010a). Over the last 30 – 40 years though, countries and cities seeking to take control of growing waste quantities in order to maintain a clean environment have gradually built up experience on what works for them.

Though environmental protection is still relatively low on the public and political agenda of many developing countries, things are beginning to change for the better (UNEP 2015; Wilson 2007). The move towards a more modern and sustainable waste disposal system usually involves a step by step process which begins with phasing out uncontrolled disposal, then introducing and gradually increasing the environmental standards for a disposal facility (Chalhoub 2018; UN-HABITAT 2010a; Rushbrook and Pugh 1999). It must be emphasised that all technologies and equipment used are appropriate and adapted to the local conditions. There are success stories such as those of the small city of Ghorahi in Nepal highlighted above, and others such as Moshi (Tanzania) and Bamako (Mali).

Legislation is important though studies have shown that this is often in place but enforcement continues to be weak (Tvedten and Candiracci 2018; UN-HABITAT 2014). In the absence of strong legislation, competition between cities to provide a 'clean city' with good municipal environmental infrastructure, often in order to attract (foreign) investment can be a key driver in this area. This has been the case in India where the jostling for foreign information technology investment is very strong between cities. Very related, and a key driver reported for cities in countries such as China, Egypt and Russia is the prestige of hosting an international sporting event (Guo et al 2005), and the promotion of tourism, which has been particularly important in the Caribbean (Wilson 2007).

Many 'new' technologies are continually rolled out to treat solid waste and sales people target both developed and developing country cities. Which is fine but it is important that decision makers have the requisite information to make informed choices for their cities. Unfortunately, experience has shown that there are no magic solutions, if the proposal sounds too good to be true, it is probably not true. Technologies developed for dry wastes with high calorific values in one region may not work when confronted with mainly organic and wet wastes with low calorific values in another region (UN-HABITAT 2010a).

2.3.4.3 Resource Management

Prior to the industrial revolution, money was scarce and families had more needs than they could meet. Consequently, products were repaired and reused, materials were recycled and organic matter was returned to the soil. Wastage was minimized. Extensive informal recycling systems flourished till about the late 19th century when formal municipal waste collection systems began to displace them. Recycling and materials recovery became huge industrial activities (UN-HABITAT 2010a). This was particularly so in the former centralised economies of China, Soviet Union and Eastern Europe where the readily available recycled materials were a mainstay for the industry (Wilson 2007; Furedy 1993). These systems, as impressive as they were, were very reliant on state subsidies but they helped reduce waste disposal quantities and costs, until they became casualties of the free market system that emerged (Wilson 2007).

In the past 10 – 20 years, high income countries have been rediscovering the essential value of recycling as an integral part of their waste management systems. But the motivation is different - no longer primarily for the value of the recovered material but as a competitive sink, an alternative to an increasingly expensive landfill (Wilson 2007). Today, many developing and transitional country cities still have a thriving informal and micro-enterprise recycling sector recording comparable rates to those in the west (an average 29 per cent in the 20 reference cities in the UN-HABITAT report). The ability to make a living by recovering saleable materials from waste is the key driver for the urban poor (informal sector) in many parts of the world (Tvedten and Candiracci 2018; Wilson et al 2006). This sector inadvertently links solid waste management to the Millennium Development Goals (MDGs) of reducing world poverty (UN-HABITAT 2014).

The priorities of good resource management are expressed by the '3Rs' – reduce, reuse, recycle (Wilson 2007).

Reduce – the quantities of waste being generated. This is the new focus in high income cities but it is important for rapidly growing cities in both middle and low income cities to control their waste growth.

Reuse – products that can be reused, refurbished, repaired, or fabricated to have longer useful lives

Recycle – where they strengthen local, regional or global production, recycle materials that can be extracted or recovered and return them to industrial value chains while nutrients are returned to the soil through composting or digestion of organic waste.

So it is safe to say that while resource management has become the main focus of MSW management in most developed countries, their counterparts in the developing world are still battling to contain the challenges of public health arising from poor MSW management. In other words, it can be argued that MSW management systems in developed countries are able to successfully operate on policies that are economic oriented because historically, they have embedded into their MSW management systems, the structures, institutions and processes necessary to ensure the attainment of basic social (public health) and environmental standards.

2.3.5 Other drivers

As stated earlier, the classification of the drivers of the development of MSW management is not straightforward. Other authors have also referred to the following as drivers.

2.3.5.1 Technological Developments

Though this has been mentioned briefly under different drivers, technological developments have been mentioned by some authors as a relevant driver of MSW management. Contreras et al 2010 notes that technological developments were an important driver in shaping the earlier stages of MSW management during industrialisation. Mechanical sweepers, compactor garbage vehicles, scales to record the amount of waste collected and disposed and engineering drainage to remove water from waste disposal sites were a few technological developments that helped drive most US cities to organised MSW management in the 1930s (Contreras et al 2010, Montville 2001, Melosi 2000).

2.3.5.2 Regional and International drivers

International trading of recycled materials has developed and is fast becoming a major driver for MSW management. The inflow of recyclable waste into China and other Asian economies from developed economies are huge and thus have huge implications for the local recycling and incineration plants (Contreras et al 2010). According to statistics from the Chinese custom department, 4.1 million tonnes of plastic waste, 12.3 million tonnes of used paper, and 10.2 million tonnes of aluminium scrap were imported in 2004. These figures accounted for more than 90% of imports with Asia (34.8%), Europe (15.2%), North America (34.2%), and neighbouring countries (8.3%) (Terazono et al 2004). A Japanese Institute of Developing Economies (IDE 2005) report shows that between 1990 and 2003, the amount of paper waste imported by China and Thailand increased from 423 and 214 thousand tonnes to 9382 and 1098 thousand tonnes respectively. Other similar trades include waste imports from Germany and Norway by Danish cements industries for combustion of cement kilns (Rasmussen and Reimann 2004).

2.3.5.3 Socio-economic Drivers

Urbanisation, population growth (especially urban population growth), changing consumption patterns and economic developments are a few of the socio-economic factors that have been cited as having major implications on MSW management (Contreras et al 2010; Ezeah 2010; Visvanathan and Trankler 2004; Mendes 2003; Daskalopolous 1998b). Other socio-economic factors include family size, education level, household income levels, attitude to waste separation, availability of active support and fee for collection service that is based on waste volume (as against a flat rate for all service users), gender, peer influence and household location, to mention but a few (Scheinberg 2011; Ekere et al 2009; Sujauddin et al 2008; Zhuang et al 2008).

The analysis of socio-economic related issues is thus of paramount importance in the development of MSW management policies (Contreras et al 2010).

2.3.5.4 Good Governance

MSW management is a public good (service) and by law should be provided by the government whether or not the users can pay for it because the public health and arguably financial health of the people depend on it (Wilson et al 2013b). If a city is dirty, it could be that the local administration is ineffective or the residents could be accused of littering. However, a clean city is attractive to tourists and investors and therefore the

quality of waste management services is a good proxy indicator of the quality of governance (UN-HABITAT 2010a; Whiteman et al 2001).

2.3.5.5 The Waste Hierarchy

The initial idea of the waste hierarchy was borne out of the Dutch's government shortage of landfill sites (Wolsink 2010). It was first introduced in the European Union's Second Environmental Action Programme in 1977 as a model of waste management priorities based on the "Ladder of Lansink" – a hierarchy of waste handling techniques going from prevention to reuse, reduction, recycling, energy recovery, treatment (e.g. incineration), and landfill (Marshall and Farahbakhsh 2013; Price and Joseph 2000). See Figure 2.2 below.

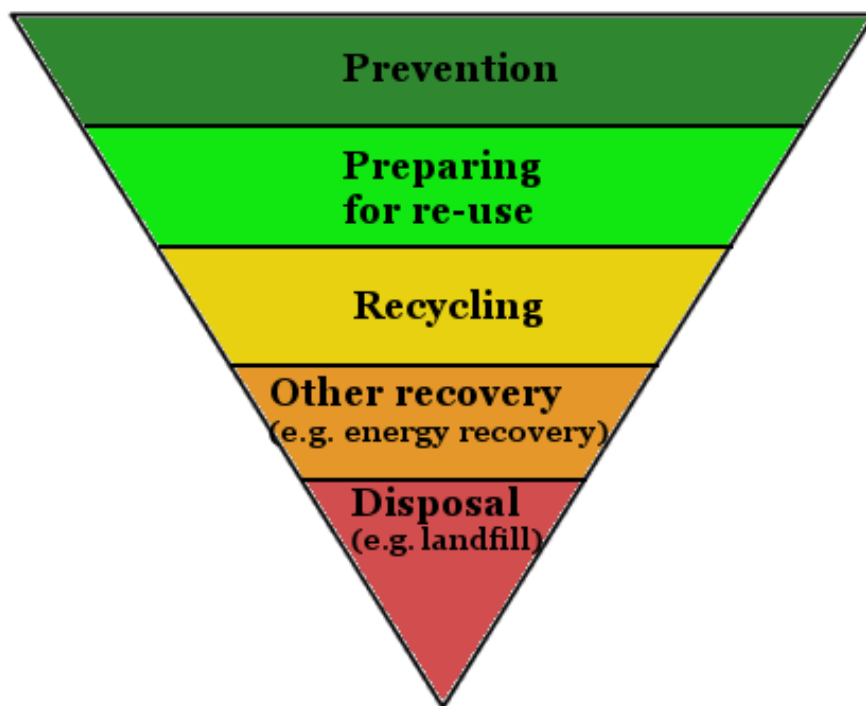


Figure 2. 2: The EU Waste Hierarchy (based on EEA 2013)

Therefore, as can be seen from Figure 2.2 above, the EU waste management policy requires that member countries prioritise and promote prevention of waste while minimising landfilling which is still the predominant disposal method (EEA 2013).

Thus, the waste hierarchy can be described as a priority ordering for waste management options, based on assumed environmental impacts or benefits of the materials on a

'cradle' to 'grave' basis (Hultman and Corvellec 2012; van de Klundert and Anschutz 2001).

However, some critiques of the waste hierarchy have argued that it does not make room for the combination of techniques or account for costs or specific constraints (McDougall et al 2001) while others have reported that the application of the waste hierarchy is inappropriate in situations where less than 10 Euros is spent per capita per year on MSW management services (Batagarawa 2011; Brunner and Fellner 2007; Seadon 2006). It is therefore difficult to implement, much more so because waste managers in industries and government have little control over production decisions that should encourage the higher level priorities such as prevention and minimisation (Gertsakis and Lewis 2003). This is particularly so in under developed and developing countries where most of the products found in the waste stream are imported, meaning that the local and national governments in those countries will not have the necessary influence over product design. What is therefore required is an assessment of the context-specific system as a whole (Marshall and Farahbakhsh 2013). By leveraging on the ISWM framework, decision makers in MSW management can design locally adapted systems most suitable for their situations.

2.4 The Integrated Sustainable Waste Management (ISWM)

Sustainable development came to global reckoning through the Brundtland report titled 'Our Common Future' published by the World Commission on Environment and Development (WCED) in 1987 (WCED 1987). The action plan on sustainable development agreed in Rio de Janeiro, Brazil in 1992 at the United Nations Conference on Environment and Development (UNCED) has also been influential in MSW management (Wilson et al 2013b).

The ISWM concept was first developed by WASTE, a Dutch non-governmental organisation (NGO) led by van de Klundert and WASTE's Southern partner organisations in the mid-1980s before being further developed by the Collaborative Working Group (CWG) in solid waste management in low and middle-income countries in the mid-1990s (Wilson et al 2013b; UN-HABITAT 2010a). The first conceptual framework for integrated MSW management in developing countries which was developed at a workshop convened in Ittingen, Switzerland in 1995 is shown in Figure 2.3 below (Wilson et al

2013b). Each side of the cube shows one of the three dimensions of the ISWM – the Who, What and How.

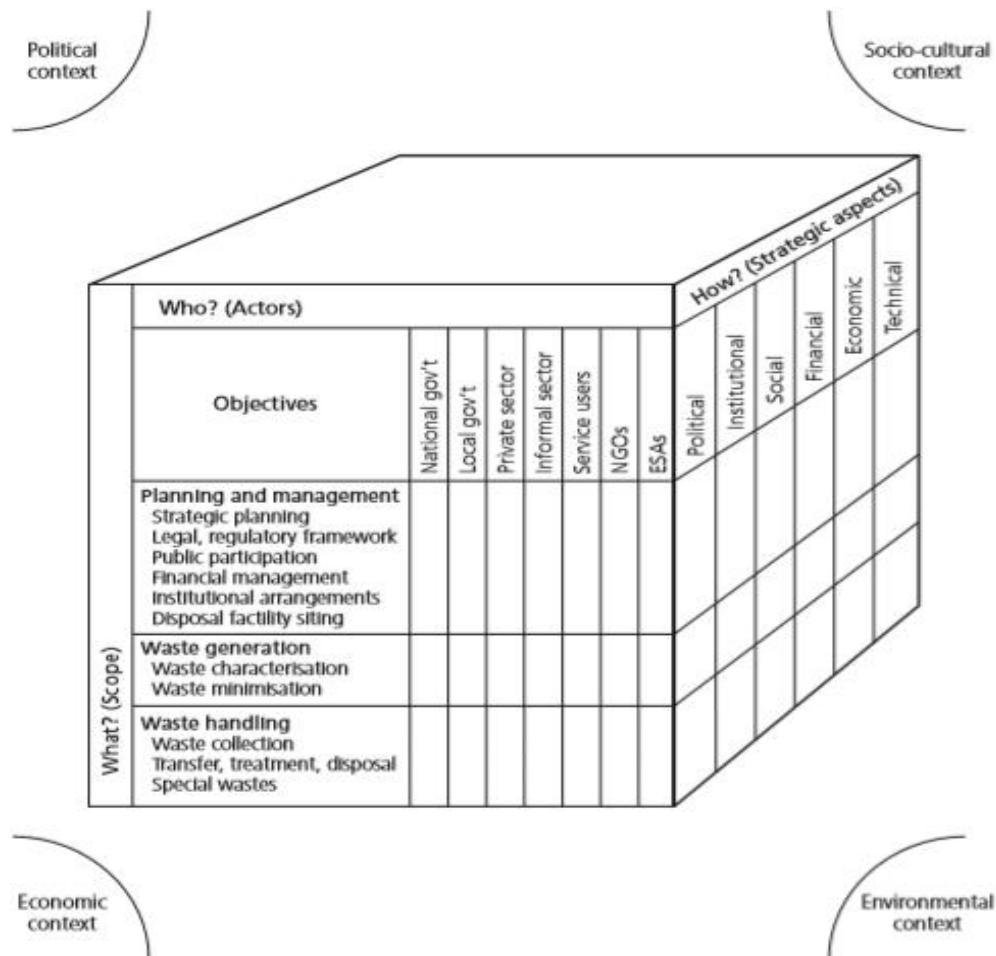


Figure 2. 3: First Conceptual Framework of ISWM (Wilson et al 2013b)

The conceptual framework (Figure 2.3 above) was further developed into the ISWM analytical tool and development framework shown in Figure 2.4 below. Like the conceptual framework, the ISWM analytical tool and development framework maintains the three dimensions - the 'Who' being the stakeholders; the 'What' as the elements; and the 'How' as the aspects (Wilson et al 2013b).

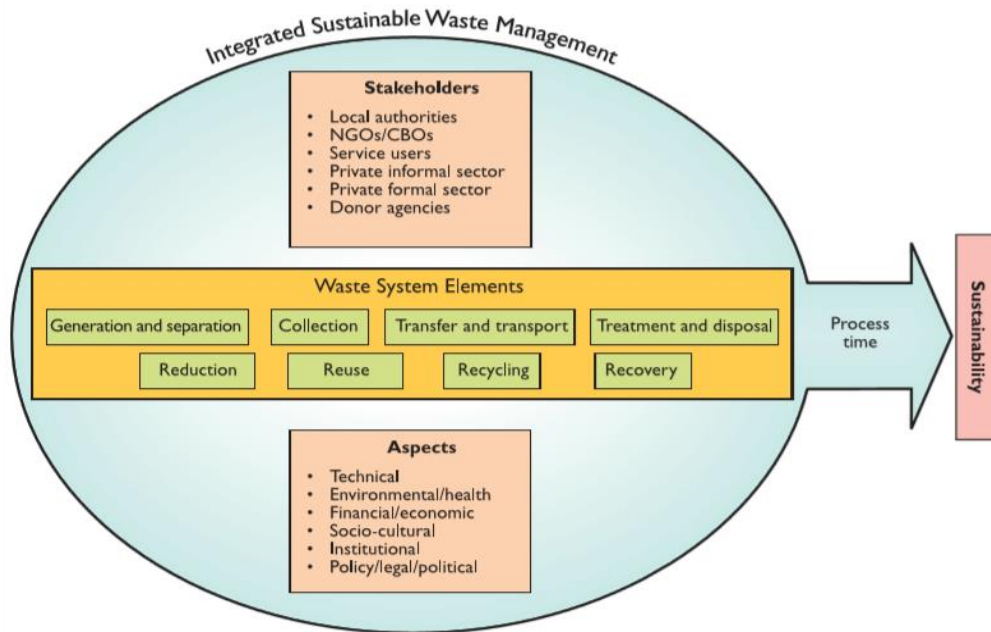


Figure 2. 4: The ISWM analytical tool and development framework (UN-HABITAT 2010)

Through the 2000s, the ISWM concept was further refined and has gradually become the norm in the discussion of solid waste management in the developing world (Wilson et al 2015; Wilson et al 2013b). For the purposes of a systematic comparison of cities, the 35-strong international team that prepared the UN-HABITAT’s Solid Waste Management in the World’s Cities adapted the ISWM three-dimension framework into the simplified two overlapping triangles shown in Figure 2.5 below.

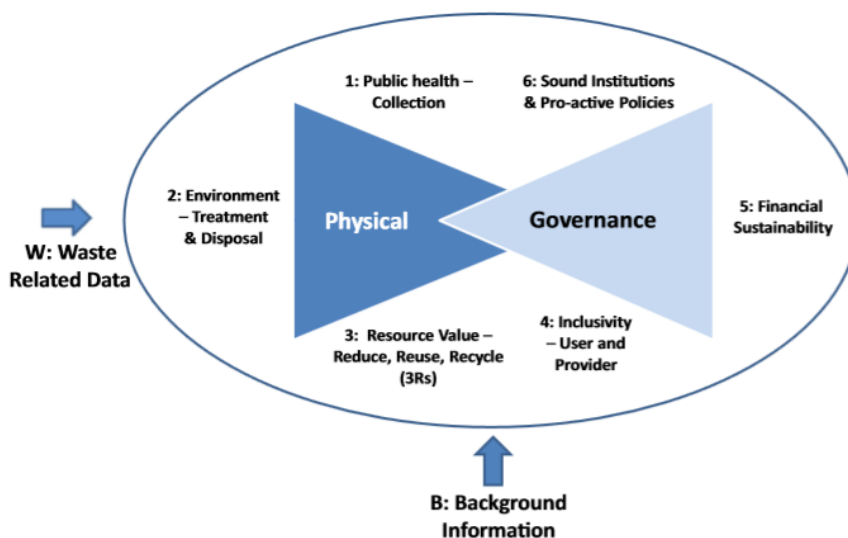


Figure 2. 5: ISWM - Two Overlapping Triangle (Wilson et al 2015)

The ISWM is a systems approach to MSW management that recognises three very important dimensions that must be addressed when developing a new or changing a MSW management system (UN-HABITAT 2010a). In the simplified two-overlapping triangle framework, the three dimensions are also covered. The 'What' which is the elements form the first triangle (physical) while the 'Who' (stakeholders) and the 'How' (aspects) form the second triangle (governance).

The first triangle focuses on the key physical elements which are linked to three key drivers of MSW management that must be addressed for the ISWM system to work well and sustainably over a long term (Wilson et al 2013b). These are: Public health (linked to waste collection); Environmental protection (linked to waste disposal); and Resource management (linked to the 3Rs – Reduce, Reuse and Recycle).

Thus, the ISWM is an integrated and multidisciplinary approach that aims to integrate the various stakeholders, a variety of aspects, collection, treatment and disposal options adapted to specific habitat scales and the MSW management system and other urban systems such as the drainage, energy and urban agriculture (van de Klundert and Anschutz 2001).

2.4.1 Using the ISWM framework

The ISWM framework is very useful both as an assessment tool (used in assessing existing MSW management systems) and as a development tool (for establishing a new MSW management where none exists) (van de Klundert and Anschutz 2001; Wilson et al 2001). In order to make appropriate decisions in either case, it is important to:

- a. Understand the waste – this involves knowing the types of waste, the quantities, where they are generated, who generates them (households, schools, hospitals, businesses, etc.), the composition of the waste, etc. These determine the best treatment options and provide information on how to plan the system to ensure all the waste are collected and handled appropriately (van de Klundert and Anschutz 2001).
- b. Understand the city and relevant neighbourhood: It is equally important to understand the physical infrastructure of the city as well as the neighbourhood including the nature of the roads and traffic conditions, the types of buildings and locations of MSW management facilities (if available) of possible places to site

them (if developing a new system), etc. Again, this will help inform the design and choice of means of transporting the waste, the frequency of collection, etc. (van de Klundert and Anschutz 2001; Wilson et al 2001).

- c. Understand the citizens and clients of the waste management system – This is important in order to know the needs of the users (or would-be users) of the system, their preferences, willingness to cooperate, etc. (van de Klundert and Anschutz 2001). For instance, source separation and recycling will not work where citizens choose not to cooperate.
- d. Understand all the waste management activities in the city – This involves knowing all the formal and informal service providers and their activities. This is very important in understanding the current performance (where there is an existing MSW management system) or assessing the performance of a new system (van de Klundert and Anschutz 2001).

In practice, the ISWM does follow the ‘cradle’ to ‘grave’ environmental impact/benefit consideration of the waste hierarchy. However, as well as taking an integrated approach that considers all aspects of the waste management – physical (discussed above) and governance (discussed below), ISWM allows for pluralism of approach and advocates for the tailoring of these approaches to local conditions.

2.5 Governance Issues in ISWM

Just as the first triangle focuses on the physical elements, the second triangle focuses on the governance strategies (otherwise termed ISWM software), that all need to be addressed in order to deliver a well-functioning system (Muhammad and Salihi 2018; Wilson et al 2013b; Wilson et al 2012). These are: inclusivity (of all stakeholders); financial sustainability; and sound institutions and proactive policies. The 35 professionals that worked on the original Habitat project (UN-HABITAT 2009) observed that where MSW management systems failed, it was often not because of the technical reasons but mainly due to politics, economics and institutions (Wilson et al 2012). This observation perhaps reemphasises the importance of the governance issues.

2.5.1 Inclusivity

Figure 2.4 shows some of the stakeholders in MSW. Often, the stakeholders can be classified into users (including the waste generators and clients such as households, offices, businesses, hotels, restaurants, hospitals, schools, etc.); providers (including the

municipal council department and or formal and informal private sector enterprises such as road sweepers, waste pickers, etc.); and external (including the national government, neighbouring municipalities, producer responsibility organisations, donor agencies, etc. (Wilson et al 2013a; Rodic et al 2010; Scheinberg et al 2010; UN-HABITAT 2010a).

Though the municipal authority is often legally responsible for MSW management in a city, it cannot deliver on that responsibility on its own without the active involvement of the other stakeholders in the prescription and implementation of measures and policies (Rodic et al 2017; Brennan et al 2016; Wilson et al 2013b). According to Rodic et al (2010) and Scheinberg et al (2010), some examples of good user inclusivity include: communication and consultation of users in strategic planning and siting of facilities; communication and involvement of users in the organisation of day-to-day services; and institutionalising inclusivity through a solid waste 'platform' while extending service provision to ensure the participation of private formal and informal service providers is a good example of provider inclusivity (Memon 2010; Ijgosse et al 2004a; Wilson et al 2001). Strengthening citizen participation in non-electoral issues such as MSW management has become an important aspect of democratic development in West Africa (Krawczyk and Sweet-Cushman 2016) as it helps in mitigating the implications of poor governance by improving the management of public resources, reducing corruption by improving the accountability of public officers and political leaders, positively impact democracy by promoting the inclusion of marginalised groups (Michels and De Graaf 2010; Haque 2003; Avritzer 2002). Citizen participation also helps in building civic skills and conceptions of democratic citizenship as well as aid improved policy outcomes and policy feedback (Krawczyk and Sweet-Cushman 2016).

2.5.2 Financial Sustainability

The provision of MSW management services in cities in developing countries is expensive, costing up to \$75 or more per capita per annum and comprising up to 0 – 15% of total municipal budget (Wilson et al 2012; Brunner and Fellner 2007). Table 2.2 below shows the affordability and cost recovery data of lower-middle to high income cities drawn from 20 reference cities of the UN-HABITAT's study.

Table 2. 2: Financial Sustainability – affordability and cost recovery in lower-middle to high income cities (based on Wilson et al 2013b)

Income level	City MSW management budget per capita (US\$)	City Average budget per capita as % of GNI per capita	MSW management fee as % of household income	% population that pays for collection	Reported cost recovery % by way of fees
Lower-middle	10	0.69	0.26	28	27
Upper-middle	33	0.59	1.4	56	36
High	75	0.17	0.44	91	81

Clearly, the table shows that as the income level reduces, both the percentage population of people paying for MSW collection and the percentage of the total cost recovered by way of fees payment by users also reduces. This perhaps explains why financial sustainability is one of the biggest challenges of sustainable MSW management in developing countries (Rodic and Wilson 2017; Wilson et al 2013b). Being a public good (service) that should be provided in any case, it also means more pressure on already stretched public funds. As mentioned earlier, one way of improving democracy and governance, especially in West Africa is by encouraging citizen participation as it aids the inclusion of marginalised groups as well as make public servants and political leaders more accountable (Krawczyk and Sweet-Cushman 2016). When the MSW management processes and policies are clear and transparent, there is a better chance of attracting investment and participation from a wider array of groups including private investors, NGOs, community interest groups, etc. (UNEP 2015; The World Bank 2012).

However, even in slums, it is also reported that people are often willing to pay for appropriate levels of collection services especially if they were consulted on the service levels and the charging systems were transparent (Wilson et al 2013b). Other cost recovery methods reportedly used in cities such as Belo Horizonte (Brazil, Kunming (China) and Lusaka (Zambia) include a combination of sources such as budgets from national (or central) governments, franchise fees and property taxes and the sale of land

and equipment (Wilson et al 2012; Rodic et al 2010). In Ghorahi (Nepal), no waste management fee is to households while in Moshi (Tanzania), a cross-subsidising policy that exempts poor people from paying is in operation (Wilson et al 2013b).

The key to achieving financial sustainability in MSW management thus appear to be the engagement and involvement of the different stakeholders and ensuring the services are adequately adapted to local conditions. Furthermore, because the provision of MSW management services is prone to 'free rider' behaviour, it is practically impossible to exclude non-payers (Rodic et al 2010). Therefore, the role of the management authority must remain strong, if not in providing the service then in regulating the service (Wilson et al 2012).

2.5.3 Sound Institutions and Proactive Policies

To ensure the provision of adequate levels of MSW management in a city, the municipal authorities must address underlying issues such as management structure, labour practices, contract procedures, accounting, equity, cost recovery, corruption, etc. (Abdulredha et al 2018; Muhammad and Salihi 2018; Rodic and Wilson 2017; Wilson et al 2013b). Often, it is necessary to involve the private sector in the service delivery as a way of achieving costs savings, improve service quality and coverage but relevant municipal authorities must still take responsibility and ensure the agreed levels of services are delivered. To achieve this, transparency, competition, accountability and the elimination of corruption are the necessary conditions for a successful private sector involvement (Coad 2005; Cointreau and Coad 2000). While Wilson et al 2013b argues that authorities in-charge of MSW management in developing countries are increasingly becoming customer oriented and accountable through various locally adapted participation and complaint procedures, Scheinberg et al 2010 suggests that dispersing MSW management functions widely through the municipality such that no single department or manager controls all the component functions and budgets could help improve institutional coherence and financial autonomy.

2.6 'Wasteaware' ISWM Benchmark Indicators

The management of MSW is one of the most important responsibilities of a city government (Abdulredha et al 2018; Muhammad and Salihi 2018; Wilson et al 2015). In order to judge a city's MSW management performance, provide information for decision making, monitor changes over time and prioritise service improvements considering the

limited funds available, it is necessary to have appropriate benchmark indicators. Benchmark indicators that are internationally consistent also make it possible to compare MSW management performance of different cities irrespective of their income level. It can also be used in comparing policy approaches in countries that are similar or in developing cooperation efforts, better protection of public health and environment and better urban governance (Wilson et al 2015).

Whereas interest in performance indicators have been long-standing, until recently, attempts at developing internationally consistent indicators suitable for comparing MSW performance in cities in all parts of the world were not that successful (Wilson et al 2015). Most of the attention has been on developing indicators for certain aspects of the MSW management system in high income countries e.g. indicators for: waste prevention (Wilts 2012), zero waste management systems (Zaman and Lehmann 2013), extended producer responsibility systems (Wen et al 2009), tracking compliance with European Union requirements (Nicoli 2012; Cifrian et al 2010; Fragkou et al 2010), ranking of the performance of US cities (Greene and Tonjes 2014) and waste collection (Huang et al 2011; Karagiannidis et al 2004). While others have focused on developing countries e.g. indicators for: 3R (reduce, reuse, recycle) policies to transition from waste management to resource management (Hotta 2014), recycling systems (Suttibak and Nitivattananon 2008), selective collection for recycling (Bringhentia et al 2011), and comparing technologies for waste treatment, recycling and disposal (Menikpura et al 2013). Other benchmark indicators and theoretical frameworks that have been previously proposed include: indicator set for use in Ireland (Desmond 2006), application of the dashboard of sustainability (Beccali et al 2007), indicator set using the Driving Force-Pressure-State-Impact-Response (DPSIR) model (Armijo et al 2011), Balanced Scorecard (BSC) approach (Guimeraes et al 2010) and the 'Garbometer' (Munizaga and Garcia 2013).

According to Scheinberg et al 2010, a recent notable attempt at developing benchmark indicators and applying them to compare cities both North and South involved a large international team collecting new data in 20 'representative' reference cities in low, middle, and high income countries in all six inhabited continents of the world. This culminated in the UN-HABITAT's report on the state of solid waste management in World's Cities and a set of ISWM benchmark indicators defined for waste systems covering both the physical and governance aspects (Wilson et al 2015). Wilson et al 2012

further undertook a detailed comparison of the results from the 20 reference cities. The 'wasteaware' ISWM benchmark indicators discussed below are developed from the original UN-HABITAT's ISWM benchmark indicator and has been extensively tested in more and more cities. It remains the broadest in terms of coverage of both physical and governance aspects of the MSW system, and the only indicators that have not only the ambition to be, but also the experience of having been applied across the full range of income levels (Wilson et al 2015).

2.6.1 Benchmark Indicators - Physical Component

The 'Wasteaware' ISWM indicators contains four (4) quantitative indicators for the three physical components (public health, environmental protection and resource management). This is shown in Appendix 1 while Appendices 2, 3 and 4 show three multi-attribute composite indicators of the quality of service for the three physical components – quality of waste collection, degree of environmental protection and quality of resource management (the 3Rs) respectively (Abdulredha et al 2018; Muhammad and Salihi 2018; Rodic and Wilson 2017; Wilson et al 2015).

These benchmark indicators provide detailed criteria for assessing the physical components of MSW management systems irrespective of the cities income level or location in a consistent manner. However, the criteria for the quality of service provision are still open to subjective interpretation of the assessor though following the guideline in the user manual will help ensure the reduction of subjective bias. This is also applicable to the benchmark indicators for the governance aspects discussed below.

2.6.2 Benchmark Indicators – Governance Component

For any attempts to modernise the MSW management system to be effective, great attention must be paid to the governance aspect (Rodic and Wilson 2017; Scheinberg et al 2010). Therefore, indicators for the governance aspects are qualitative, multi-criteria, multi-attribute and composite indicators (Abdulredha et al 2018; Muhammad and Salihi 2018; Wilson et al 2015).

Appendices 5 and 6 show the indicators for inclusivity for service users and providers respectively. This addresses the issues of involvement, interest and influence of the key stakeholders of the MSW management services. Appendices 7, 8 and 9 show the indicators used in assessing the financial sustainability; and national framework for MSW

management and local institutional coherence respectively. The national framework and local institutional coherence together provide the indicators for assessing sound institutions and proactive policies. The tables (appendices 1 – 9) are adapted from Wilson et al 2015.

2.7 MSW Management in the EEA

The implementation of Waste Policies is one of the key priorities of the European Commission as evidenced by its proposal for a Roadmap to a resource efficient Europe and a 7th Environmental Action Programme, in 2011 and 2012 respectively (EEA 2013). Binding targets for recycling municipal waste and diverting biodegradable municipal waste from landfill were set in EU's Landfill Directive (1999) and Waste Directive Framework (2008). Besides concerns about landfill capacity in some countries, the rationale was also based on identified environmental impacts of landfilling, including emission of methane and other greenhouse gases (GHGs), and pollution of groundwater, surface water and soil (EEA 2009). Though recent analysis by the EEA showed that marked differences in MSW management performance still exist between countries in the European Economic Area and between regions within the same country (EEA 2013), EU policies such as the Landfill Directive have been credited with successes in most EU countries {except in German and the Flemish region of Belgium where the process of diverting waste from landfills had started before the adoption of the Landfill Directive}, for:

- (a) Promoting the diversion of waste, especially biodegradable waste, from landfills through a combination of long and short term targets for member countries; and
- (b) Providing the flexibility required by member states to try alternative policies and measures to match national and regional realities, and adapt policies in light of their experiences (EEA 2013).

Consequently, as well as focused on waste diversion as against waste disposal, the EU Landfill Directive also makes provisions for tailoring waste management options to suit local situations.

2.7.1 National strategies in EEA countries and waste policy objectives

Landfilling has massive disamenity and economic costs as well as high environmental and sanitary impacts (DEFRA 2005; Pearce 2004). Therefore, strategies in most member

states are aimed at achieving the objectives set in EU policies as depicted in the EU waste hierarchy in Figure 2.2. Separate collection of biodegradable waste and some measures to increase the costs of landfilling are common amongst most EU countries but while Estonia, Hungary and Finland are shifting focus to increasing their capacities in incineration, MBT and recycling in order to reduce the amounts to landfill, countries such as Germany and the Fleming region of Belgium have already reduced landfill to about 1% and have banned the incineration of certain waste streams such as unsorted household waste and waste containing >3% organic content. In Italy, the northern region favour incineration while the southern region favours MBT. In the Fleming region of Belgium efforts are geared towards promoting home composting and Germany is moving towards dedicated incineration with energy recovery (EEA 2013). Generally speaking, EEA countries can be grouped into 3 categories according to strategies used to divert waste from landfill, relative shares of landfill, material recovery (recycling and composting), and incineration (Mazzanti and Zoboli 2008; EEA 2007). These are countries with:

- i. high levels of both materials recovery and incineration and relatively low landfill levels
- ii. high materials recovery and medium incineration and medium dependence on landfill
- iii. low levels of both materials recovery and incineration and relatively high landfill levels

Though there is evidence of significant shift from landfilling towards the top of the waste hierarchy, landfilling is still the predominant option in Europe (Berg et al 2018; Pomberger et al 2017). Countries such as Germany, Netherlands, Denmark, Sweden and Belgium have already achieved very low levels of landfilling along with high levels of incineration and material recovery, but others such as Greece, Bulgaria, Croatia, Latvia and Romania are still very reliant on landfills (EEA 2013; Mazzani and Zoboli 2008). Figure 2.6 below shows MSW landfilling rates in 32 EU countries in 2001 and 2010. Studies by the EEA (2013) also showed that MSW management performance is better in countries where some economic incentives (e.g. 'pay -as-you-throw' schemes where charges are based on the weight of residual waste, the size of residual waste bin or frequency of collection) are offered to households to encourage recycling. This is not to

suggest that the success of the implementation of one policy or a combination of policies in one country guaranties the success or otherwise of the same policy or combination of policies in another country.

Whereas policy variables such as EU directives and national or regional waste strategies are credited with successes in improving recycling and materials recovery rates, urbanisation and increasing population densities are important socio-economic factors enabling the diversion of waste from landfills (EEA 2009). However, Mazzanti and Zoboli (2008) are of the opinion that current EU policies and national strategies have no effect on waste generation and as such, waste generation has continued to increase with economic growth, a position reaffirmed in studies by the EEA (2013).

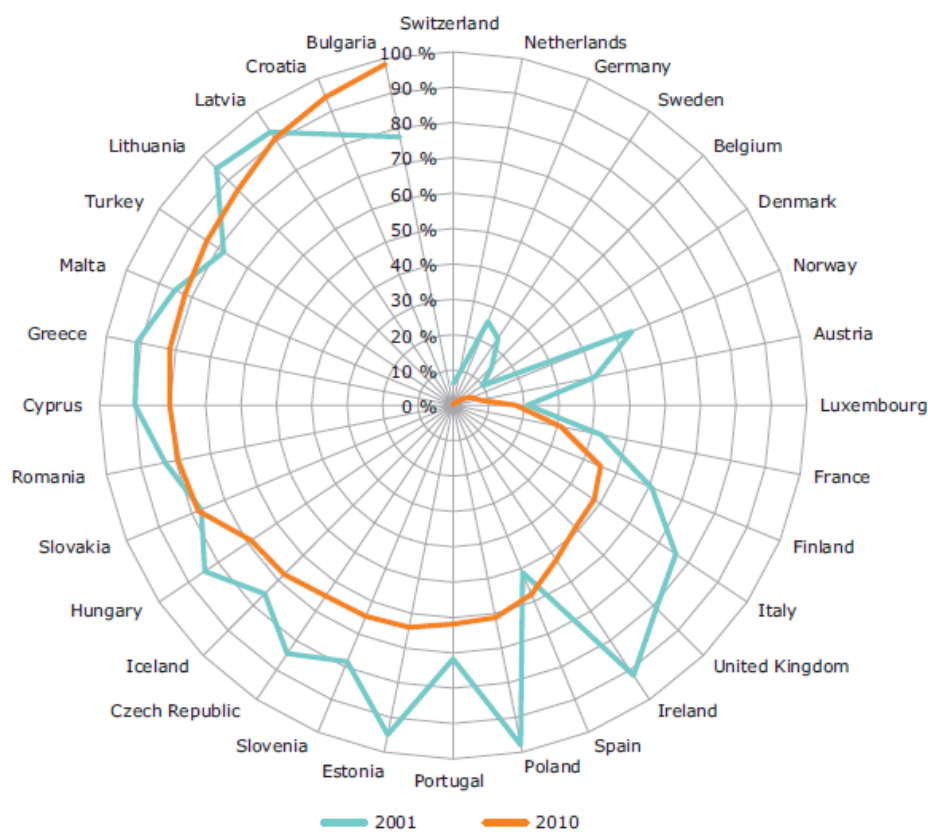


Figure 2. 6: MSW landfilling rates in 32 EU countries in 2001 and 2010 (Credit: EEA 2013).

2.7.2 Institutional Contexts and Policy Instruments

In most EU countries, the Ministry of Environment develops and implements a National Waste Plan but the responsibility for waste collection, transport, treatment and disposal

mostly lie with the municipalities, local authorities or regions as the case may be (Berg et al 2018). In Finland, households and enterprises can have direct contractual agreements with waste service providers to collect, treat and dispose their waste though the local authorities still set the conditions under which the waste service operators carry out these duties, including the maximum amount they can charge. Cooperation between municipalities and local authorities are common as they often pull resources and share waste management expertise (EEA 2009).

The political structure in Germany is more similar to that in Nigeria – Federal, State and Local, but there is no National Waste Plan instead each State develops a waste management plan for its area while the national Ministry of Environment sets priorities, enacts laws, oversees strategic planning, information and public relations and defines requirements for waste facilities. Local authorities and municipalities still oversee waste collection, transport, treatment and disposal as well as develop measures to promote waste prevention and recovery and construct and operate waste disposal facilities (EEA 2009).

EU countries employ a range of policy instruments to achieve their waste management objectives. Most common ones include separate collection of certain classes of waste - food, bio-waste, paper, glass, plastics; introduction of MSW disposal charge also known as Landfill Tax (paid by Landfill operators), waste management levy on households and enterprises (in UK this is included in council taxes and business rates), ban on landfilling of certain waste types, etc. (Berg et al 2018; EEA 2009).

2.8 Overview of MSW management in developing countries and Africa

A study of the state of solid waste management in four African countries by the African Development Bank (2002) revealed that: no country in Africa has detailed solid waste management legislation yet; solid waste management in most countries of Africa is characterised by inefficient collection methods, insufficient coverage of the collection area and improper disposal methods; city-specific data for waste characterisation in these countries are generally unavailable; and a general lack of regulatory initiatives in management and minimisation of waste. Over a decade on, the situation has not changed much except in cities such as Lusaka and Nairobi where local MSW management systems, mainly driven by public health concerns, are being pursued (UN-HABITAT 2010b). Lately, governments in Africa and other developing nations are beginning to realise the negative

effects of poor waste management, and are starting to put in place policies, institutions and programmes aimed at abating the situation (Ezeah 2010; FME 2005). However, most municipal, local or regional authorities who have the primary responsibility of ensuring adequate MSW management seldom have the full complement of qualified - planners, managers, technical and field staff to work with (Ezeah 2010; Agunwamba 1998). Consequently, there is poor representation for waste management at the decision making level resulting in poor funding and diminished operational capabilities (Henry et al 2006). This causes dumping of waste at any convenient space and over time, these accumulate to open dumps while some block drainages. Open burning give rise to several respiratory infections while several water borne diseases are the results of flooding (Wilson et al 2013b; Ezeah 2010; UN-HABITAT 2010b).

2.8.1 MSW Management in Ghana

Like in most other countries around the world, city authorities in Ghana have been responsible for providing MSW management services to their residents (Owusu-Sekyere et al 2015). For example, upon the establishment of the Accra City Council (ACC) in 1898 in accordance with the provisions of the Town Council Ordinance of 1894, it was charged with the responsibility of providing refuse and sanitation management services (Acquah 1958). Through the services of a few community sanitary inspectors, the council provided systematic waste collection and disposal services and by 1925, public dustbins that were emptied by two pushcarts had been introduced. In 1929, incinerators were introduced though they broke down in 1970 due to increased quantities of waste generation (Oteng-Ababio 2013). The breakdown of the incinerators culminated in uncontrolled dumping at Aborfufu, Achimota and Abeta (Owusu-Sekyere et al 2015).

With increasing financial burden on the councils and guided by the following: the Local Government Act (1994), Act 462, the Environmental Sanitation Policy (ESP) of 1999, the Environmental Protection Agency Act 490, Environmental Assessment Regulation LI 1652 and Environmental Assessment Procedure; which until then were the main policies and legal frameworks guiding solid waste management in Ghana, the policy thrust was shifted towards a private sector-led participation in the 1990s (Owusu-Sekyere et al 2015). In collaboration with The World Bank, the Ghana government established Urban Environmental and Sanitation Programme (UESP) across five major cities in the country in 1999 (The World Bank 1999). In the hope of achieving service efficiencies that were

lacking in public service-led delivery, solid waste collection services were contracted out or franchises sold to private operators (Post et al 2003; Cointreau and Coad 2000). This New Public Management (NPM) market friendly mechanism which decentralised local service delivery mirrors European models and are still in predominant (KMA 2010; Issahaku 2000).

This attempt by city-managers in sub Saharan Africa (SSA) to solve MSW management problems by forming alliance with cities in the developed Global North which in essence translates to copying of European policies is regarded in Ghana as 'sister-city' initiatives (Oteng-Ababio 2012). While it may be laudable to learn from historical drivers of waste management in the developed world, the so called 'technical assistance' from these temperate regions has ensured that SSA countries have become dumping grounds for technologies nearing their end-of-life (Ali 2010; Wilson et al 2006). Consequently, even though the revised MSW management policies reflect the priorities of the Millennium Development Goals (MDGs), the New Partnership for African Development (NEPAD) and Ghana's Poverty Reduction Strategy, MSW management in Accra and Kumasi (the two largest cities in the country), are still characterised by mountains of uncollected waste, gutters choked with waste and beaches strewn with plastic waste (ISSER 2012; UN-HABITAT 2010a).

2.8.2 MSW Management in Kenya

According to a study by African Development Bank (AfDB) in 2002, the ministries of Environment and Natural Resources (MENR), and Local Government in Kenya have the responsibilities of formulating environmental policy and regulations, enforcement and evaluation as well as issuing of operational licenses and permits to would-be waste operators (Ezeah 2010; AfDB 2002). While detailed historical information is unavailable for MSW management in Kenya, Gicheha 1990 reports that MSW collection rates of about 90% were the norm up to the mid-1970s. However, the expansion of industries, rural to urban migration, improved standard of living and advancement in technology culminated in increased waste generation. That, and the breakdown of waste collection vehicles due to lack of maintenance ensured the waste collection rates in Nairobi dwindled to about 20% in the 1980s (Njorege et al 2014; Gicheha 1990). All of the collected waste was deposited at Dandora open dumpsite, located some 7.5km from the city centre (Esho 1997). UN-HABITAT 2010a reports that about 1000 waste pickers live on the Dandora

dumpsite. Though there is no integration between these waste pickers and City Council of Nairobi (CCN) employees, a recovery rate of about 20% was also reported.

Going by MSW management in Nairobi which is reportedly representative of MSW management situation in Kenya (Njorege et al 2014), MSW in Kenya is characterised by rising waste generation quantities that has doubled over ten (10) years, inefficient collection systems and un-sanitary disposal of waste (UNEP 2010). In 2009, in an attempt to tackle the challenges posed by the poor waste management situation in Nairobi, the Kenya government collaborated with the United Nations Environment Programme (UNEP) to develop an integrated sustainable waste management plan for Nairobi. Upon initiation of the project, a national task team was formed, stakeholders were widely consulted and local universities took hundreds of samples of waste to determine the origin, composition and estimate quantities. The 1st draft of the findings is UNEP 2010. Amongst other things, the findings reveal that about 51% of the waste stream was organic, 38% recyclable (paper, plastic, glass, metal) and 11% classed as ‘other’. The study also reported that about 50% of the residents of Nairobi did not have access to any waste collection service even though there was significant growth of small private sector waste collectors in the city. Another interesting finding by the study was that while the city’s budget was steadily increasing, budget allocation for MSW management was steadily decreasing. Table 2.3 below present specific actions aimed at achieving ISWM in Nairobi.

Table 2. 3: Specific Action Plan for ISWM in Nairobi (based on UNEP 2010)

Theme	Specific Action
Strategic Alignment and recognition of partners	<ul style="list-style-type: none"> • Strategic alignment • DoE mission • Recognition of partners • Waste information system
Waste reduction and source separation	<ul style="list-style-type: none"> • End-of-life levies for problematic wastes • Source separation of recyclable and pure organic wastes with incentives • Streamlined (weight-based) collection fees • Awareness campaigns and education

From source to valorisation or disposal	<ul style="list-style-type: none"> • Zoning of waste collection • Formalised waste collection contracts • Development of material recovery & transfer stations • Regulation, enforcement and oversight of private/CBO waste collection
Resource recovery: materials and energy	<ul style="list-style-type: none"> • Recovery of value from organic wastes • Strengthening of specific recycling strategies
Infrastructure and systems for residual waste	<ul style="list-style-type: none"> • Development of new engineered landfill site • Rehabilitation of Dandora dumpsite

2.9 Nigeria – Background Information

Located in Western Africa on the Gulf of Guinea and with a population of over 173million (The World Bank 2014), Nigeria is the most populous black nation in the world. It is bordered in the West by the Republic of Benin, in the East by Chad and Cameroon and by Niger in the North. Nigeria has a coastline of about 853km and a landmass of about 923,768km². The landscape varies from the mangrove swamp in the furthest south to the Obudu Hills, the rainforest and the Lagos estuary, all in the South (Amasuomo and Baird 2016; Nwaka 2005). The middle and Southwest of the country is mainly savannah while the North is increasingly arid with the encroaching Sahara (Batagarawa 2011; Ogwueleka 2009). As the Atlantic ocean in the South and the Sahel in the North influences the climatic conditions in the country, there exists a significant contrast in the climatic conditions as one move from the South to the North or vice versa (Adejuwon 2006). Olaniran (1991) also reported that the moist south-westerly wind which brings moisture into Nigeria from the Atlantic ocean reduces as it travels northward thereby causing a differential in the rainfall pattern between the South and the North. Figure 2.7 below is a map of Nigeria showing the vegetation/ecological zones while Figure 2.8 is a map of Nigeria showing the city of Aba, other cities and the country boundaries.

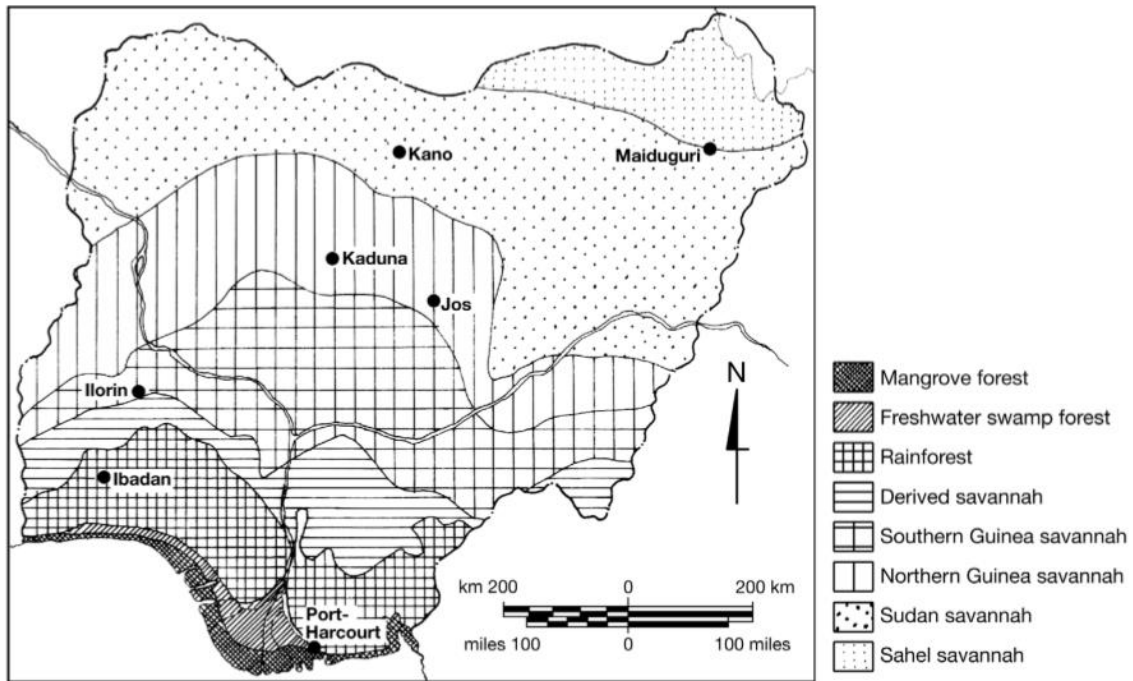


Figure 2. 7: Map of Nigeria showing the Vegetation and Ecological zones (based on Adejwon 2006)



Figure 2. 8: Map of Nigeria showing Aba, other cities and country boundaries

(based on www.mapsofworld.com/nigeria)

The gross National Income per Capita is \$2,450 while average life expectancy at birth for male and female is 54 (WHO 2012). 46% of the population lives below the poverty line, the labour force of about 53million is just below 31%, enrolment into primary school is at 85% while literacy level is an estimated 68% and urban population is about 48% (The World bank 2014; Ogwueleka 2009; Nwaka 2005).

Nigeria operates a federal system of government with the Federal Government at the apex - made up of The Executive, Legislative and Judicial arms. There are 6 geopolitical zones – South-South (SS), South-East (SE), South-West (SW), North-Central (NC), North-West (NW) and North-East (NE); a total of 36 states, (the State Government, again with the 3 arms of government present) and one Federal Capital Territory (FCT) administered by an appointed Federal Minister. These are further divided into 774 local government areas (LGAs) (Ogwueleka 2009). The Local Governments also have the 3 arms of government, headed by a local government Chairman. The diversity in customs, religion, languages and even conflicts is huge with about 374-394 different ethnic groups identified (Batagarawa 2011).

2.9.1 Overview of MSW Management in Nigeria

The Public Health Act of 1909, the Township Ordinance No. 29 of 1917 and the Town and Country Planning Ordinance of 1946 were the earliest forms of environmental legislation introduced in Nigeria by the colonial administration (Ezeah 2010; Adama 2007) but Adelan (2004) contends that those policies were either not clearly formulated to curb the harmful effects of industrialisation on the environment or they were poorly implemented or enforced. As a result, the study insists that the formative years of environmental legislation and management in Nigeria lacked clear objectives and strategies.

In the post-colonial era, Decree 58 of 1988 established the Federal Environmental Protection Agency (FEPA) to tackle the problems of pollution and waste management (Walling et al 2004). In 1991, legal frameworks such as - the National Protection Management of Solid and Hazardous Wastes Regulations, the Pollution Abatement in Industries and Facilities generating Wastes Regulations, and the General Guidelines for Pollution Abatement in Industries, were introduced to manage solid waste (Okorodudu-

Fubara 1998) and in 1999, the Federal Ministry of Environment absorbed FEPA and took over its role of administering and enforcing environmental laws in Nigeria as well as carry out public relations activities related to environmental issues (Batagarawa 2011; Adewole 2009). Over the years, other policies, frameworks and strategies with environmental, waste management and sustainable development connotations include Agenda 21, Vision 2010 and Vision 2020 (Walling et al 2004; Adelagan 2004) and in 2005, the FME issued its policy guideline on solid waste management (FME 2005) which prescribed roles for the different tiers of government as well as private institutions and the general public.

Poverty, rapid industrialisation, high population growth rate and underfunding of state and local agencies have been mentioned as some of the main factors militating against sustainable waste management in Nigeria (Ezeah 2010; Akoni 2007).

2.9.2 Current status of MSW management in Nigeria

Generally, MSW management in Nigeria is often characterised by several inefficiencies, general lack of planning, shortage of skilled manpower and negligence (Ezechi et al 2017; Nzeadibe et al 2012; Ezeah 2010; Imam et al 2008). The following sections discuss aspects of MSW management in Nigeria.

2.9.2.1 Waste Generation and Composition

The availability of reliable information on the quantity and composition of MSW is invaluable as it aids the effective planning of waste management infrastructure. It also shows the percentage of waste that can be recycled, reused, composted and or biologically stabilised (Dennison et al 1996). Unfortunately, this information is generally scarce in Nigeria and other developing countries (Wilson et al 2009), making the calculation of waste generation rate very inconclusive (Batagarawa 2011). However, Solomon (2009) puts the average national waste generation rate at 0.49Kg per person per day with households accounting for about 90% of total urban waste generated while figures obtained for Abuja (0.57Kg per person per day) was higher but still within the range (0.1 to 1.2Kg per person per day) for developing countries (Batagarawa 2011). Studies by Afon (2007), Afon and Okewole (2007) and Imam et al (2008) agree with similar studies in various other countries that MSW generation Nigeria is also affected by time of the year, traditions, income, household size, environmental awareness and concern, etc. Other studies such as Anake et al (2009), Igoni et al (2007) and Ogbonna et

al (2007) all show that wastes from Nigerian cities have high organic content (see Table 2.4 below).

Table 2. 4: Waste composition (% by weight) in some Nigerian cities (based on Batagarawa 2011)

Category/City	Abuja	Port Harcourt	Oyo	Maiduguri	Kaduna
Organic waste	57	23	30	46	30
Plastic	18	11	19	12.7	20
Paper	11	15	14	5.7	15
Metal	5	9	6	10.7	15
Glass	4	9	-	5.8	5
Textile	2	6	4.4	4	5
Ashes, dust, stones	-	1	10.3	13	-
Other	2	-	-	2	10
Garden waste	-	10	16.2	-	-
Carton	-	16	-	-	-

The observable differences in the waste composition could be attributed to changes in the socio-economic dynamics of the population sampled such as income, level of education, household size, etc. (Ezeah 2010; Afroz et al 2010; Bandara 2007; Rushbrook and Pugh 1999). Other contributory factors may include seasonal variations (Imam et al 2008), environmental awareness and concern (Afroz et al 2011) and possibly, differences in methods of measurement and categorisation. However, it is important to note that, like waste from other developing countries, the composition is high in organic matter (Hettiarachchi et al 2018; Muhammad and salih 2018; UNEP 2015)

Perhaps, it is important to mention that in the absence of any targeted government policy to decouple economic development from waste arising; continued population growth will ultimately result in increasing waste generation (Berg et al 2018; Chalhoub et al 2018; Brennan et al 2016; Ezeah 2010).

2.9.2.2 Temporary Storage of MSW

Previous studies on MSW in Nigeria found that in most urban centres and cities, standard waste collection receptacles are rarely available for households and as a result, they use whatever container available for waste storage (Batagarawa 2011; Imam et al 2008; Abdullahi et al 2008). In Abuja, the federal capital territory, an estimated 42% of the population still use 'flimsy' open containers for the storage of their waste while others use plastic bags, 120L or 240L containers (Ezeah 2010; Imam et al 2008). Due to prevailing high temperatures, the waste decays rather rapidly, with undesirable environmental consequences including but not limited to release of gases and pollutants, odour nuisance and pest infestation (Berg et al 2018; Breza-Boruta 2016; Marchand et al 2012; Ezeah 2010).

However, other studies imply that about 50% of households in cities have no temporary storage facilities of their own and as such use communal disposal sites as temporary storage (Batagarawa 2011). For these people, waste is transferred from the point of generation to these sites by household members or contracted waste collectors (Dauda and Osita 2003). The communal disposal sites are often characterised by presence of rodents and strong unpleasant odour.

2.9.2.3 Waste Collection and Transportation

Waste collection often involves the emptying of bins and or bin bags (temporary storages) from within a settlement area while transportation refers to the haulage of the collected waste to the treatment or disposal facility (Den Boer et al 2007). Due to the unplanned nature of most cities, MSW collection is very daunting and expensive (Olowomoye 1991). This gives rise to different methods and modes of collection in different areas or cities and often involves either direct collection by the state, local government or management agency or indirect collection by appointed private contractors or informal waste managers for a fee (Batagarawa 2011). The most common methods of collection include:

2.9.2.3.1 Door to door/House to house collection

This involves the collection of waste often stored in temporary storages from within individual households/premises by private organisations including informal waste workers. The different categories of informal waste workers involved in MSW management in Nigeria are discussed further in section 2.9.2.5. Often, there are

contractual agreements between parties (Abdullahi et al 2008). This system of waste collection often requires a good level of planning and management, accessibility, and a significant outlay in manpower and equipment (Ezeah 2010).

2.9.2.3.2 Kerbside

With kerbside collection system, households in a given settlement are responsible for bringing their waste to the kerbs on or before the scheduled collection date, from where the waste is uplifted by the MSW management authority (Batagarawa 2011). Oftentimes, kerbside collection in Nigeria is irregular (Imam et al 2008).

2.9.2.3.3 Depot/Receptacle/Communal Facilities

Similar to kerbside system, the communal/depot system is often utilised where access to many houses is limited (Ezeah 2010). It requires households to bring their waste to the designated point usually purpose-built structures, skips or even a shallow trench where waste is dumped directly on the ground (Batagarawa 2011; Ezeah 2010; Dauda and Osita 2003).

The collection and transportation of waste is both labour and capital intensive (Rogic and Wilson 2017; UNEP 2015; The World Bank 2012), often accounting for between 70% and 80% of the total cost of MSW management in Nigeria (Imam et al 2008). As stated earlier in section 2.9.2.1, waste composition in Nigeria is often high in organic matter. This means that compaction vehicles offer very little or no advantage in terms of increasing waste density (Imam et al 2008). Therefore, the efficient collection and transportation of waste should involve a careful selection of vehicles taking into account the local road conditions, servicing requirements, availability of spare parts, maintenance costs, traffic density, haulage distances, etc. (Nzeadibe and ajaero 2010; Imam et al 2008).

Unfortunately, for a variety of reasons and like every other aspect or elements of MSW management, waste collection and transport in Nigeria is often characterised as inefficient, insufficient and improper (Muhammad and Salihi 2018). One of the main reasons often cited is the prevailing preference of MSW management authorities in Nigerian cities to splash significant sums of money in importing waste collection and transportation equipment (Abdulredha et al 2018; Imam et al 2008). One example is the reported spending of Seven Hundred Million Naira (about US\$5.5m) in 2006 by the Abia

State government on the purchase of refuse management vehicles (Nzeadibe and Ajaero 2010).

Table 2.5 provides a breakdown of waste collection, transportation and disposal vehicles operating in Abuja where the Abuja Environmental Protection Board (AEPB) is responsible for MSW management.

Table 2. 5: Summary of waste collection, transportation and disposal vehicles operating in Abuja

Type	Owned by AEPB			Owned by Private Sector		
	Existing Units	Operational		Existing units	Operational	
		No	%		No	%
Lorries	4	4	100	12	10	83
Tippers	8	2	25	48	32	67
Roll-on roll-off skip vehicles	2	2	100	1	1	100
Tractors	3	2	67	1	1	100
Automated compactor truck	17	5	29	9	8	89
Side loader truck	2	2	100	-	-	-
Total	36	17	47	71	52	73

(Credit: Imam et al 2008)

The table shows that only 29% and 25% of the automated compactor trucks and tippers respectively, owned by the AEPB were operational. Only 47% of the vehicles were operational. This supports findings from previous studies which included poor choice of vehicles and lack of maintenance as some of the challenges of MSW management in developing countries (UNEP 2015; Ali 2010; Wilson et al 2006).

The situation with waste collection and transportation is further exacerbated by the reported increase in the intolerance of the activities of informal waste workers in many cities across Nigeria (Muhammad and Salihi 2018; Nzeadibe and Ajaero 2010; Imam 2008). For example, while inaugurating 50 waste compactor trucks acquired by the Lagos State Waste Management Authority (LAWMA), the then governor of the state stated that a law was already in force prohibiting cart pushers and their activities, and ordered all

cart pushers in the metropolis to leave the state by 31st of December 2008 (Nzeadibe and Ajaero 2010; Aderibigbe 2008).

Add other administrative challenges such as underfunding of agencies responsible for waste management, lack of qualified staff and unavailability of data for planning; the overwhelming outcome is indiscriminate dumping of refuse with the attendant public health and environmental challenges previously highlighted (Muhammad and Salihi 2018; Ezeah 2010; Nzeadibe and Ajaero 2010). These uncontrolled dumps are thus the attraction of informal recyclers, scavengers, or itinerant waste pickers (popularly known by other local names such as Mai-bottle, Ndi-ebulu, Baro-boys, etc in different parts of the country). These people, forced by economic pressures, scavenge the dumps in search of 'high' value papers, glass, metals and plastics. (Afon 2007; Kofoworola 2007; Agunwamba 2003).

2.9.2.4 Waste Treatment

In the strictest sense of the definition, waste treatment is almost non-existent in Nigeria as even the waste collected by the MSW management authorities goes straight to disposal sites without treatment (Ezechi et al 2017; Ezeah 2010; Imam et al 2008; Abdullahi et al 2008). However, it is safe to say that the most common treatment practiced in Nigeria is open burning (Batagarawa 2011; Imam et al 2008). Open burning happens at designated dumpsites, at illegal dumpsites and is commonly practiced by households and individuals (Nzeadibe and Ajaero 2010).

2.9.2.5 Materials Recovery, Recycling and Composting

Unfortunately, due to poor governance and other related issues highlighted previously (Izugbara and Umoh 2004, Ekugo 1998; Agunwamba 1998), both the local government councils with primary responsibility for MSW management in Nigeria (FME 2000; Federal Republic of Nigeria 1999) and the specialised agencies and taskforces established as intervention measures in MSW management by both states and federal governments (Nzeadibe and Ajaero 2010) have not lived up to expectations. Though there are several socio-economic and environmental benefits of materials recovery, recycling and composting to the local population and environment (Kofoworola 2007; Afon 2007; Agunwamba 2003), the perceived apathy of the government and relevant agencies in Nigeria towards materials recovery have ensured that there are no statutory structures or requirements for materials recovery in MSW management, there are no designated

officials responsible for recycling and there are no incentives to the public to recycle their waste (Nzeadibe and Ajaero 2010) These and a choice between starvation and surviving have forced many amongst the urban poor into the informal MSW management sector (Ezeah 2010; Nzeadibe and Ajaero 2010; Roberts et al 2009). An estimated 3000 (Nzeadibe and Iwuoha 2008) to 5000 (Adebola 2006a) operate in the city of Lagos, earning well over the US\$1 benchmark per day and in some cases earning more than the statutory minimum wage in Nigeria (Nzeadibe and Ajaero 2010; Nzeadibe and Iwuoha 2008; Agunwamba 2003; Adeyemi et al 2001). The numbers may be smaller in smaller cities for example an estimated 600 people are involved in this sector in Aba (Nzeadibe et al 2012) but these informal MSW workers account for all materials recovery and recycling activities in Nigeria but yet they are treated with social opprobrium (Nzeadibe 2009; Nzeadibe and Iwuoha 2008; Adebola 2006b).

The informal waste MSW workers operate in different modes and formats. These include: (Muhammad and Salihi 2018; Nzeadibe and Ajaero 2010; Abdullahi et al 2008; Kofoworola 2007; Adebola 2006b; Agunwamba 2003)

(a) Itinerant waste pickers/buyers/cart pushers

This group often operate with push carts, wheel barrows, tricycles or motor vehicles from street to street, and or house to house picking and buying wastes of value which they in-turn sell to middlemen or resource merchants. They tend to specialise in a few kinds of materials such as plastics, drink tins, aluminium, metals, etc. (Batagarawa 2011; Wilson et al 2009). There are also other cart pushers that move from house to house collecting wastes from households or businesses on contractual bases. The waste they collect are sometimes sorted for valuable waste which are sold on to middlemen, while the remnant is disposed at communal disposal sites, taken to designated dumpsite or dumped indiscriminately.

(b) Scavengers

This group operate mainly at designated dumpsites, bins and illegal dumpsites. They scavenge the sites for wastes of value which are also sold on to middlemen. Sometimes, these scavengers have contractual agreements (even if not written) with middlemen, to source specific materials. Prices are often agreed based on the quality and quantity of the finds. Wilson et al 2009 reports that some scavengers are found among formal waste

collection crews and could recover materials of interest from vehicles transporting waste.

(c) Middlemen/resource merchants

The middlemen or resource merchants are usually waste dealers who buy the waste collected by scavengers at dumpsites or in their shops. They also buy from cart pusher and itinerant pickers/buyers. The materials bought are often sold on to private individuals and small scale local producers for re-use, or in bulk to recyclers.

(d) Recyclers

This group includes all micro, small scale and medium scale entities that convert recovered materials such as paper, plastics, aluminium, metals, etc. to valuable products or raw materials for other industrial processes.

The urgent need to find a means of supporting and regulating the informal waste sector in Nigeria is indeed a challenge to policy makers and MSW managers (Nzeadibe 2009). Meeting this need is necessary to forestall the adverse implications of current hostilities by MSW managers and authorities toward the informal sector (Muhammad and Salihi 2018; Batagarawa 2011; Nwaka 2005). It will also ensure that the contribution of the sector to MSW management is accounted for as well as contribute to toward achieving the relevant MDGs and SDGs in poverty eradication and governance.

2.9.2.6 Waste Disposal

The predominant waste disposal method practiced in Nigeria is open dumping (Abdullahi et al 2018; Muhammad and Salihi 2018; Ezechi et al 2017; Ukpong et al 2015; Batagarawa 2011; Nzeadibe and Ajaero 2010; Ezeah 2010; etc.). Open dumps or dumpsites are often burrow pits that arose from excavation of sand for construction purposes (Abdullahi et al 2008; Dauda and Osita 2003). These abandoned pits are often acquired and designated as official dumpsites. It is important to note that unlike in landfills (which are often purposefully built); there is no planning involved in open dumpsites in Nigeria (Nzeadibe et al 2012; Ezeah 2010; Imam et al 2008). MSW management authorities often transport all the waste they collect to designated dumpsites (Ezechi et al 2017; Nzeadibe and Ajaero 2010; Izugbara and Umoh 2004). Waste dumped in these designated dumpsites is counted as controlled disposal (Wilson et al 2013b). Most times, staffs from the MSW management authority are assigned different duties and are responsible for manning the sites (Agunwamba 1998). Sometimes, it is also possible to find heavy machinery such as

caterpillars and other earth moving equipment at these sites. They are often used to push the dumped waste away from the roads or to push burnt, rotting and older waste further inside to make way for new waste to be dumped.

There are also illegal dumpsites which could be abandoned pits but not (yet) designated by government as official dumpsite, undeveloped plots, street corners, abandoned building sites, etc. Sometimes, MSW management authorities have enforcement agents who patrol the illegal dumpsites to apprehend defaulters dumping waste on the sites.

2.9.3 Aba – History and Background Information

Historically, Aba urban or Aba city was made up of several villages such as Umuokpoji, Eziukwu, Obuda, Ogbor, Abayi, etc. as shown on the district map of Aba in appendix 11. These villages were merged together for administrative convenience by the British. The British established a military post in Aba in 1915 after conquering the initial anti-colonial revolt by the locals (The Aro Expedition). They (British) also constructed a railroad linking Aba to Port Harcourt, for easy transportation of agricultural produce (palm oil, palm kernels, cassava, vegetables, etc.). In 1929, the historic Aba Women Riot – a protest to the census and taxation of women in the area by the colonial administration, took place in Aba (Van Allen 1975). By 1930, Aba was largely established as an urban community with thriving industries in textiles, breweries, soaps, etc. (Van Allen 1975).

Currently, Aba is a city in Abia State – one of the 36 states in Nigeria. Popularly known as the ‘Japan of Africa’ - a credit to her artisans and quality handicrafts, Aba is the commercial and industrial centre of South-Eastern Nigeria (Ajero and Chigbo 2012). Ariaria International Market, located in Aba metropolis is perhaps the largest cosmetics market in West Africa while Aba shopping centre is possibly the biggest electronics mall in south eastern Nigeria. Many of the industries are involved in Pharmaceuticals, brewery products, plastics, cosmetics, etc. (Ukpong et al 2015). Abia State Polytechnic, Aba; Rhema University, Aba and School of Health Technology are the popular higher education institutions located in the city (Ukpong et al 2015).

With an estimated population close to one million, the city occupies an area of about 40,000km² and is located between longitude 7°19'E and 5°10'N (Amadi and Nwankwoala 2013; Ezechi et al 2017; Umunnakwe et al 2013; Ajero and Chigbo 2012; Izugbara and Umoh 2004). Popular areas in the city such as Factory road, Aba Town hall, Umungasi,

Ndi-Egoro, Abayi, Ogbor Hill, Urratta, Obohia, Ngwa Road, Eziukwu, Faulks road, etc. are all located within four local government areas; namely – Aba North, Aba South, Obingwa and Osisioma Ngwa (Ezechi et al 2017). There are two distinct climatic seasons – the rainy season (April to October) and dry season (November to March) (Amadi and Nwankwoala 2013). Average mean temperatures range between 24 – 34°C with a relative humidity of 70% and 90% in dry and rainy seasons respectively (Ukpong et al 2015; Ezechi et al 2017). Oil wells in Ukwa and Ugwunagbo villages separate Aba from Port Harcourt in Rivers State (the oil capital of Nigeria – a distance of about 43 miles) and as such the trading of petroleum products such as kerosene, cooking gas, petrol and diesel is very popular with numerous filling stations located along most major roads and streets in the city. The city also has a network of roads leading to other states including Akwa Ibom, Enugu, Imo, Enugu, etc. (Ezechi et al 2017; Ukpong et al 2015). The native language spoken by the locals is Igbo (Ukpong et al 2015).

2.9.3.1 MSW Management in Aba

For some time now, the MSW management situation in Aba, like in many Nigerian cities and urban areas have reached alarming and critical dimensions (Izugbara and Umoh 2004; Ekugo 1998; Nwankwo 1994; Adedibu 1986; Sule 1982). The attendant deaths and illnesses from diarrhoea, respiratory and lung diseases, malaria, parasitic worms, typhoid fever, cholera, etc. caused in no small measures by poor MSW management practices have implications on the social, political and economic development of the population (Izugbara and Umoh 2004; Izugbara and Okon 2000; Izugbara and Ukwai 2002).

The Abia State Environmental Protection Agency (ASEPA) has primary responsibility of waste management in the Aba (Ajero and Chigbo 2012). However, like in many Nigerian cities, MSW management is very low on the governance agenda (Nzeadibe et al 2012). The result is poor or weak implementation of the national environmental sanitation policy in the state (Odoemena and Ofodu 2016; Eneh 2011). Though there are several factors such as lack of organisational capacity, limited and dilapidated infrastructure, lack of skilled manpower and lack of commitment (Izugbara and Umoh 2004, Abila and Kantola 2013), ASEPA cites poor funding as its major hindrance to providing effective MSW management services in the city (Ukpong et al 2015). Consequently, and like many other MSW management authorities in Nigeria, ASEPA adopts a task-force approach - the environmental sanitation day (every last Saturday of the month), mandates all residents

to carry out a clean-up of their immediate surroundings (Izugbara and Umoh 2004). The 'environmental sanitation day' is perhaps the only MSW management policy known by the public in Aba and most other Nigerian cities but garbage from the clean-up exercise, like other waste generated in the city which are indiscriminately dumped end up at the roadsides (Izugbara and Umoh 2004). On the roadsides, the garbage rots, some eaten by animals, others scavenged by informal waste recyclers, while the rest are washed off by rain water and floods (Ogbonna et al 2002).

An estimated 236,703 tonnes of waste generated in the city monthly (Ezechi et al 2017; Abila and Kantola 2013). Out of this, up to 25 tonnes of waste are dumped at each of two (2) open dumpsites operated by ASEPA in Aba, daily (Ukpong et al 2015). There are also illegal dumps scattered all over different locations in the city (Odoemena and Ofodu 2016). While the dumping of waste in the open dumpsites and illegal dumpsites result in soil contamination, emission of GHGs, LFGs, and production of leachates which contaminate the ground water, along with the attendant health implications other indiscriminately dumped waste also cause environmental blight and thus reduce the aesthetic value of the urban environment (Ukpong et al 2015).

The estimated population of informal waste pickers in Aba is 600 (Nzeadibe et al 2012). Together, they account for all materials recycling and recovery activities in the city. However, they are not recognised as stakeholders in MSW by the authorities and are even treated with social opprobrium (Nzeadibe 2009; Nzeadibe and Iwuoha 2008).

CHAPTER THREE

Research Methodology

3.1 Introduction

This research was designed to understand the 'real' issues, challenges and contexts of MSW management in Aba. 'Real' here emphasises focus on the actors (stakeholders) who by living in the case study area, have lived experiences of the subject of study. This research is post normal science (PNS) in nature which means that it involves the inclusion of a wide range of stakeholders in the research process and recognises the value of history (personal experiences as recounted by participants). It is therefore, a phenomenological study.

The rest of this chapter sets out the strategy adopted in order to achieve the aims and objectives of this research as elucidated in section 1.5. The chapter is arranged in sections. Each section contributes to describing the steps and actions taken by the researcher from choosing the research methods through to data analysis and planned research outputs.

3.2 Theoretical underpinning of the study

Principle 10 of the United Nations Conference on Environment and Development held in Rio de Janeiro in 1992 (UNCED 1992) states that "Environmental issues are best handled with participation of all concerned citizens, at the relevant level". Thus, the engagement and involvement of all concerned citizens (stakeholders) became the most important factor in designing this study. This decision was further strengthened after a review of the literature on municipal solid waste (MSW) management studies (discussed further below in section 3.2.1). For this reason, PNS was chosen as the most suitable approach.

The next major issue was the method of enquiry that will appreciate the various valid perspectives from the different stakeholder groups. This was important to ensure the

problems and issues were those raised by the concerned citizens and not just the researcher's views and perceptions. Considering the complexity of a MSW management system due to high uncertainty, high number of variables, high decision stakes involved and the objective to create a vision and action plan, the adaptive methodology for ecosystem sustainability and health (AMESH) was chosen. AMESH have been explained in more detail in the section 3.2.3.

The final theoretical underpinning was a framework, robust enough, for analysing the issues and challenges identified. The integrated sustainable waste management (ISWM) framework was chosen for this task as it is the most comprehensive framework that has been developed and used for similar purposes in other cities (Abdulredha et al 2018; Wilson et al 2013b). Once these challenges and issues were analysed and understood, the vision and action plan was created from the views and proposals elicited from the concerned citizens. The ISWM framework was discussed in more detail in Chapter 2, section 2.4.

3.2.1 Municipal Solid Waste (MSW) Management Research

Complex systems are best understood through multiple perspectives and methodological pluralism (Neudoerffer et al 2005). Investigations into MSW management usually have broad outlook and overlap several academic disciplines from the applied to the social sciences (Olowomeye 1991). Evidence from previous studies have shown that data generated from MSW management investigations usually vary from finite statistical (quantitative) data to the more generally descriptive information common to most investigations involving human subjects (Ezeah 2010). However, after a thorough consideration of the nature of this study and its objectives, a wholly qualitative approach was chosen. This approach, though more time consuming and expensive, is humanistic and holistic in that it focuses on the personal, subjective and experiential knowledge and seeks to contextualise the behaviours of participants and their ways of doing things (Kielmann et al 2011). This approach is deemed very essential in ensuring that this research impresses on its aims and objectives as well as contribute uniquely to the existing body of knowledge considering that most previous studies in this area have mainly focused on the quantitative. The few studies involving qualitative methodologies were not designed to look at the whole spectrum of waste management and thus not holistic. It is therefore noteworthy to mention that while this is not an attempt to relegate

the import of quantitative data in waste management, it is a positive step towards providing the complete set of information that is much needed for waste management policy makers and managers to ensure a better MSW management performance.

Globally, a lot of studies have been focused on MSW management systems. Consequently, we have come to know a lot too including several factors that affect the rate of waste generation, the common challenges of effective and efficient MSW management systems as well as a wide range of possible solutions. However, developing effective and efficient MSW management systems in developing countries continues to prove very difficult and elusive.

The full range of research methodological approaches – quantitative, qualitative and mixed methods, have been utilised in previous studies focused on MSW management. The most common methods of data collection included questionnaire surveys, field measurements, observations, interviews and focus group discussions. For example, in analysing the barriers and success factors affecting the adoption of sustainable management of MSW in Abuja, Nigeria (Ezeah 2010), the researcher employed a mixed method methodology collecting relevant data via field measurements, questionnaire surveys and focus group discussions. Nzeadibe et al 2012 also used a mixed methods methodology to assess vulnerability and quality of life of waste pickers in Aba, Nigeria. Their data collection methods included ethnographic interviews, questionnaire survey, focus group discussions and field observations. Batagarawa 2011 used a quantitative methodology and questionnaire survey as data collection method in development and evaluation of index based tool for appraising the sustainability of waste management in Nigeria. All the aforementioned methodologies and data collection methods are well established and any one or combination of them could have been chosen for this study too. However, the researcher believes that the scope of this study required a more rigorous and adaptive method with particular focus on the stakeholders in terms of capturing their perspectives, complaints and needs because those are the ingredients required to fully understand the issues and challenges. Also, unlike the studies enumerated above and so many other similar studies on MSW management in Nigeria, this study appreciates MSW management systems as an eco-social system. This means that while parts of the system can be studied in isolation (as is the case with the studies enumerated above), any sustainable solutions should consider all parts of the system.

Therefore to make any sort of progress in developing an effective and efficient MSW management system in Aba, Nigeria and other similar cities in developing countries, an integrated local approach such as the one adopted here is necessary. This approach ensures that regulatory authorities embrace public participation, transparency in decision making, networking, collaboration and co-operation with all stakeholders. It adds effective communication and accessibility of information as key elements of successful MSW management systems. Something advocated by the UNCED and supported by Zarate et al 2008, Marshall and Farahbakhsh 2013, and widely adopted by the UN-HABITAT project.

This PNS approach may be contrary to the mind-set of traditional science or normal science which expects regularity, simplicity and certainty in the phenomena and interventions or solutions proffered. But traditional science and normal science have been partly responsible for the current state of intellectual triumph but yet socio-economic peril in tackling MSW management problems in developing countries. PNS is more suited as it focuses on quality assurance by embracing uncertainties and multiple perspectives; and recognises that the decision stakes are high (Funtowicz and Ravetz 1990).

3.2.2 Post Normal Science (PNS)

Post-Normal Science (PNS) is a 'new' – not by age but acceptability, conception of the management of complex science-related issues. It is a problem solving framework that focuses on those aspects that are often neglected by traditional science practices such as uncertainty, value loading, multiple legitimate perspectives, incomplete control and urgency of decisions (Funtowicz and Ravetz 1991). As a theory, PNS links epistemology and governance. It recognises uncertainty and the existence of multiple valid perspectives through the extension of the peer community (stakeholders). So unlike applied (core) science that relies on the 'truth', PNS relies on 'quality' (Funtowicz et al 2000). In context, a PNS task may be a policy-related research, science-related decision making or creative technical-social innovation (Funtowicz and Ravetz 2003). These characteristics typify most environmental science researches and in particular, MSW management studies like this present study. Figure 3.1 below illustrates how decision stakes and level of uncertainty determine the choice of science.

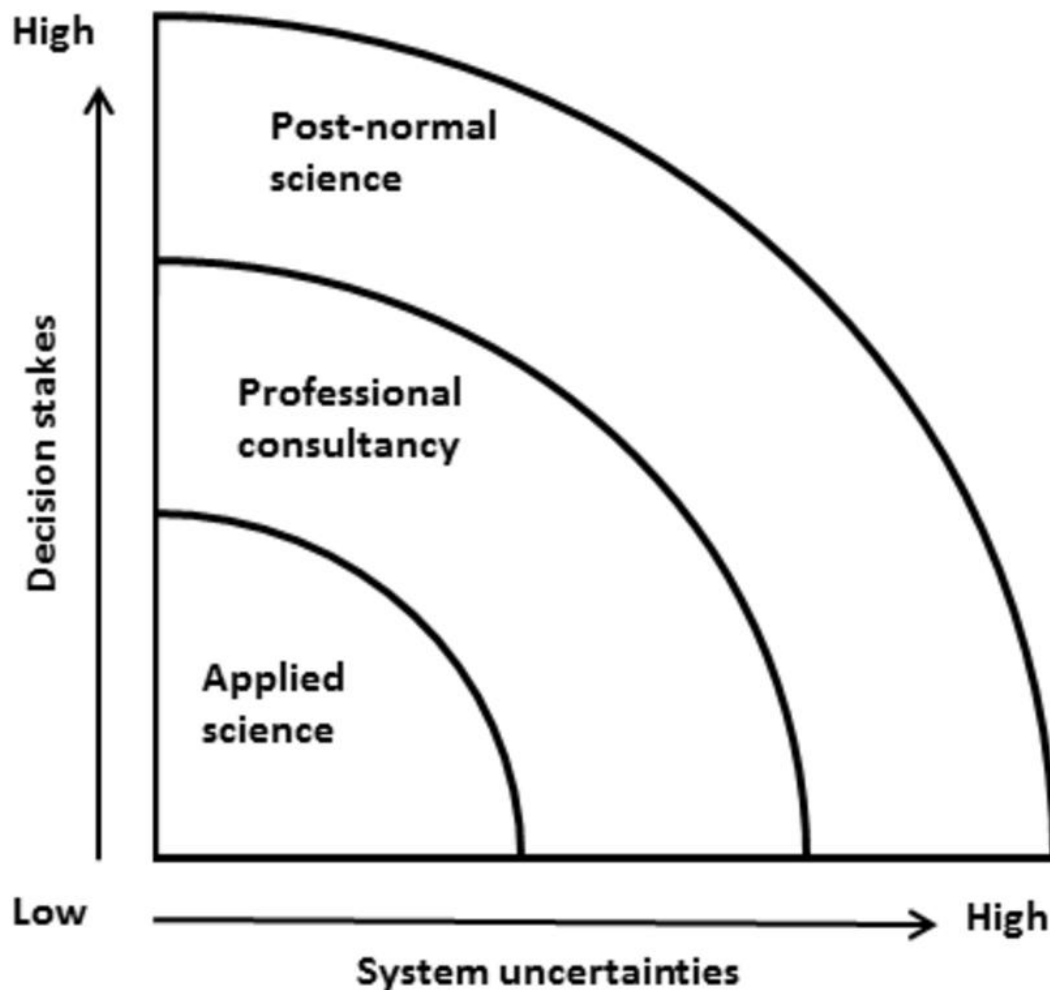


Figure 3. 1: PNS – Science for high decision stakes and system uncertainty (after Funtowicz and Ravetz 2003)

As a tool, PNS operates around diverse extended peer communities and so serves as a democratising technique in drawing and evaluating the legitimacy of various perspectives about an issue. As demonstrated by Fetalvero et al 2013, it is “a workable framework in fostering environmentalism and in addressing socio-scientific issues that are high-stake and high-risk in nature”. In their evaluation of the Seveso incident of 1976, the Bovine Spongiform Encephalopathy (BSE), commonly known as the mad cow disease, and the licensing of Genetically Modified Organisms (GMO), De Marchi and Ravetz 1999 demonstrated, in a continuum, how the key themes of PNS - uncertainty (which is a key factor in risk assessment/management); procedures and participation (involvement of stakeholders at the earliest stages of discussions); and finally problems for governance (a policy framework that compliments science with other considerations) were employed in handling each crisis. They showed that in handling issues with high uncertainties, unquantifiable risks and high decision stakes, real progress can only be

made through committed dialogue and building of trust between government and the lay critics. They concluded that PNS was very important in risk management and could be extended to various other areas of governance.

Given that there can be varying descriptions and several valid perspectives, it is difficult to select what to include and what to leave out. In a system such as MSW management, it is not also appropriate to rely on expert scientists to determine what is important and desirable for everyone else (Waltner-Toews 2004). Thus as a theory, PNS was found to be the most suitable choice for achieving all the goals set out for this study. A few other theories considered include grounded theory, systems theory and behavioural science theory. By using PNS, it was still possible to view MSW management as an eco-social system. None of the other theories would have allowed for the inclusion of the extended peer community (stakeholders) in a way that satisfies the need for a local approach. Grounded theory does offer that freedom of starting off without much restriction in terms of predetermined objectives but its suitability and applicability in solving MSW management issues were not convincing.

3.2.3 Adaptive Methodology for Ecosystem Sustainability and Health

The Adaptive Methodology for Ecosystem Sustainability and Health (AMESH) is one of the more established methodologies used in participatory action research (Neudoerffer et al 2005). The AMESH methodology emerged from studies in Nepal, Peru, Kenya and Canada seeking to define complex eco-social system of study; explore goals and visions for the future to develop action plans; and consider how current institutional arrangements affect decision making (Waltner-Toews et al 2004; Kay et al 1999). Those goals are analogous to the goals of this study.

AMESH is flexible and adaptable, and that was very important to me because I needed a method that affords me and my participants a suitable medium for quality exchanges so that while I elicited relevant data from them, I also gave them the necessary information they needed to understand their roles as members of the extended peer group and the responsibilities that will engender the required change. Diagrammatically, Figure 3.2 below shows the various steps involved when using AMESH.

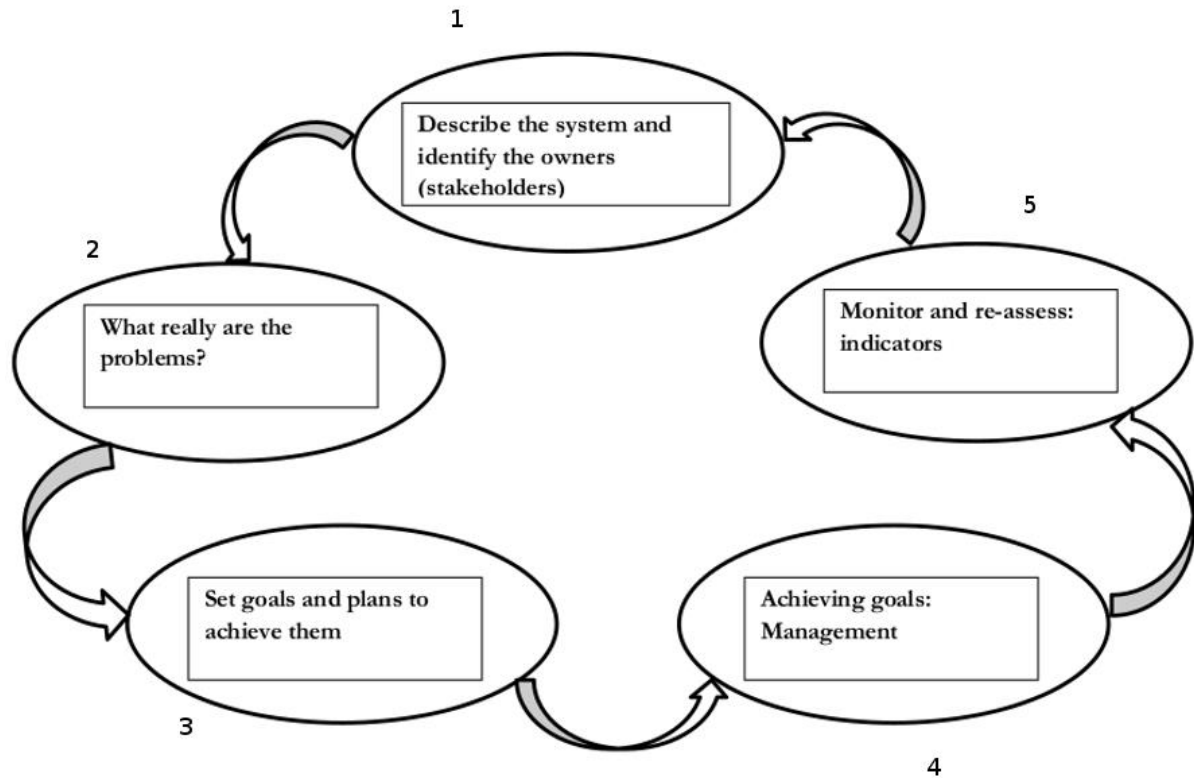


Figure 3. 2: The Core Steps involved in AMESH (after Waltner-Toews 2004)

This system is similar to and has been adapted from a medically based assessment and treatment process. The research design, processes and activities were carefully built around steps 1 to 3. In the words of Kay and Schindler (1994), using an ecosystem approach means ‘changing in a fundamental way how we govern ourselves, how we design and operate our decision-making processes and institutions, and how we approach the business of environmental science and management’. That is in summary, the long term goal of this research and AMESH was adjudged a perfect fit and thus the most suitable methodology after trialling and experimenting with a few other methodologies. Q-methodology was considered but it was practically impossible to adapt and expand it to the extent that a complex system such as MSW management could be holistically studied without discarding several valid perspectives. The Contingent Valuation Approach (CVA) was also too limited in capacity and much focused on economics and hypothetical costs.

3.3 The Research Design and Process

Having decided on the theory and methodology, it became pertinent to plan the research activities that will help in achieving the set goals and objectives. A sequence of actions, activities and steps necessary to do so are set out below.

- a. Describe the system and present the situation (initially through secondary and historic data) i.e. Literature review.
- b. Carry out workshops, surveys and or further review of literature to identify stakeholders (peer communities), issues and policy and governance questions
- c. Historic review to elicit from the stakeholders how the current situation came to be
- d. Use qualitative investigative methods to explore causal structures from various valid perspectives and relevant epistemologies
- e. Create meta-narratives and qualitative depictions that can be used to identify connections and trade-offs
- f. Negotiate policies and or synthesise action plans
- g. Close the 'loop' as the system and actions deemed feasible and desirable are altered accordingly i.e. repeat the process from (a) as variables change.

As shown in Figure 3.3 below, Stage 1 involved steps (a) and (b). Through thorough literature review, a preliminary field visit to the case study area, telephone calls, informal chats and use of a pilot questionnaire administered on visitors of the research website (www.waste.org.ng); the MSW management system in Aba was described and presented, and the extended peer communities (stakeholders) and the key research questions were identified.

Stage 2 involved steps (c) and (d). This is the data collection stage. By using guided unstructured interviews, qualitative information was gathered through audio recordings and notes taken during interviews with the stakeholders. As expected, these recordings and notes once analysed formed the various valid perspectives of the issues. Through personal observations and field notes, more details were obtained that in most cases validated the information obtained from the stakeholders.

Stage 3 involved steps (e), (f) and (g). Once data saturation was reached, data collection was stopped. This was achieved once no new leads or information was obtained from

further stakeholder interviews and all identified areas for observation had been visited and observed. The data collected at interviews (audio recordings) was transcribed, analysed and used to create meta-narratives and qualitative descriptions. The vision and action plan (Annex 1) to help the city move towards a sustainable MSW management system was created by further analysis of the data using the ISWM framework as the main tool.

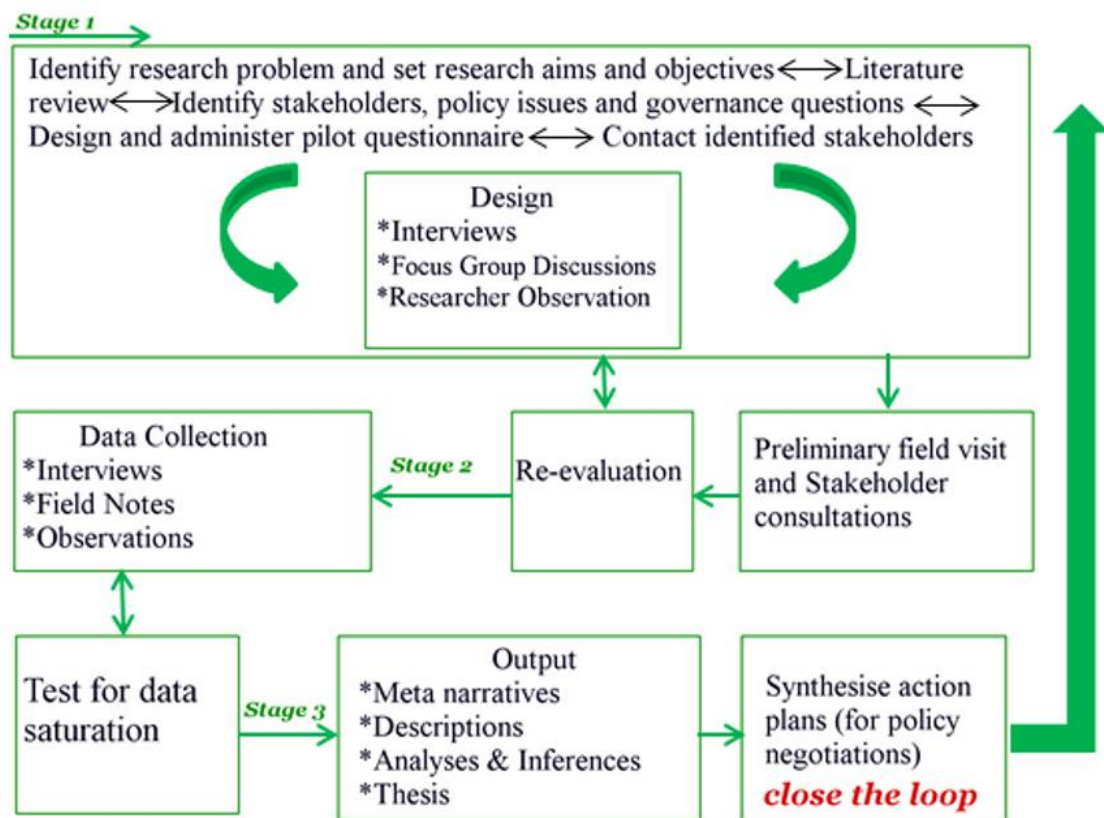


Figure 3. 3: Flow chart for the research design and process (credit: Researcher)

3.3.1 Research website

The research website (www.waste.org.ng) was created to facilitate exchanges between the researcher and would be participants. The 2015 general elections in Nigeria ushered in a new state government in Abia State but the political instability that followed as a result of court cases challenging the victory of the governor delayed the researcher's intended travel to the case study area. It became necessary to establish a reliable mode of maintaining communication with identified stakeholders, as well as identifying more would-be participants. To help the researcher have a better understanding of the current MSW situation in Aba, a pilot questionnaire was developed and administered on

participants through the research website (www.waste.org.ng/quiz/waste-mgt-survey-aba). The pilot questionnaire is also attached as appendix 10. The data obtained from the pilot questionnaire did not form part of the data analysis for research output(s).

3.3.2 Preliminary field study

The preliminary field study was designed and intended to give the researcher first-hand knowledge of the current state of the waste management situation in the city. In addition to literature review and pilot questionnaire, this was part of the research design and processes undertaken to help present the situation.

The researcher spent a total of 3 weeks in the study area between January and February 2016. During this time, emphasis was on identifying and establishing contacts with key stakeholders and proposed participants and also using researcher observations to collect useful primary data. In order to test proposed methods of data collection and sampling techniques, some informal unstructured interviews were carried out too. (The research website: www.waste.org.ng contains some picture evidences of the researcher observation). Table 3.1 below shows some of the findings from the preliminary field study.

Table 3. 1: Some Inferences from preliminary field study

	MSW management Aspect	Inference
1	Governance	Local councils do not play any role in waste collection/related services
2	Governance	The state government (through ASEPA - its agency entrusted with waste management services and environmental protection) decides what and how waste is collected, transported and disposed.
3	Governance	Existing proactive institutions are not consulted for inputs into waste management decisions
4	Governance	There appeared to be conflicts between members of staff of ASEPA and the Environmental Health Department of local

		councils. This seems to be a result of lack of clear delineation of duties of both departments.
5	Governance	The general public appeared to have next to no knowledge of existing policy regulations such as duties and responsibilities, complaints procedure, and fines for flouting such regulations due to absence of communications between the government and its agencies on one hand, and the general public and service users on the other.
6	Physical	Observable evidences of indiscriminate dumping and littering were very common in various locations in the city.
7	Physical	There were no provisions for standard (or even any sort of formal) waste bins for households, businesses and the general public
8	Physical	Waste skips (where available at recommended waste points) were left to overflow before they are carted away to dumpsites
9	Physical	There was no evidence of any sort of waste processing in place. All waste collected were transported to open dumpsite. Open burning of waste was also common.
10	Physical	There was an apparent lack of coordination and established system in managing the waste generated in the city
11	Physical	Most drainage systems were clogged with refuse
12	Physical/Governance	Staff of both ASEPA and Environmental Health appeared to be inadequately engaged as they were seen loitering in numbers during work hours
13	Governance	The researcher was informed that the environmental health department and ASEPA instituted and ran parallel mobile courts for prosecution of waste management and sanitation offenders with emphasis on extortion of money from those apprehended.

The information gathered was used to develop a cohort of probes for the different stakeholder groups using guided unstructured interviews and also to identify relevant areas for the researcher observations. The different probes (or questions) and researcher observations were systematically linked with research objectives.

3.3.3 Case Study

This research is a problem solving based learning. In order to achieve set goals and objectives, there was the need to carry out an in-depth and detailed examination of the problem. The case study method is one of the most established and common methods used in this situation (Wisker 2008). The city of Aba is thus chosen as the case study area as it fits the criteria for the phenomenon of study and out of a genuine interest in finding a lasting solution to a problem that has bedevilled the city for a very long time.

3.3.3.1 Sampling Techniques

Sample sizes for qualitative researches are relatively small, purposefully selected to obtain rich information and representative (not statistically) of the broad types of participants compared to sample sizes for quantitative studies that are usually large, can be randomly selected and statistically representative (Kielmann et al 2011).

The main sampling techniques used in this study are:

Judgement/purposeful sampling - This sampling method was used to choose certain participants due to their positions and specific roles relating to the phenomenon of study. Examples include leaders of market groups, government appointees and staff of the MSW management agency. Once the identified participants were interviewed, they were encouraged to recommend others who may be interested in taking part in the study. Those suggested were then approached and their responses recorded (Kielmann et al 2011; Robson 2002).

Random sampling – This sampling technique was used to compliment the previous techniques discussed in (a) above. It was particularly used with the general public and household stakeholder group (discussed further in section 3.3.4.7).

3.3.3.2 The Study Area

Aba is a typical Nigerian city. There is clear evidence of continued disregard to original plan and design of the city, rapid urban population growth leading to high population density, abundance of health challenges arising from poor MSW management and poor

application of environmental management policies. This situation is exacerbated by the lack of quality and reliable data on MSW management. Figure 3.4 shows the main urban area including popular streets - Azikiwe, Asa, Ngwa and Jubilee roads; neighbourhoods – Ehere, Ogbor Hill; and landmarks – Enyimba International Stadium, Water Side Bridge and Aba Amusement Park.

Aba is predominantly a commercial hub. Section 2.9.3 provides more background information of the city while Appendix 11 is a district map of the city. All of the data were collected in Aba except one interview with a senior government official that was held in his office at government house in Umuahia, the state capital.

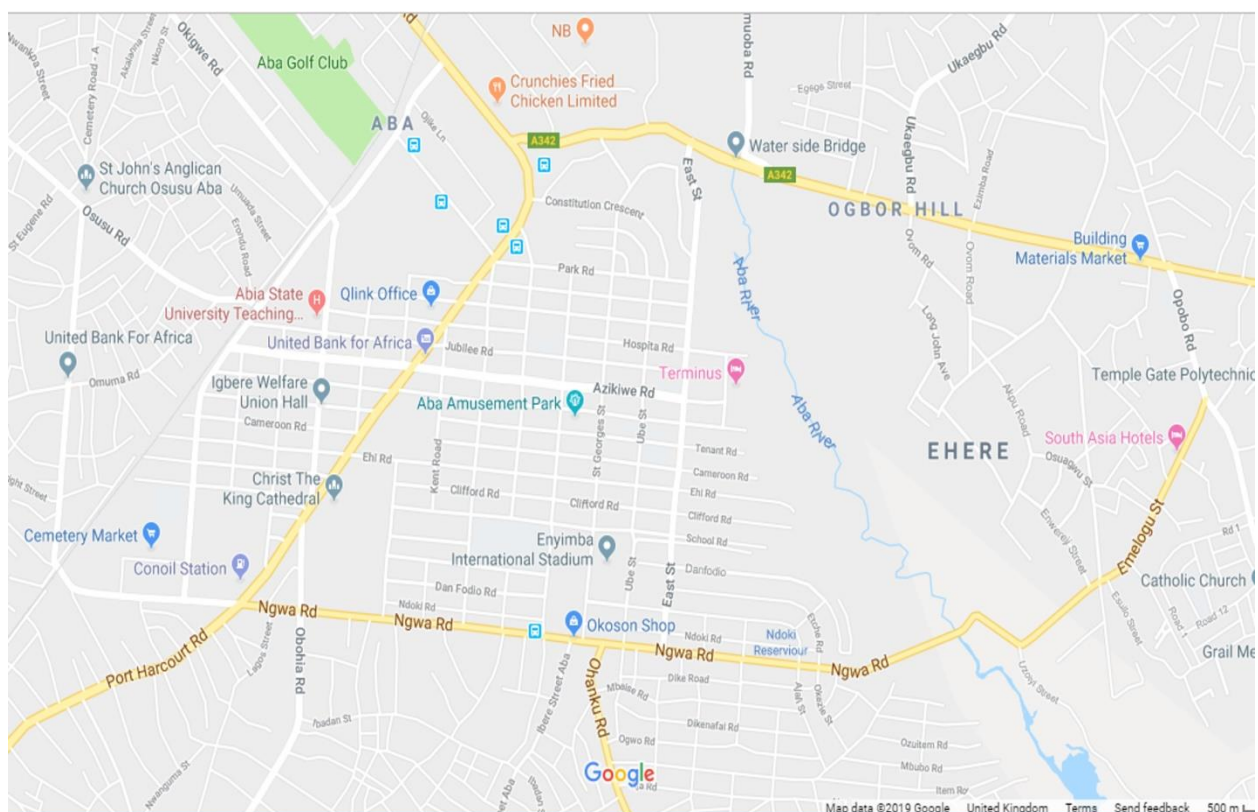


Figure 3. 4: Map of Aba urban

<https://www.google.com/maps/place/Aba,+Nigeria/@5.1070479,7.3764198,15.25z>

3.3.4 The Stakeholder Groups

PNS involves extended peer community (stakeholders) and the objectives of this study require a very local approach. The identification of the stakeholders is thus a key factor in the design of this research as well as the achievement of its goals and objectives. All identified participants have been grouped into the following 7 stakeholder groups:

3.3.4.1 The Government and Government Officials

Nigeria currently operates a democratic system where the government is made up of the Executive, Legislature and Judiciary. Each arm of government has a defined role in the effective management of MSW as stipulated in the National Environmental Sanitation Policy developed by the Federal Ministry of Environment, Abuja, Nigeria (FME 2005). In Aba, the state government through the Abia State Environmental Protection Agency (ASEPA) is responsible for ensuring effective waste management services are delivered, and thus a very important stakeholder for this study.

Proposed key participants for this stakeholder group include the Executive Governor, The commissioner for finance, the commissioner for environment, commissioner for health, commissioner for education, chairman house committee on environment, the Deputy General Manager (DGM) of ASEPA, Aba, the chairmen and or secretaries of the three (3) LGAs in the study area (Aba South, Aba North and Osisioma Ngwa LGAs) and members of the legislative arm of these three (3) LGAs.

However, only four (4) officials were accessible for interview from this stakeholder group. For the purpose of confidentiality, the identity or specific positions of those interviewed are not disclosed in this thesis.

3.3.4.2 Informal Recyclers/Waste Pickers

Informal recyclers play very significant roles in the provision of MSW management services in many low and middle income (developing) countries. In some of these countries, they account for up to 50% collection and disposal of all waste generated as well as about 20-30% materials recovery and recycling (Wilson et al (2013b)). In Aba, informal recyclers also operate, ranging from itinerant waste pickers that move from place to place, to scavengers that operate predominantly at waste dumpsites and middlemen or resource merchants that buy and resell these recovered materials. They are therefore important stakeholders in the quest for a sustainable MSW management data in Aba.

Proposed key participants for this stakeholder group include itinerant waste pickers, scavengers and middlemen/resource merchants who buy the 'recyclables' from the waste pickers. There were nine (9) participants interviewed from this stakeholder group.

3.3.4.3 Waste Management Contractors/Service Companies and their staff

ASEPA works with contractors and service companies. Some simply lend their trucks and or personnel to the establishment while others offer MSW management services to businesses such as fast food eateries and similar establishments in the city. Others are required to carry out certain specific jobs by the agency, including revenue collection and enforcement. There are also road sweepers employed on ad-hoc basis and are predominantly old and vulnerable women.

The key participants identified for this group include owners and managers of these waste management and services companies as well as their staff, and adhoc staff of ASEPA. Seven (7) participants were interviewed from this stakeholder group.

3.3.4.4 Law Enforcement and Proactive Institutions

Sound proactive institutions play a major role in ensuring a strong and transparent institutional framework which is essential in good governance of MSW management (Wilson et al 2013a) while effective law enforcement ensures there are systems in place to deter people from violating waste management laws and policies, identify, rehabilitate and punish offenders fairly and systematically.

The key participants identified for this stakeholder group include the head and staff of department of environmental health, the executive secretaries and staff of the town planning authorities of the 3 LGAs involved, the members of the task force on environment, the magistrates of the mobile court on environment, the general manager of Abia State Water Board, private law firms, NGOs, the civil defence and the Nigerian Police. There were ten (10) participants interviewed from this stakeholder group.

3.3.4.5 Manufacturing and Production Companies

The one most obvious single challenge to environmental sanitation in Aba is the volume of empty plastic sachets of what is popularly called 'pure water'. It is everywhere – on the roads, in the gutters, etc. Other major culprits are wastes from food packaging and wrapping such as paper, cardboards and polymeric materials; and organic and inorganic debris. There is also abundance of companies and businesses generating these classes of waste in the city such as water packaging companies, fast food houses and other eateries, roadside markets and even hawkers. Together, they form the key participants for this stakeholder group. Seven (7) participants were interviewed for the study from this group.

3.3.4.6 Traders and Market Unions

Aba is a city well known for the number of markets and range of wares available on offer. It is the commercial hub of Eastern Nigeria. It is also a common knowledge that traders and market unions are a very influential group and play pivotal roles in the politics of the state. Most entrepreneurs and private business persons belong to one trade or market union in the city.

The key participants identified for this stakeholder group include traders and members of the market unions of Ariaria International Market, Ahia Ohuru (New Market) and Aba Shopping Centre (Ekeoha). All three (3) markets are situated within Aba urban. Others include traders and artisans in stalls not located within the aforementioned markets but within the city centre in areas such as Azikiwe road, Asa road, Cameroon road, Park road, Pound road, Hospital road, etc. There were nine (9) participants interviewed from this stakeholder group.

3.3.4.7 General Public and Households

Data from the preliminary field study revealed that households are responsible for taking their wastes to the waste skips (where available). Others take their wastes to 'illegal' dumpsites. The general public simply use any available space for disposing waste.

The key participants identified for this stakeholder group include every resident of the city that consents to giving their opinion and providing feedback to the researcher. Therefore some members of the other stakeholder groups will double as members of this group. Twelve (12) participants were interviewed from this stakeholder group.

3.3.5 Researcher Observation

For this study, participants were observed overtly and covertly, depending on the situation, employing unstructured and semi structured observation techniques. Most of the data collected through observation are in the form of pictures with some descriptive texts where necessary. The main purpose of the researcher observation was to serve as a triangulation to validate data collected through interviews.

Table 3.2 below shows the aspects observed and how they link into the research objectives and goals. An actual observation exercise is also detailed in the data collection section.

Table 3. 2: Researcher Observation and Links to Research Aims and Objectives

The Research Objectives are as given and numbered below:

To analyse the realities and challenges of waste collection, disposal and treatment in Aba

To evaluate the history and contexts of waste management from the perspectives of the stakeholders

To identify potential areas of conflict between stakeholders

Researcher Observations	Linked Objective(s)
Waste collection services; coverage and availability	1
Types and availability of 'standard' bins	
General appearance of the environment; in terms of cleanliness and absence of litter; are dumps and skips open or secured?	1
Waste - transport of; suitability, availability and quality	
Attitudes to waste management; day-to-day actions	1
Air quality; contribution from waste management services, waste dumps and skips; and burning of waste	1
Availability of public convenience(s)	1, 2
Quality of service/availability of necessary manpower; protective clothing; morale and attitude to work	2,3
Cooperation between stakeholders; conflicts;	3
Medium and quality of communications	3

3.3.6 Interviews

The design of the interviews is such that the least possible amount of structuring is involved. Though these are called unstructured interviews, they are not necessarily completely unstructured because there are aims and objectives to be achieved. The interviews are designed to very much look like conversations in order not to limit responses from the interviewee. The broad area of study is – poor waste management in Aba; the first question is centred on this and interviewee responses are further probed and explored, according to their stakeholder group, to gather information relevant to the research aims and objectives.

Table 3.3 below shows the range of questions and possible probing and how they link to the research aims and objectives. A detailed account of an actual interview is also presented in the data collection section.

Table 3. 3: Interview Questions and Links to Research Aims and Objectives

The Research Objectives are as given and numbered below:

To analyse the realities and challenges of waste collection, disposal and treatment in Aba

To evaluate the history and contexts of waste management from the perspectives of the stakeholders

To identify potential areas of conflict between stakeholders

Interview questions/further probing during interviews	Linked Objective(s)
Availability of waste bins; types	1
Waste collection services; frequency	1
Waste transportation; nature; secured or unsecured?	1
What happens to the waste collected? Treated? Burnt? Openly or controlled?	1
Do individuals burn own waste openly?	
Participant routine as regards to waste management. Activities/actions	1
Waste points/Skips/Dumps provided? How do you know which to use?	1
Type of convenience available	1
Source of drinking water	1
Availability of waste workers (including informal waste pickers)	1
Training of waste workers; remuneration; protective clothing; job security	1,2,3
Length of time as a resident in the city	2,3
Perception of the MSW situation; getting better or worse?	2
Knowledge of changes over time; policy; actions; tariffs; fines; etc	2,3
Current costs of MSW services; affordable? Worth paying?2,3	2,3
Who collects levies? Transparency in how levies are calculated? Formula for determining what is to be paid? Communicated? Incentives for reducing waste arising?	2,3

What will be a better or desirable level of MSW management	2
Need and concerns towards your desirable MSW management	2
Personal contribution/knowledge of responsibility to an efficient MSW management. If you know your responsibilities, do you live up to them? If not, why?	2
What should be done differently for better MSW management	2
Clear policy on sanitation and waste management available? Budgets and project goals? Are these communicated to stakeholders	3
Consultations. Are stakeholders adequately involved and consulted in reaching policy goals and objectives?	3
Are there neighbourhood groups, NGOs, public-private partnerships, etc. concerned with better MSW management? Support from government? Prohibited? Are you a member?	3
MSW management contracts and jobs publicly advertised? Open bidding? Community partnerships encouraged participate? Private-Public Partnerships?	3
MSW services monitoring – who supervises? Clear mandates? Adequate training provided to both supervisors and contractors?	3
Clear delineation of duties between relevant departments and staff? Cooperation between stakeholders promoted?	3
Periodic reviews carried out? Reports? Communicated?	3

3.4 Fieldwork and Data Collection

The fieldwork and data collection exercise lasted a period of 7 weeks between October and November 2017. Though it was originally planned for early 2016, it was delayed due to political instability necessitated by ensuing legal tussles between state politicians that arose from the 2015 general elections held in Nigeria. However, it did mean that the researcher was afforded more time to consolidate the contacts with would-be participants. Part of this strategy was a social media campaign aimed at arousing the interest of residents in the city. Figure 3.5 below shows a poster used for one of such social media campaigns. The feedback and responses received from such exercises were used in retuning the research design.



Figure 3. 5: Social Media Campaign Poster (Credit: Researcher)

Once in the study area, the first step was to reach out to the stakeholders whose contact details had been obtained through email conversations, telephone calls, social media and word of mouth, and where possible, interview times and locations were agreed. I also recruited and trained 2 new graduates of Environmental Management (EM) and Electrical and Electronics Engineering (EEE) as assistants on my methodology and research objectives and goals. Through role play with the research assistants, the researcher recreated the several scenarios by having each of the assistants act as an interviewee from the different stakeholder groups. By doing this, the researcher was able to master what probes to use for each stakeholder group. This was very important as the researcher did not want to use any interview guide during the interviews. It also helped the researcher to practice and master the tone for the questions and probes so as not to ask leading questions or show any preconceived ideas or thoughts. These assistants also accompanied the researcher and sat in the first few interviews (with the permission of the interviewees).

3.4.1 Procedure

Part of the general procedures while in the field for data collection included identifying the location for each interview or observation, dressing appropriately depending on the location and the participant involved, planning the logistics and transportation to the location and ensuring the availability of a fully charged audio recorder with a fully

charged mobile phone with audio recording capability as back-up, (which also doubled as a camera for capturing picture and video evidence where appropriate), a notebook and writing pens. Fully charged replacement batteries for the audio recorder were also carried at all times.

While most of the government officials did not keep to the agreed times, it was always important to reach the appointment location at least 10 minutes before the agreed time. Before concluding the data collection, it became very clear that waiting for the interviewee (especially participants from the government stakeholder group), for at least 2 hours was a norm rather than the exception. In some cases, the interviewee will not turn up and the interview had to be rescheduled through telephone calls. Sometimes, even that did not work and the interview was forfeited. For most other stakeholder groups, time keeping was very impressive though sometimes we were interrupted by either customers (in the case of the traders and market unions, and production and manufacturing companies) or by acquaintances or general background noises (as in the case with participants from general public and households; and informal recyclers and waste pickers stakeholder groups).

Generally, the daily schedule was determined by who was available. On days when there were no appointments booked-in for interviews, the researcher carried out planned observations and or approached members of the households and general public stakeholder group. It is noteworthy to mention here that many would-be participants vehemently refused to give their opinions once MSW management was mentioned. Some cited fear of victimisation by government authorities while others insisted that nothing will ever change in the city irrespective of their opinions. Many insisted that corruption was the bane of the problems and that they had lost faith in the present crop of politicians. Some were simply dismissive with a gesture while others referred the researcher to some of the worse off areas of the city in terms of MSW management (in relation to present location of the researcher) and to interview people there instead.

3.4.1.1 Interviews

Each interview began with the exchange of pleasantries between the researcher and the interviewee. This was quickly followed by what this study termed 'formal disclosure' – a quick introduction of the researcher, the research and goal and the approach (guided unstructured interview that allows for a 2-way information exchange with audio

recording and note taking). Interviewees were also informed that no question was compulsory including personal identification details. The interviewee was then offered a copy of the information sheet and consent was requested. All interviewees gave oral consent before the interview proceeded. Where the participant declined to consent, the interview was immediately ended with what the study termed ‘closing remarks’ – a vote of thanks for the attention paid by the participant and apologies for the time taken followed by an expression of hope that the city will achieve improved MSW management. Appendices 12 and 13 show the information sheet and consent form respectively.

Once consent was given by the participant and the personal identification details obtained or declined (some interviewees gave consent for the interview to proceed but declined giving their personal identification or contact details including names and or emails), the interview will then proceed with an open question about the participant’s view of waste management in Aba. The next and subsequent probes will depend on the participant’s response and stakeholder group. Because the researcher had had extensive preparation and practice, an interview guide was not needed. This was important in maintaining a natural flow to the conversation and ensured the participants felt at ease (Kielmann et al 2011).

A total of 58 interviews were completed. Table 3.4 below provides a breakdown for the different stakeholder groups, the pseudonyms used to identify the various groups and the participant numbers (id) assigned.

Table 3. 4: Breakdown of the Interviewees by stakeholder group

Stakeholder Group	Pseudonym	No of Participants Interviewed	Assigned identification numbers (id)	% of total sample

General Public and Households	GePH	12	1 - 12	20.69
Informal Recyclers and Waste Pickers	IRWP	9	13 - 21	15.52
Law Enforcement and proactive Institutions	LEPI	10	22 - 31	17.24
Manufacturing and Production Companies	MaPC	7	32 - 38	12.07
The Government and Government Officials	TGGO	4	39 - 42	6.90
Traders and Market Unions	TrMU	9	43 - 51	15.52
Waste Management Contractors/Service Companies and their staff	WCSC	7	52 - 58	12.07

During the interviews, the audio conversations were recorded using a Sony IC Recorder ICD-PX240 (hereafter referred to as 'Recorder'). The researcher also took some notes that were helpful during the transcription of the audio recordings. Three (3) interviews had no audio recordings either because the interviewee declined being recorded or the location was unsuitable. The interview locations included offices, markets, shops, along the streets, motor parks and dumpsites.

The shortest interview lasted 98seconds (1:38s) while the longest lasted a total of 65minutes (1hr5minutes). The average interview time was 41minutes. All interviews were coded and pseudonymised and participant details (where available) replaced with code (indicating the stakeholder group) and number (for each participant). All audio recordings were transcribed manually but not verbatim. Most of the interviews were completed in English language while others were completed in Pidgin English (a variation of the English language widely spoken locally) or Igbo language (the local language of the indigenous people of Aba). Where the participant agreed to have a copy of the interview transcription, this was provided once the transcription was completed. All three (3)

participants who requested a copy of the transcriptions accepted the copies as a true representation of the interview. Appendices 14, 15 and 16 are examples of pseudonymised transcription of a short, average and long interview respectively.

3.4.1.2 Observations

The researcher observation was a key part of the data collection and possibly the most challenging too. Because the research had lived in the city, it was important that the researcher's observation was not affected by the previous lived experiences. Consequently, before starting recorded observations, the researcher spent numerous hours and several days conducting casual observation exercises. These exercises were helpful in replacing the researcher's previous lived experiences with new information that was current and representative.

All the observations were direct but depending on the situation, a covert or overt observation method was used. The researcher also used semi-structured and unstructured observations. This was necessary to ensure all areas relevant to provide the needed information was duly observed.

An example of a semi-structured overt observation was when the researcher accompanied a MSW evacuation team on a daily schedule. The researcher wanted to know everything about how their day-to-day job was executed; what equipment they had and used; if they wore personal protective equipment (PPE), and so on and so forth. The researcher contacted the officer in charge at the agency (ASEPA) and an appointment was agreed. Before proceeding to the field for the day's job, the researcher was formally introduced to the team by the officer. He also gave the researcher the opportunity to explain the objectives of the observation exercise and study to the team. Appendix 17 shows the observation notes from that exercise. On another day, the researcher decided to observe how residents disposed their waste at the designated receptacle points. This was an example of semi-structured covert observation as the participants were not formally informed that they were being observed. Appendix 18 shows the observation notes for that exercise.

On another eventful day, the researcher decided to walk from the junction where he usually got a taxi to the city centre as there was traffic jam. On approaching an area where there was a local market for food stuff, the researcher saw an elderly lady selling fresh

vegetables on the street from a basket she had attached to her bicycle. The researcher stopped and began writing down his observations. This was an example of unstructured covert observation and Appendix 19 shows the notes for this observation exercise.

3.4.2 Ethical Consideration and Ethical Clearance

Participation in this research was voluntary. The process was non-invasive and no sensitive personal data were sought from the participants. The privacy and confidentiality of all participants were respected at all times. The information sheet containing the details of the research was provided to all prospective participants and a consent form administered. All the participants gave oral consent but none signed the consent form. Most participants confirmed they had learned a few new beneficial things about MSW management by taking part in the research process. They also expressed hope that their opinions will be considered in any future plans and policy changes in MSW management in the city. No guarantees or incentives were offered for participation. However, in order to reciprocate the efforts of the participants and as a show of appreciation for the time invested in making this research a success, the researcher plans to provide feedback on the research findings to each participant to ensure they benefit from the research. This will be done a planned visit to the case study area once the final steps of the research have been concluded. Furthermore, due to the expressed despondency and vulnerability of some of the stakeholder groups, plans are now in the pipeline to institute some sort of advocacy to tackle some of the very serious issues raised. For participants that demanded a copy of their interview transcript, such was also made available through email within the agreed timeline.

All relevant data collected have been stored in accordance with QMU recommendations for data storage as stipulated in Research and Ethics Guideline Section 1, Paragraph 2.4.2. The Ethical Approval form submitted for this research is attached as Appendix 20.

3.5 Organisation of data

At the end of each day, all the audio recordings from the day's interviews were transferred from the 'Recorder' to an ASUS laptop computer (hereafter referred to as 'Laptop'). The notes taken during the interview contained the identification details that were used to match up the audio files to the respective interviews. This information was used to pseudonymise the data before copies of the audio files were then saved unto the researcher's Onedrive (an online data service provided by Microsoft) account as backup.

3.5.1 Pseudonymisation

Pseudonymisation here simply means removing all interviewee personal details and replacing them with a pseudonym and participation number. The data thus become anonymous to everyone else except the researcher who can still identify the interviewees using the notes taken during the interviews i.e. where such details were made available in the first instance. Pseudonymisation involved 2 parts – a mnemonic that identified the interviewee's stakeholder group and a serial number for each interviewee in the stakeholder group.

3.5.2 Transcription

All the interview audios were manually transcribed by the researcher using the intelligent transcript method. The transcription was effected using Microsoft Groove Music (MGM) and Microsoft Word applications. The process often involved several play-backs of the audio files on MGM and typing on Microsoft Word. The MGM offered the functionality of an interactive screen with pause, rewind and drag-back; slow play speed, etc. options which were very handy in completing the task. After each transcription, the researcher then listened to each interview audio one more time, this time without the transcribed notes but with just a pen and paper, taking notes of all the points that were made by the interviewee. This new notes were then used to check the transcribed notes for any points missed.

3.5.3 Thematic Coding of data

Once the transcribing of the interview recordings was finished, the raw data was made into a 160-page Microsoft Word document. The thematic coding of the data was a two-stage process. The first involved reading through the interview transcriptions (raw data) over and over again to familiarise oneself with the data (Creswell 2007; Braun and Clarke 2006). The second was to apply codes by asking the following questions: what is going on? What are the participants saying? What are the participants doing? What do the actions and statements mean or take for granted? What structures and contexts support or impede these actions and statements? (Charmaz 2003). Some of the codes used were simply common words that appeared in participant responses (Gibbs 2007) such as ASEPA, services, corruption, nepotism, manpower, skips, sickness, pollution, population, professional, payment, enforcement, recycling, responsibility, harassment, taskforce, drainage, dumpsite, waste, etc. Others included values, rules, norms and narratives expressed by participants and those developed by the researcher which related to the

research questions and objectives (Gibbs 207). Examples include house to house collection, waste management professionals, waste separation at source, open burning, western world, environmental health officers, etc. A total of 142 codes were developed and applied on the raw data. This was done using different highlighting schemes and colour coding on Microsoft Word. Once the entire document was coded, the texts were collated according to the applied codes with the pseudonym and number indicated representing the stakeholder group and participant identification number (id) respectively. A coding list containing the definition of each code was also created to assist the research in the next step of identifying themes.

3.5.4 Thematic Analysis of data

Once the coding was completed and checked over a few times for errors, the next step was to identify common themes. The first step was to use the coding list to find relationships between codes that had been applied. This was done by synthesising the code definitions and applying the suggestion of Ryan and Bernard (2003) by identifying repetitions, metaphors and analogies, similarities and differences such as comparisons, missing data, linguistic connectors, indigenous typologies and transitions. This inductive approach allowed the research findings to emerge from frequent, dominant or significant themes inherent in the data (Thomas 2003). Still using Microsoft Word, all texts for similar codes that had been combined to form a theme were copied and combined into one document for analysis. For example, codes that had ASEPA, manpower, service, responsibility, government, etc. were combined in the analysis for the broader theme of MSW management service constraints, challenges and investment options. The initial syntheses of the codes into sub-themes which were then combined further to form themes were completed using a combination of mind maps and thematic sketches. During the actual analysis of the coded and copied texts, responses that were not applicable were identified and marked as 'outliers' and used in other themes where they were applicable.

After the initial collation of the codes, eight initial themes were identified. This was in line with reports from Thomas (2003) which suggests that most inductive studies report a model of 3 to 8 main categories in the findings. Deductively, by applying the ISWM framework upon which the research questions and objectives had been previously developed, the 8 themes were then summarised into the following six main themes or findings: Historical review of MSW management in Aba; Realities and challenges related

to aspects of MSW management; Aka Syndrome and knowledge of MSW management; Realities and challenges related to the governance of MSW; ASEPA operations and relationship with other stakeholder groups; and The operations and role of informal waste workers.

Once the main themes had been identified, the codes were collated again, this time according to the stakeholder groups. The data was analysed again to find out if there were agreements or disagreements amongst members of the same and different stakeholder group. All the data coding and thematic analysis were done manually, without the use of any qualitative analytic software.

3.5.5 Research Output

The main research output of this study will be the thesis. This will be a collection of descriptive essays and qualitative depictions such as influence diagrams, charts, tables and pictures arranged in form of chapters. The main result chapters are chapters 4, 5, 6 and 7 and together, they present the outcome of the data analysis and provide answers to the research questions. In Chapter 8, the researcher discusses the main findings and contextualises same with relevant literature.

Other research outputs will be in the form of research papers published in peer reviewed journals and on the research website. There are also plans to make the vision and action plan (Annex 1) into a handbook for waste managers and policy makers.

CHAPTER FOUR

The History and Contexts of MSW from the Perspectives of the Participants

4.0 Introduction

This chapter presents the history and contexts of MSW management in Aka by recounting the stories told by the participants. Where relevant, their accounts will be supported with observations made by the researcher and picture evidences. The chapter will address the second aims and objectives of this study (as detailed in pg. 7).

4.1 Historical Review of MSW Management in Aba

Historical reviews of the MSW management practices or systems in cities around the world tend to revolve around the drivers of the observed changes. In the UN Habitat's book – solid waste management in the world cities, the section titled 'learning from history' focused on the drivers. Most publications by David Wilson on history of MSW management follow the same pattern. It is thus a good practice to historically review MSW management along the lines of changes in the driver.

However, it is often commonly said in Nigeria that Nigerians do not attach much value to history - something which can be argued as being partly responsible for the dearth of relevant academic literature on the subject of this section. Thus, in order not to lose the value of the stories gathered from the stakeholders in this study and to ensure that it contributes to closing the obvious gap in literature on the subject matter, this section will be dedicated to the history, contexts and perspectives of MSW management in Aba while a separate section will be dedicated to the drivers, or motives, of MSW in the city.

In order to recount these stories accurately and make sense of the rich information they contain, it is necessary to define four (4) different timelines. These timelines have been chosen by the researcher to correspond to the most common reference points referred to by the stakeholders in this study. Table 4.1 below shows the different timelines (eras).

Table 4. 1: Four (4) Eras of MSW Management in Aba

Timeline	Era
Years up to 1987/1988	Mbakwe's era – Era of Stability
1988 - 2013	After Mbakwe but before Okezie Ikpeazu became DGM of ASEPA Aba Zone – Era of Decay
2013 – 2014	Okezie Ikpeazu as DGM – Era of Adhoc Remediation

2014 to date	After Okezie Ikpeazu’s tenure as DGM – Era of Oppression
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4.1.1 Period 1 - Mbakwe’s Era (The era of Stability)

Chief S.O Mbakwe was the governor of old Imo State from 1979 to 1983. Abia State was carved out of the old Imo State in 1991. Most participants referred to this period (Mbakwe’s tenure as governor) as a time when government in the state had a sense of purpose. They enthused that there was a clear policy, determination, drive and commitment by the government of the time to keep the environment clean and protect the lives of the masses. Table 4.2 below is an excerpt from stakeholder interviews.

Table 4. 2: Excerpt of Stakeholder Responses – Mbakwe’s Era

Participant id	Comments
9	We should not be littering waste here and there. The truth is that this government has no program. During Mbakwe’s time, there was a program called ‘Keep Imo a Beautiful Society’ which was positively pursued.
22	I’m in my late 40s now. As a kid, I saw Environmental Health Officers (EHOs) from local governments coming to fumigate our gutters. I also participated as a member of the War Against Indiscipline and Corruption (WAI-C) brigade. We usually went round Aba excavating refuse and de-silting the gutters, something they now give out as major contracts to political cronies for huge pay and yet it does not get done.

The WAI-C was a headline program of the then Supreme Military Council (SMC) headed by Major General Muhammadu Buhari and his second-in-command Major General Babatunde Idiagbon. Stories of overzealous military personnel beating up civilians for offenses such as not queuing up or littering were common but as the states were also mandated to implement the WAI-C, it meant that public officials were held accountable and responsible when they failed in their duties. The participant (id = 22) continued – “Even though then, the population was not as much as it is now, bearing in mind the small

population and the efficiency of the (waste management) professionals that were used then, the Aba environment was very clean”. He went on “I know that I met an environmental system where you see the EHOs do not just sit in their local governments waiting for allocations to be shared as salaries; these people go (went) about noting houses that are dirty and once your house is noted as being dirty, the next thing that happens is that police will come to arrest the landlord. And what the landlord will do is to bring out the erring tenant who will be sanctioned. Most times, it attracted quit notices to people”. These stories were somewhat a recurring decimal and another participant (id = 1) even told of how women found culpable by EHOs on inspection were treated as outcasts in the community as other members of the community resented, avoided and “treated them with odium”.

It is interesting to note that most participants agreed that the actual process of managing waste in the city during the Mbakwe era is similar to what is still in use now though one participant (id = 7) highlighted that during this era, the waste was dumped on the ground at specific places as there were no skips. However, he added that the heaps of waste were timely and regularly evacuated unlike what is obtainable now. All the participants were of the opinion that the Aba environment was cleaner during this era, and by analysing their responses, the researcher identified the responsibility for each of the main reasons given as justification by the participants. These are shown in Table 4.3 below.

Table 4. 3: Reasons given by Participants for a cleaner environment during Mbakwe’s era

Reason	Responsibility
Sincere and purposeful leadership	The government, policy makers
Clear policy on waste management	The government, policy makers
Use of trained professionals (EHOs)	The government, policy makers
Enforcement and deterrent	The government, policy makers
High level of discipline	All stakeholders
Support groups e.g. WAI-C brigade	All stakeholders
Low population density	All stakeholders
Public waste bins at strategic locations	The government, policy makers

One major factor referred to by many participants as a reason for the worsening state of cleanliness was population. One participant (id = 7), captured the opinion of many very succinctly when he said “Aba used to be cleaner but the increase in population has put a lot of pressure. The process employed now is better (referring to the use of skips against the practice of dumping the refuse on the ground) but it’s not punctual or regular and that’s why it seems it’s not working. The timing needs to be improved to ensure the skips don’t overflow”.

4.1.2 Period 2 – After Mbakwe (The Era of Decay)

The timeline for this period has been designated as 1988 to 2013. In essence, it could be anytime from 1984 as many stakeholders argue that the then SMC did not fund the ministries adequately to maintain the level of services they were providing but rather used military might to crack down on civilians. There is some truth in that as it is on record that the then SMC ran an austerity economic policy. Others put the genesis of this period to about earlier 1990s when Nigeria had become deep rooted in military rule. Whatever the timeline was, most participants opined that this period saw the beginning and sustenance of the decay in MSW management that is still being felt today in cities all over Nigeria. The National Environmental Sanitation Policy – a policy document developed by the Federal Ministry of Environment (FME) in 2005 throws more light on this when it says in section 1.2.4 (pg. 12) “In the immediate post-independence era (1961-1980), legislation and authority on Environmental Sanitation were derived from the Nigerian Constitution as stated in the concurrent, exclusive and residual lists. Nonetheless, routine house to house inspection was still effective in the maintenance of environmental sanitation. However, political interference with the statutory role of Sanitary Inspectors led to the collapse of the house to house inspection programme and contributed to the poor sanitary conditions in the country”.

What followed was a litany of legislative and regulatory instruments (Table 4.4 below) developed at different tiers of government in an attempt to address the worsening sanitation situation.

Table 4. 4: MSW- Related Legislative and Regulatory Instruments in Nigeria

	Title of Legislation/Regulatory Instrument
1	Harmful (Toxic) Waste Criminal Provision Decree 42 of 1988

2	Federal Environmental Protection Agency (FEPA) Decree No. 58 of 1988 and No. 59 of 1992 as amended
3	National Policy on Environment (1989) and 1999 as amended
4	National Environmental Protection (Effluent Limitations) Regulations S.1.8 of 1991 – mandatory for industries to install anti-pollution equipment and for effluent treatment
5	National Environmental Protection (Pollution Abatement in Industries and Facilities Generating Wastes) Regulations S.1.9 of 1991
6	National Environmental Protection (Management of Solid and Hazardous Wastes) Regulations S.1.15 of 1991
7	Environmental Impact Assessment (EIA) Decree No. 86 of 1992
8	Nigerian Urban and Regional Planning Decree No. 88 of 1992
9	National Urban Development Policy, 1992
10	Guidelines on Hazardous Chemical Management 2001
11	Guidelines on Pesticides Management and Handbook on Safe and Effective Use of Pesticides 2001
12	Blueprint on Municipal Solid Waste Management in Nigeria 2001
13	The Blueprint on Handbook on Waste Management in Nigeria 2001
14	The Blueprint on Environmental Enforcement 2001
15	Promulgation of State Edicts/Laws and Local Government Bye-laws

These regulations were followed by the creation, at various times, of several state and local government agencies responsible for sanitation (including Abia State Environmental Protection Agency – ASEPA), and the creation of the FME in 1999. The states were also empowered to levy the service users. It is important to highlight that from 31st of December 1983 to 29th of May 1999, Nigeria had 4 military Heads of State and a civilian headed transitional government that lasted 83 days. It is thus not surprising that most participants described the situation that ensued during this era as chaotic. When asked about MSW management in Aba during this time, one stakeholder (id = 7) who has lived in Aba since 1988 said “I’m talking 20 – 25 years ago. Then waste was dumped on the ground at specific places. There were no skips or mobile removal systems. I don’t think such system will survive with the kind of population we have in Aba now”.

According to Chukwuemeka et al (2002), corruption in Nigeria manifests in several forms including, but not restricted to, inflation of official contract fees, doling out of public funds to political allies and cronies in the guise of contracts, kickbacks on public procurements and outright embezzlement of public funds. Many participants in this study narrated how corruption and nepotism slowly but steadily grew through the military regimes to the point now where it pervades the entire public service. It is corruption that the participants blame for the dilapidation in infrastructure. Many argued that with the diversion of public money into private purses, the existing infrastructures were left to rot away as they were not maintained. It is not difficult to see why corruption is also blamed for the loss of discipline and disillusionment of both public sector workers and members of the public as reflected in the following responses by participants. When asked how the MSW management situation has changed in the last 20 years, one participant (id = 9) said “It has gotten much worse. There was a time this street was being swept by road cleaners. Now, from year to year, nothing; 5 years, nothing. It is like this because the present democracy that is almost 20 years has no program, no positive and practical program. They may claim to have ASEPA and what have you, but they are all empty claims that can be likened to building a house without foundation” while another (id = 28) added “Before I get into that, the whole country is in a mess. Salaries are not being paid and morale is very low. Most staffs now call in sick and you cannot force anyone to work when they are sick”.

This period in review also saw the designation of every last Saturday of the month as the monthly environmental sanitation day. This was enshrined in the national environmental sanitation policy and was to be implemented by states and local governments. A participant (id = 38), who functions as a senior government officer said “by policy there is also a monthly environmental day every last Saturday of the month aimed at helping get waste that was not properly disposed to the designated places”. As well-meaning as an environmental sanitation day may seem, it appears to be an acceptance of the failures in the system and an attempt to shift the responsibility to the service users. This will be discussed further in section 2 under ‘Monthly Environmental Sanitation Day’. Table 4.5 below is a summary of the reasons given by the stakeholders for the poor state of MSW management in Aba during this period.

Table 4. 5: Reasons given by Participants for poor state of MSW management between 1988 and 2013

Reason	Responsibility
Absence of strong, purposeful leadership	The government, policy makers
Proliferation of corruption	All stakeholders
Inadequate funding	The government, policy makers
Dilapidating infrastructure and MSW management equipment	The government, policy makers
Absence of a clear focused policy on MSW management	The government, policy makers
Indiscipline and indifferent attitude	All stakeholders
Dearth of support groups	All stakeholders
Indiscriminate dumping of refuse	Service users
Oppression and apparent state of despair	The government, policy makers

4.1.3 Period 3 - During Ikpeazu's tenure as DGM, ASEPA Aba Zone (The era of Adhoc remediation)

Okezie Ikpeazu is the current governor of Abia State. He holds a PhD in Biochemical Pharmacology and was appointed Deputy General Manager (DGM) of ASEPA Aba Zone in June 2013 by the then governor of Abia State. A position he resigned in October 2014 to become a gubernatorial candidate.

Part of the outcomes of the decay period preceding this was the creation of ASEPA. Analysis of the data collected during this study shows that ASEPA has the overall mandate of managing MSW in the entire State. It was also put under the direct supervision of the state governor, who appoints members of the Abia State Environmental Protection (ASEP) Board with very little oversight function. The entire state was divided into 2 zones – Aba and Umuahia (the 2 main cities in the state). These zones covered the adjoining environs too. Consequently, MSW management was no longer a responsibility of the local governments. It also meant that the Ministry of Environment was no longer responsible

for MSW management in Abia State. ASEPA, current structure and the implications of this structural change are discussed further in section 4.2.

In his position as the DGM of ASEPA Aba Zone, Ikpeazu could be said to be responsible for MSW management in Aba. According to the feedback from relevant stakeholders, with his senior management staff, the DGM was expected to set the zone's strategic focus and operational processes. He controlled the revenue and could hire and fire staff for the zone. While he was expected to report to the governor on a monthly basis, he only really had recourse to the governor if his zone needed more funds. Several participants narrated that at this time; refuse heaps occupied even major streets in the city for upwards of 2 weeks before they were eventually evacuated. The mandate was clear.

With the city almost overrun by refuse and the stake so high, Ikpeazu (and his team) embarked on several remedial approaches to save the city from the menace of MSW. Some of these measures included irregular street to street collection services; sustained evacuation of refuse from unofficial dumpsites and the introduction of secondary refuse collection points (skips) and heightened monitoring and enforcement activities. When asked for a personal opinion on MSW management in the city, a participant (id = 33) responded thus "I think ASEPA has lost total control compared to when the present governor was the head of ASEPA. In my street, people dump waste on the street because there is no designated point nearby (the closest is over 2 miles away). Some people dump in the gutter and others use any bush close to them". When asked what was different in how waste was managed when the present governor (Ikpeazu) was the head of ASEPA and now, the stakeholder continued thus "there was street collection service. People eagerly awaited those ASEPA vehicles as if they were celebrities. The environment was cleaner and people were happy". Another participant (id = 30) enthused "I have lived all my life here in Aba the exception being when I was studying. I have practiced here (as a legal professional) for about 12 years. There was a time it (the MSW management situation) was very bad. Those days, Aba was known as 'Aba dirty' but since the present governor served as ASEPA boss, I won't say they have fallen much short". A participant (id = 42), who functions as senior member of staff at the agency (id = 42) added "before the present governor's tenure as the DGM ASEPA Aba, refuse dumps used to take over almost all the major roads in Aba including Asa Road, and they will be there 2 or 3 days before they are carted away. Now, those heaps get removed on daily basis.

It is important to point out that Ikpeazu’s approach to MSW management in the city was mainly adhoc. The comments lend credit to this position too. It could be argued that the approach was suitable at the time as it proved successful. That much is recognised and appreciated by stakeholders going by the following participant responses: (id=4) “The best has not been given with respect to waste management in Aba. A huge success was recorded when the present governor was the ASEPA manager. Waste is no longer being carted away appropriately as it used to be. Waste receptacles are getting overfilled and more wastes dumped on the ground”. He continued: “That man was always in the field and he gained popularity from what he did as head of ASEPA. That’s partly why he became the governor. Now he’s the governor, he may not know what goes on in the field. We need to find out if the problem is coming from ASEPA as a sector or from the centre (state government)”.

However, the underlying problems inherited from the previous period including corruption, dilapidated infrastructure, indiscipline, etc. remained and that perhaps partly explains why the success recorded during that period has not been sustained to date. Table 4.6 below summarises the reasons given by participants for the improved state of MSW management in Aba during the era in review.

Table 4. 6: Reasons for improved state of MSW management in Aba during the adhoc remediation era

Reason	Responsibility
Purposeful leadership	The government, policy makers
Improved monitoring, enforcement and deterrence	The government, policy makers
Improved staff discipline and morale	The government, policy makers
Public compliance and goodwill	Service users

4.1.4 Period 4 - After Ikpeazu’s tenure till date (The era of Oppression)

The current leadership of ASEPA continued with the basic operating processes introduced during Period 3 with a few minor tweaks such as the introduction of a time restriction to when refuse can be dumped at the secondary collection points (skips) and the introduction of bin bags which the service users are expected to buy from the agency. They have also expanded the role of the agency staff to include such duties as health

education and abatement of nuisances – roles which are also in the primary remit of EHOs. This is discussed in more details in section 4.2.

Surprisingly, or rather unsurprisingly based on some of the previous comments by stakeholders, the agency has not lived up to the expectation of the people and that is not because the expectations are unreasonable. There are serious accusations of nepotism and corruption, ineptitude, gross inefficiency and even oppression levelled against the current leadership of the agency. One participant (id=41), who functions as a senior member of staff of the agency said “The salaries we receive are not even what we are paid on paper – I can tell you that those receiving twenty thousand naira (#20,000.00) are recorded as fifty thousand naira (#50,000.00) on paper. You can ask anyone who knows the inner working here. The level of corruption is untold”. The researcher was also authoritatively informed that in one department at the agency, there were 35 to 40 names of staff on that department’s payroll, that are paid regularly but do not turn up for work. When the researcher enquired if those people can be called ‘ghost workers’ (a common term used in Nigeria to describe staff that draw salaries but do not carry out their duties), there was great laughter first and then the participant responded thus: “we are not saying they are ghosts, they come and take their salaries but they don’t work. I am just giving you true information. I can be fired tomorrow but the truth has to be told”.

On the service front, the researcher noted that all the gutters observed in the city were filled with refuse. Indiscriminate dumping was rife and there were no refuse bins at strategic points for use by the public. Consequently, odour nuisance and vermin infestation was of obvious concern. Pictures 3 and 4 below are original images captured by the researcher in the city.



Picture 3: A Refuse-blocked gutter near Aba Main Park [Credit: Researcher]



Picture 4: Indiscriminate dumping of refuse and dilapidated road in Aba [Credit: Researcher]

Many participants decried the current state of MSW management in the city. Many condemned the introduction of time restrictions while others lamented over the few number of designated secondary collection points (skips) available. The biggest issue though for the participants was the apparent lack of service provision on the part of the agency even after collecting multiple levies supposedly meant for such services. All the traders in the markets and malls that were interviewed stated that they paid between one thousand (#1000.00) and three thousand Naira (#3000.00) annually for sanitation and because the agency does not provide the service paid for, they have to pay informal waste pickers each time they hand over their waste to the pickers. Some say they pay as much as two hundred (#200) daily depending on the quantity of waste they hand over. The story was the same for all the service user groups interviewed. The situation meant that most participants felt oppressed by the agency in particular and the government in general. Table 4.7 below is an excerpt from stakeholders' responses.

Table 4. 7: Excerpt of Participant Responses – Era of Oppression

Participant id	Comments
45	<p>“Government contracts the revenue collection to individuals but the worst part is that once they collect the revenue, they disappear. You are left to pay private people to dispose your waste”.</p> <p>“Government is just using the waste management portfolio to generate funds from the masses. They do not understand what it takes to provide the waste management services needed”.</p>
48	<p>See, when I pay for electricity bill, I expect electricity supply every day. Likewise, when I pay for sanitation, I expect service from them (ASEPA). That’s all; nobody is asking them for favours.</p>
47	<p>“There was a time ASEPA used to go round with their truck and people will be throwing their waste into the trucks. At least, that was service everyone could see. Now they tell you they have some buckets somewhere and you have to take your waste there. For us here, I cannot leave my work to go and throw my refuse there because it is far”.</p> <p>“They usually come in a very terrible way – with police and even thugs and they will apprehend everyone they find in the vicinity. All those people (apprehended) will bail themselves and also pay the levy”.</p>
49	<p>“The truth is that if it is a government that has respect for people’s right, they will seek the views and opinions of people in this market. But this government don’t care; they just enforce whatever they decide”.</p> <p>“We know this government; they are just after their pockets”.</p>
44	<p>Traders pay #1000 per shop to ASEPA for waste management through the market’s task force on sanitation but ASEPA does not provide any service so traders spend even more money, #100 to #200 weekly to dispose their waste through informal waste pickers</p>
43	<p>“You get nothing for the #1000 but you have to pay it”.</p>

3	“Yes, we pay but not directly to government but to revenue collectors. It's actually a problem because there is no link between what is paid and disposing of waste as there is no service provided”.
5	“Yes, I pay sanitation levy but I have never seen anyone from ASEPA or otherwise come to cart away my waste”.
6	“Absolutely nothing. The nearest designated skip is about 10 minute drive away (I don't know the distance in km)”.
32	“Absolutely nothing. I still have to pay a private contractor between #15,000 and #20,000 every month to dispose my waste”.

These responses were common from members of all the stakeholder groups and when these concerns were posed to the senior management of the agency, the spokesperson (id = 40) insisted that the agency was providing the best services possible considering the huge challenges the agency faced. He also blamed the service users and residents of the city for some of the issues stating that indiscriminate dumping had become habitual for most while many others will go to any length to avoid paying the statutory sanitation fees thus making it even more difficult for the agency to generate the much needed funds to run its operations. When asked if the distance of the skips from some service users, and not having the right orientation could be valid reasons for some of the expressed unacceptable behaviour, he said “they may have the right orientation but the indiscipline in them or laziness will make them not appreciate the short trek to the skip”. He added that dissident behaviour is frequent – “A typical Aba man is dissident”. The researcher then informed him that previous studies have shown that most dissident behaviours could be overcome by adopting an inclusive approach that involves all stakeholders. At first, he found it laughable and then responded as follows “naturally, it is difficult to consult the waste generators. You take decisions, design the system and communicate the decisions to them. It is the business of the agency to design waste management strategy and tell them the strategy so designed”. This attitude was rife at the agency and all the agency staff interviewed confirmed the stakeholders have never been consulted with regards to seeking their opinions into how waste should be managed in the city. However, all other stakeholder groups declared their keenness to have an opportunity to

give their opinions and contribute to the design of the MSW management process of the city. The issue of power relations and inclusivity is discussed in more detail in Chapter 6.

In light of the responses received from participants and what was observed in the city, it is justifiable to say that most of the problems described in Period 2 (the era of decay) still persist to date. One may argue that there is a clear policy in that all the stakeholders that responded knew their responsibilities in terms of the requirement to take their waste to the skips and perhaps more importantly, the need to pay their levies. What is also obvious is that the policy is not working. With very few designated points, the distance to a skip is far and inaccessible to most service users. The poor state of local roads and the absence of use of standard temporary storage bins compound the problem of accessibility to service users. Consequently, participants' assessments of the agency were scathing and understandably so. Table 4.8 below summarises the stakeholders' reasons for the current state of MSW management in Aba.

Table 4. 8: Reasons given by Participants for the current poor state of MSW management in Aba

Reason	Responsibility
Pervasive level of Corruption	The government, Policy makers
Lack of Enforcement and high levels of indiscipline	All stakeholders
Unsuitable MSW management policy	The government, Policy makers
Oppression and apparent state of despair	The government, Policy makers
Dilapidated infrastructure and equipment	The government, Policy makers
Indiscriminate dumping of refuse	All stakeholders
Poverty, poor awareness and general lack of information	All stakeholders

4.1.5 Summary

In an attempt to carry out a review of the history and contexts of MSW management in Aba, stakeholders' responses were used to identify four (4) key periods/timelines with

unique characteristics that could be of immense benefit in understanding, and perhaps, contribute to solving the current problems of poor MSW management in the city. Analyses of the stories told by stakeholders in the city reveal the crucial role of a strong and focused leadership in achieving good MSW management. This agrees with previous reports from cities such as Ghorahi (Nepal), Kunming (China) and Bangaluru (India), where strong and committed leaderships and genuine citizens' participation in the design, implementation and evaluation of MSW management processes helped overcome financial constraints. The stories and responses from participants also highlighted the negative impact of pervasive levels of corruption and nepotism, dilapidated infrastructure and equipment, and loss of discipline and morale on the state of MSW management in Aba. Most of the challenges of MSW management in the city today, it is safe to say, are historic and the genesis could be traced back to mid or late 1980s.

Throughout the period in review, the approaches to MSW management have remained rudimentary – predominantly involving the evacuation of refuse from one point to another without any form of treatment or processing. Recent efforts at achieving a better or acceptable level of MSW management can be best described as palliative as most of the historical problems and challenges have either been overlooked or ignored by the government and policy makers. Table 4.9 below summarizes the different eras reviewed.

Table 4. 9: Summary of the different Eras of MSW management in Aba

Era	Mbakwe (Era of stability)	After Mbakwe (Era of decay)	Okezie Ikpeazu as DGM ASEPA Aba zone (Era of adhoc remediation)	Current (Era of oppression)
Time period	Post-colonial to 1988	1988 to May 2013	June 2013 to October 2014	November 2014 to date
Positives	Strong, committed and focused leadership; Support groups; Discipline	None	Strong leadership, commitment, monitoring and enforcement	Willingness of service users to pay; clear mandate
Negatives	Rudimentary systems of MSW management	Indiscipline; proliferation of corruption;	Adhoc approach; underlying	Oppression of the masses; Corruption; nepotism;

		lack of leadership	problems not tackled	unprofessionalism; indiscipline and lack of commitment
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CHAPTER FIVE

Current Realities and Challenges of MSW Management in Aba

5.0 Introduction

In chapter 3, the researcher presented a list of researcher observations and interview questions that were devised to ensure the aims of this research were achieved. These are shown in Tables 3.2 and 3.3 (pp. 70 and 71 respectively). These questions and probes were designed to cover all areas of MSW management as shown in the ISWM framework (Figure 2.4, pp.29) and linked to specific aims and objectives of this study. This chapter addresses the first aims and objectives of this study (pg.7).

5.1 Current realities and Challenges of waste collection, disposal and treatment

The ISWM framework is further simplified into the ‘two overlapping triangles’ analytical framework shown in Figure 2.5 (pp.29). Clearly, collection, treatment and disposal are covered in the first triangle – physical.

However, before presenting the current realities and challenges, the next section will present further details of the agency responsible for MSW management in the city and the current MSW management process. The purpose is to highlight what the ideal process entails so as to contrast it with the realities on the ground.

5.1.1 ASEPA Aba zone, Key Officers, Structure and Operation

As mentioned in section 4.1.2, part of the steps taken to curb the declining state of environmental cleanliness and MSW management in Nigerian cities was the setting of environmental protection and refuse management agencies at state levels (FME 2005). Data collected during this research confirms that ASEPA has the full responsibility of MSW management in the state, and unlike in other states in Nigeria such as Lagos, where the environmental protection and MSW management agency is under the ministry of environment (Nzeadibe and Ajaero 2010), ASEPA is directly under the office of the executive governor of Abia State. As mentioned in section 4.1.3, Figure 5.1 shows that the DGM has the overall control of the day to day running of the agency in the zone. The ASEPA

board, whose members are appointed by the executive governor, maintains very little oversight function. Other key officers of the agency include the Chief of Staff (supposedly the most senior public servant and permanent staff of the agency); the director of finance, head of administration, head of education and director of operations. Information gathered from participants show that all the key senior officers mentioned above except the chief of staff, are employed by the agency on adhoc basis. This means that such officers are political appointees of the DGM and by extension, the executive governor.

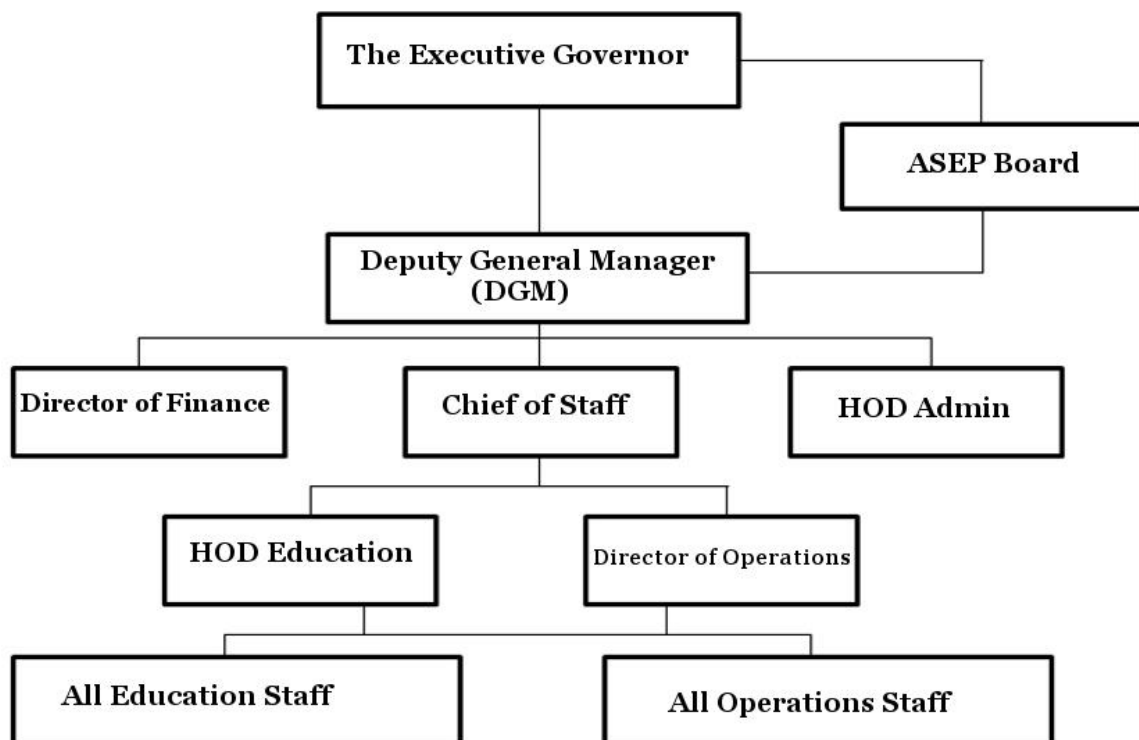


Figure 5. 1: The Organogram of ASEPA Aba zone (Credit: Researcher)

The education department is responsible for educating the general public and providing information on the MSW management policy of the agency. Members of staff of this department headed by the HOD Education include supervisors and educators. Information from participants shows that while there are about 70 members of staff on the payroll, only about 30 participate in the delivery of service. All but one member of staff are employed on adhoc basis.

In the operations department, responses from participants show that only one driver is employed on permanent basis. All other members of staff are employed on adhoc basis. Members of staff of this department headed the Director of Operations include:

Operators - those who operate the different equipment such as compactors, pay-loaders, excavators, roll-off trucks, etc.

Road Sweepers – those who sweep the streets.

Evacuators – those who follow the trucks, tippers and compactors.

Bucket Minders – those stationed at every designated point (skip) to ensure no refuse is littered round the bucket and to close the bucket when it is full. The closing of the bucket means using ropes to tie around the bucket (see picture 10, pg. 121), signalling that more refuse should not be dumped into it.

Mechanics – those who repair and service the vehicles, machinery, equipment, etc.

Supervisors – they supervise the evacuators and bucket minders.

According to the information obtained from participants, the agency also engages 27 contractors called 'revenue consultants' (RCs). Each revenue consultant manages one zone and each zone is an area of the city without accessible road. As well as collecting revenues from residents in each zone, each contractor is in principle, required to organise and effect the evacuation of refuse from their zone. Analysis of the data collected shows that the current MSW management policy implemented in the city by ASEPA is a 2-stage process that should work as shown in Figure 5.2 below.

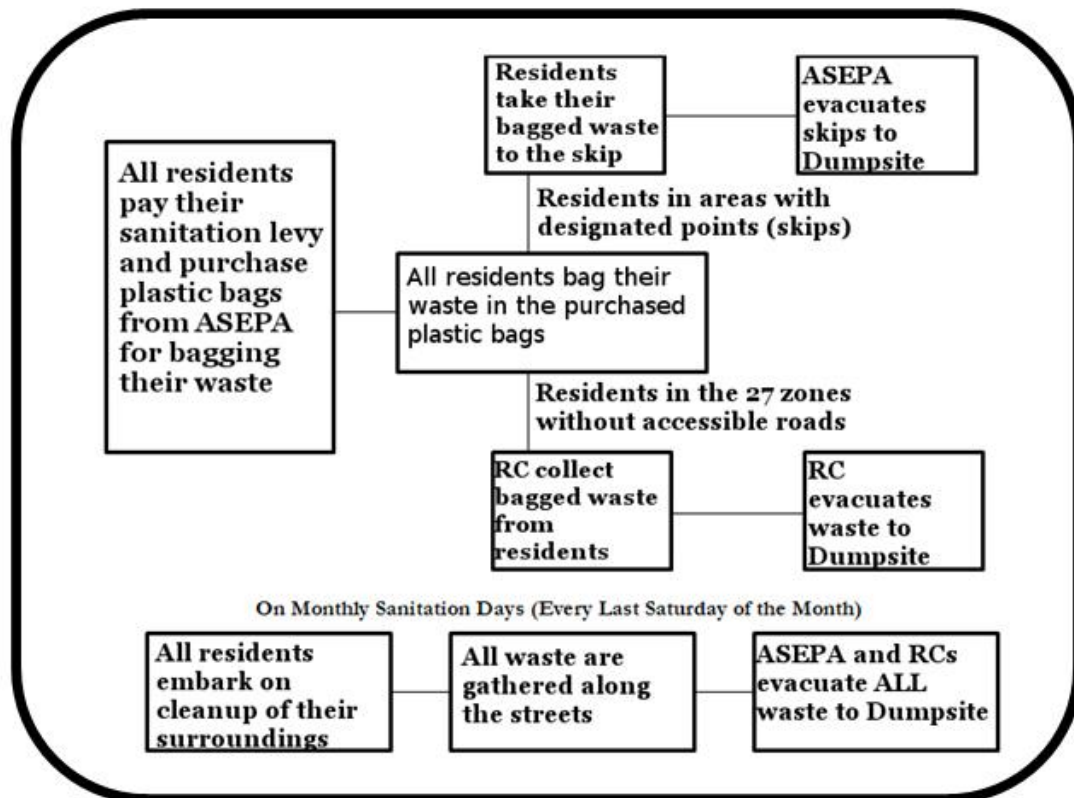


Figure 5. 2: Ideal working of current MSW process in Aba (Credit: Researcher)

Figure 5.2 shows how the current MSW management process implemented by ASEPA Aba zone should ideally work. In the words of one of the participants (id = 40), who functions as a senior officer at ASEPA, “government provides buckets placed at several points (secondary collection points), where experience has shown that waste generation is high. The people are required to take their waste to the points and government will evacuate these buckets to the dumpsites”. Another participant (id = 39), who functions as an assistant in the governor’s office added “by policy, there is also a monthly environmental day every last Saturday of the month aimed at helping get waste that was not properly disposed to the designated places”. Various participants from the TGGO stakeholder group confirmed that ASEPA sells each plastic waste bag for fifty Naira (#50.00) and residents in areas with designated points are expected to bag their waste before depositing same at the skip while the RC for each of the 27 zones in areas without accessible road is expected to collect the bagged waste from residents in their zone. In reality, the situation is different as shown in the following sections in this chapter.

5.1.2 Realities and Challenges related to Waste Generation

Several factors have been found to affect the quantity and composition of waste generated in a city. In a study in the city of Dar-es Salaam in Tanzania, Senzige et al (2014) found it to be highly dependent on population and socioeconomic status of the residents of the city. Other commonly reported factors include income level, education level, household size, cultural patterns, personal attitudes, the cost and frequency of MSW management service, etc. (Afroz et al 2011; Al-Momani 1994; Grossmann et al 1974). Therefore broadly speaking, population, socio-economics and government policy on MSW management are key determinants of waste generation.

5.1.2.1 Population

The official gazette of the Federal Republic of Nigeria (FRN) released in 2009 for the 2006 National Population Census (NPC) puts the population of Aba (Aba North and South) at 534,265 (FRN 2009). Like for every other useful metric, it is difficult to get an official population figure of the city that is reliable. However, most estimates put the current population of Aba Urban (comprising Aba north and south and parts of Obingwa and Osiosoma Ngwa areas) at well above One million. However, the World Population Review (2018) puts the figure at 897,560. This figure is justifiable and conservative considering that the World Bank annual population growth rate for Nigeria has averaged a little over 2.6 since the last census of 2006 (The World Bank 2018).

For someone who lived in Aba for a long time, the increased population density is almost palpable. This much is also supported by various responses from participants in the previous chapter (4) that blamed the worsening state of MSW management on the increased population of the city. On the other hand, while a visual check on the state of the environment suggests a similar rise in the quantity of waste generated, there are no records to back up this viewpoint. The agency claims the amount of waste they evacuate has continued to rise as estimated by the number of skips they have to evacuate daily. Table 5.1 below show responses from 2 senior officers of the agency (ASEPA) when asked if they had records of quantity of waste generated or evacuated in the city:

Table 5. 1: Excerpt from Stakeholders' Response on Waste Generation Data in Aba

Participant id	Comments
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40	I am very sure Aba generates well over a thousand metric tonnes of waste daily. Each of our buckets (secondary collection point) is 30 tonnes and we evacuate 30 to 35 buckets daily
42	No, we don't have records but we have about 30 receptacle points, each weighs about 10 tonnes, which we cart away every day and some receptacles are emptied about 2 or 3 times daily.

These estimates differ markedly and consequently are not reliable bases for adopting a position on the subject matter. There is also no historic data to compare with so as to ascertain the implication of the obvious increases in population on the waste generation. However, it is not uncommon to assume that the waste generation amount will be on the increase considering that there are no efforts e.g. government policy aimed at preventing such trend. This situation aligns with previous reports that MSW generation in Nigeria grows at a faster rate than MSW management agencies can cope (Muhammad and Salihi 2018; Ogwueleka 2009).

5.1.2.2 Socio-economics

Several socio-economic factors that affect waste generation have been listed in 5.1.2 above. Like in most cities around the world, service usage for MSW management services in Aba is billed per household (and per shop in markets). But like for population, reliable data on the number of households and average size of households in the city is also unavailable thus making it difficult to estimate the waste generation rate using this indicator. In developed cities around the world, there are certain inherent processes in the system that helps city councils ascertain the number of households in the area such as registration for medical services, council tax, school places, etc. Even landlords and letting agencies provide relevant details of new tenants to the councils. In Aba, and many other cities in Nigeria, these processes are not present in the current systems thus making it almost impossible to keep a record of that nature.

Income levels are also an important determinant of waste generation. Majority of the residents of the city are artisans and traders. It is difficult to ascertain the income levels of this group of people as there are no processes intrinsic in the system to encourage such

declaration as is the case with civil servants or other salaried employees. There are also low cadre civil servants and other salaried workers in the city, but their incomes are generally low considering that minimum wage is a paltry Eighteen Thousand Naira (#18,000.00 per month). However, going by the feedbacks received and all indicators observed, it is safe to say that majority of the residents are on very low incomes. A participant (id = 22) who functions as a practicing private solicitor in the city had this to say “They have so impoverished us that every other average man you see in Aba is a poor man, including myself. In Aba, out of 100% of the population, I make bold to tell you that 98% are poor”. He went on to explain with valid scenarios of minimum wage, salaries of sitting magistrates and average family earnings. Most salaried workers in the city especially those in public employment also lamented the irregular receipt of their salaries. Most workers stated they were owed an average of 5 months salaries.

Previous studies established that high income levels usually translated to higher waste generation rates (Senzige et al 2014). This is also supported by the I=PAT equation; where

I = Impact (Waste generation is an impact)

P = Population

A = Affluence; and

T = Technology

Therefore, in the case of Aba, affluence cannot be considered a stand-alone contributing factor to the increasing quantities of waste generated.

5.1.2.3 Government Policy

In 2015, a policy paper by the Department for Environment Food & Rural Affairs (DEFRA) also known as the Environmental Agency stated that about 177million tonnes of waste was generated every year in England alone. The paper went on to say that the situation demonstrated a poor use of resources that was costing businesses and households’ money (DEFRA 2015). In order to help people and organisations leverage on the opportunities to save money by reducing waste, the government published a Waste Prevention Programme for England. The programme set out to, amongst other things, “encourage businesses to contribute to a more sustainable economy by building waste

reduction into design, offering alternative business models and delivering new and improved products and services” (DEFRA 2015). Other policy measures by government to encourage waste minimisation in the UK includes promotion of waste minimisation clubs, education of households, landfill tax and service usage billing based on the quantity of waste generated (Ezeah 2010; Clarkson et al 2002).

It is important to distinguish between pre-consumption and post-consumption waste minimisation here. Cox et al (2010) defines pre-consumption waste minimisation as ‘strict avoidance’. This involves a conscientious effort to avoid producing waste in the first instance. At consumer levels, it could involve steps like reusing shopping bags, mending old clothes and reusing them instead of buying new ones, preparing the correct quantities of food as at when needed to avoid waste, etc. At manufacturing levels, it includes redesigning products to ensure durability, reducing the amount of packaging or using more efficient systems in manufacturing. Arguably, material recovery would be easier and more profitable if the products were designed bearing in mind their next stage following use (Rodic et al 2010). On the other hand, post-consumption waste minimisation includes steps such as composting, donating old stuffs and recycling (Diaz and Otoma 2013). Government policy is particularly essential if required changes are to be made at manufacturing levels.

However, in Nigeria the National Environmental Sanitation Policy (FME 2005) does not mention pre-consumption waste minimisation in particular nor consider any form of waste minimisation as a strategy for MSW management. Consequently, there are no provisions for states and or local governments, whose responsibility it is to implement the policy, to pursue waste minimisation. This apparent lack of policy direction towards the minimisation of waste was also confirmed in the interviews with one of the most senior government officers responsible for MSW management in the state and a senior management staff of ASEPA as shown in the following conversations:

Table 5. 2: Excerpt of Participants’ Responses on Waste Minimisation

Question	Answer
Participant id = 39	
Are there policies geared towards encouraging people to reduce the	The people lack the necessary understanding because the people see waste management as

amount of waste they generate? Obviously, this will reduce the quantity of waste the government (ASEPA) will have to manage, and as you mentioned it's costing the government a lot to manage.	the responsibility of the government. However, behavioural change, including waste minimisation and placing some value on the waste generated is something the governor is looking at. It is something I have also advocated for since I've been here.
Participant id = 40	
Moving forward, what is the goal of the agency? What does the agency hope to achieve in the next 12 – 18 months?	What else except to give the city a good waste management service. Until we can recycle waste, we have not arrived yet.
So the ultimate goal is to start recycling of waste?	Yes, granted that the waste collection and evacuation processes have been perfected. We are looking at the proposals for recycling.

With the senior management staff of the agency (ASEPA), the researcher had to explain the concept of waste minimisation and how it offers a better MSW management option than recycling which is seen as the ultimate goal by ASEPA.

Further chats with staff of ASEPA and EHOs showed a deeper problem than the feedbacks above perhaps suggests. All the staff interviewed had no knowledge of waste minimisation.

The current billing system for MSW management services (sanitation fees) does not also take into account the quantity of waste generated by a service user. This is also understandable as there are no strategies for enforcing such regulations in the current system. However, there appears to be a lesson to be learned from the operations of the informal waste pickers who charge users based on the quantity of waste they hand over as described in 5.1.4 (realities and challenges related to waste collection).

5.1.3 Realities and Challenges related to Waste Separation

Source separation or sorting of waste is commonly regarded as a key step to minimising waste and enhancing recycling and disposal efficiency (Kuusiola et al 2012; Zhang et al 2012). In 2008, certain municipalities in Japan separated waste into over 25 categories (Matsumoto 2011). However, the simplest waste separation or sorting system at source

involves separation into two (2) categories – biodegradables (organic) and non-biodegradable (inorganic) (Agarwal et al 2015). Again, several factors have been found to affect the waste separation behaviours of residents. In Suzhou, China, Zhang and Wen 2014 reported the main determinants of residents’ source separation of solid waste to be age, availability of source separation facilities and government preferential policies aimed at encouraging source separation. A similar study in Shanghai reported similar findings and also restated the importance of effective communications between the government and local residents in ensuring the success of waste separation at source (Zhang et al 2012). The study also reported the importance of pilot studies in communities prior to rolling out such programmes.

Currently, in Aba (and Abia State in general), there is no official policy on source separation of waste in operation. Fortunately, there appears to be a fair level of optimism amongst stakeholders and service users going by this excerpt from interviews in Table 5.3 below.

Table 5. 3: Excerpt of Interviews with Stakeholders on Waste Separation

Question	Interview
Participant id = 1	
Do you have access to standard bins or any kind of bin at all?	Yes, obtained through connections at ASEPA. It is not affordable for households. Trash bags and bins are stashed in a room at ASEPA office as people are not buying
So everything you generate as waste goes in there? Do you separate it?	No separation. I knew you will ask me that question. And everything (waste) they (ASEPA) pack (evacuate) ends in the landfill along Umuahia express road. Sometimes, it spills out taking over an entire lane along the express way
Participant id = 2	
We’ve been going back to the government for almost everything so far. What about the people? How	I have some knowledge of waste separation and waste hierarchy. I know that in western states (meaning developing countries), recycling is common but here, the government has not come to appreciate the need for

would you rate your own knowledge of modern waste management practices such as separation and waste hierarchy?	such practices and so the people have not done too. Government need new policies to initiate and encourage these changes. New conservation actions, activities and policies are needed and you'll see people motivated to take up these new practices.
Participant id = 5	
So how do you manage your waste?	Luckily, I have a good space behind my building so I use it to separate my waste. I burn off the combustibles, throw the degradable into my garden to decay and serve as manure, and send the rest of the stuff like tins away.

It is also noteworthy to highlight the contribution and role of itinerant waste pickers and buyers who transverse the length and breadth of the city collecting and buying wastes of value from residents. Some of the most common types of valorised waste collected in Aba by these people include cardboard paper, waterproof sheets, plastic bottles, drink cans and other metals such as aluminium, copper, etc. After collection, most of these materials are sold on to middlemen who in turn retail them to individuals or small scale local manufacturers who predominantly reuse the materials in packaging of their products. The metals are mainly sold on to recycling companies by the middlemen.

There are also other groups of informal waste pickers that scavenge the dumps for wastes of value. In Aba, this set of waste pickers have formalised associations and each association is often stationed at a specific operating dumpsite. Anyone wishing to speak to any member of the association on site (at the dump) must first get permission from the leader of the group. The researcher also discovered that the waste pickers were subjected to certain levies and registration formalities by the agency (ASEPA) who also enforces certain strict confidentiality rules. The most common types of waste scavenged by this group include leather, glass and plastic bottles, waterproof sheets, etc. and any other material that a middleman may request to be scavenged by the waste picker. The price is often agreed between the two parties and some form of deposit paid by the middleman to secure the deal.

While this study did not investigate the effect of age of residents on waste separation at source, there is sufficient evidence to say that the conversations lend credit to previous research findings highlighted ab initio and it is thus reasonable to think that most stakeholders and service users in Aba will embrace source separation of waste if the right policies were to be initiated and effectively communicated by the government. The onus is thus on the government to also provide the facilities that will enable this change.

5.1.4 Realities and Challenges related to Waste Collection

According to the UN-HABITAT, the collection of MSW is an important public service with a very significant impact on the public health and the appearance of towns and cities (UN-HABITAT 2011). For clarity, the term collection of MSW as used here includes the initial storage of waste at the point of generation (households, shops, offices, etc.), transfer and transport of the waste to the final treatment or disposal point. It also includes road sweepings, cleaning of drainages/gutters and the removal of such wastes. Figure 5.3 below show the flowchart of MSW collection in Aba.

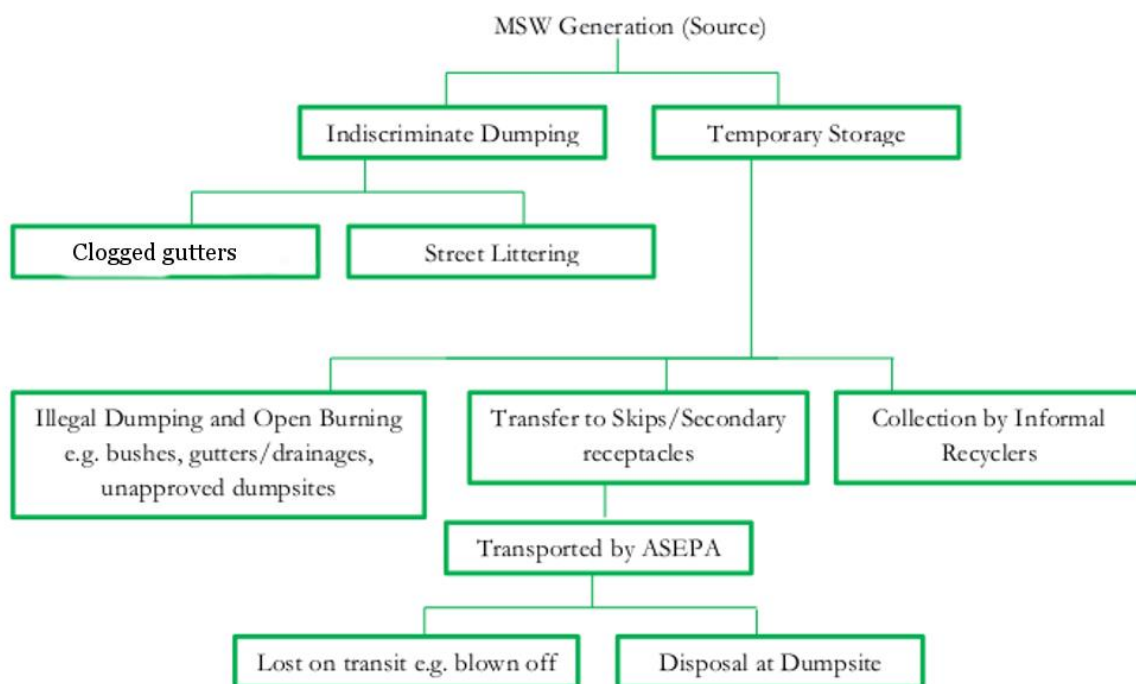


Figure 5. 3: Flowchart of MSW Collection in Aba [Credit: Researcher]

A closer look at the diagram above perhaps shows why collection of MSW is the most important aspect of MSW management. Essentially, the collection of MSW has the greatest impact on public health and urban living. Consequently, it demands the highest

budget allocation compared to any other aspect of MSW management (UN-HABITAT 2010a).

5.1.4.1 Indiscriminate Dumping/Littering

To someone visiting Aba urban for the first time, the first things of note experienced will be the adverse smell in the air, the huge amounts of litter and debris on the streets and drainages; and the seemingly haphazard noisy movement of people and motorists. Most people on the streets appear to be in a hurry.

On a closer observation, it is not very difficult to find reasons for the situation. Accepted that there are recidivists in Aba like in most other cities around the world, the basic facilities and processes to prevent indiscriminate dumping/littering are lacking. All over the city, there are no public waste baskets or bins. This situation is exacerbated by the daily influx of people, mainly traders and shoppers, from neighbouring cities and states who troop into the markets in Aba to purchase their wares. Most of these visitors often eat on the move and it is common to see all kinds of litter being thrown off from moving vehicles. The residents too are high on the practice as the researcher regularly observed people throwing whatever they deemed waste unto the street or into the gutters. Even members of staff of ASEPA were also observed to be on the act of indiscriminate dumping.

Aside the 4 major markets in the city – Ahia Ohuru (New Market), Ariaria, Cemetery and Eke Oha (Aba Shipping Centre), there are shops and stalls in every nook and cranny of the city. However, the researcher observed that the singular most contributory factor to the alarming state of indiscriminate dumping/littering is the prevalence of street hawking in the city. Hawkers are ubiquitous in Aba and they sell virtually everything from rat poison to 'pure water'. With the observed poor state of roads and the overcrowding of the major streets in the city with slow moving vehicles and tricycles, Aba is a street hawker's paradise. The waste generated from these exchanges is predominantly packaging materials and food waste. The waste continues to accumulate on the streets and in the gutters pending the next monthly clean-up exercise which holds every last Saturday of the month, when the waste is supposed to be evacuated to the dumpsites (see Fig 5.2). Pictures 5 and 6 are original photos captured by the researcher of a typical street and gutter/drainage respectively, in Aba.



Picture 5: Kent Street - a typical street in Aba with accumulated littering [Credit: Researcher]



Picture 6: A Gutter/Drainage along Aba-Owerri Road (Near Star Paper Mill) [Credit: Researcher]

The level of indiscriminate dumping/littering in Aba is so intense that some stakeholders opined that residents prefer a dirty environment to a clean one. The notoriety of the city of Aba as a dirty place and the usual reference to the inhabitants as people who prefer a

dirty place is one that has developed over time. It is thus historic (Odoemena and Ofodu 2016). The researcher has coined the term ‘Aba Syndrome’ to denote this commonly held notion. Table 5.4 below shows some responses from participants supporting their views on Aba Syndrome. Table 5.5 is an excerpt from the researcher’s observation note following the observation of the activities of a street vendor of fresh vegetables near Umungasi market in Aba, and together with Picture 7, which is a gallery of photos taken by the researcher during the observation, provide first hand evidence of indiscriminate dumping/littering in the city.

Table 5. 4: Participants views on indiscriminate dumping/littering

Participant id	Comments
22	There are people called recidivists. For some, it’s habitual not to do the right thing even if you provide the necessary conditions.
7	Also our people have formed the habit of indiscriminate littering with little or no regard
41	Aba residents are very stubborn, not ready to learn and very unwilling to cooperate and they just mess up the environment. They are terrible.
39	The people lack the necessary understanding because the people see waste management as the responsibility of the government. The truth is that the societal behaviour we have here will make London as dirty as you see Aba. An average man here does not care how they manage their waste. You’ll observe people throw their waste indiscriminately.
45	I think it’s difficult for people to avoid indiscriminate littering because it is not something they were taught as kids. It has almost become a norm to most people.
40	A typical Aba man is dissident in nature They may have the right orientation but the indiscipline in them or laziness will make them not appreciate the short trek to the skip

Table 5. 5: Observation note of a street vendor of fresh vegetables in Aba

Trader had her stock in a basket on a bicycle

Buyers separated the leaves from the vegetable stem and dropped the stems on the street

There were several openings on the drains that posed great risk as people could easily fall inside the gutter through them

Suddenly a task force appeared and tries to confiscate the trader's goods. The trader and the buyers ran away with the goods

A member of the task force was stood by the spot and yelled instructions at the trader to stay inside the market and not on the street

The trader soon returned to gather the refuse from her earlier activities together but she did not pack the refuse away. The refuse remained on the street

The trader finished selling her vegetables and left without evacuating the refuse she had earlier gathered together



Picture 7: Gallery of photos for the observation of a street vendor [Credit: Researcher]

Whereas all the participants from the TGGO stakeholder group blamed the notion of Aba Syndrome for the prevalence of indiscriminate dumping and littering, a few participants from the other stakeholder groups argued that while residents of Aba could be said to be stubborn, more sensitisation and public education was required to curb the unwanted practice. They argued that ASEPA had not done enough to ‘carry the people along’. Other reasons advanced by participants included neglect by the government, lack of consultation with service users, dilapidated infrastructure especially roads, distance from the few government approved designated disposal points, absence of waste bins at strategic locations for use by the public, and lack of enforcement.

5.1.4.2 Temporary Storage

Most households in the city have some form of temporary storage for their waste. In most cases this is an improvised bin – container, sack or even a dedicated corner within the compound or premises. The same applies to most traders in the markets, street shops and stalls. Some traders have small open baskets which are emptied into the improvised bin once full or at the end of the day. All the offices visited in the course of the study had a waste basket which was again, emptied into a larger improvised bin usually a sack. Table 5.6 below is an excerpt from interviews with stakeholders regarding the types of bin they used for temporary storage. This study noted that service users were not buying the plastic bags from ASEPA which are sold at #50 each, with which they are required to bag their waste before taking same to the skip.

Table 5. 6: Excerpt of Responses from Participants on Waste Storage and Handling

Question	Answer
Participant id = 3	
As a resident of Aba, do you have standard bins for storing your waste? If yes, how did you come about it?	I use improvised bins not standard. I use nylons and throw them in the general collection skips or sometimes in the bush.
Participant id = 1	
Do you have access to a standard bins or any kind of bin at all?	Yes, obtained through connections at ASEPA. It is not affordable to the public
Participant id = 26	

<p>You said your role is limited as ASEPA has almost full responsibility. Currently, what role does the environmental health department play in waste management in Aba?</p>	<p>We carry out inspection and if we discover nuisances, we serve abatement notices. Part of the inspection of the premises is to check if residents have 'standard' waste bin because if there is none, then there is a greater tendency of indiscriminate dumping</p>
<p>So basically your role is restricted to inspection. Is that correct?</p>	<p>Yes</p>
<p>From responses I have gathered so far and from observation too, that number of premises that have this 'standard' bins is very minute. Does it mean the department is not inspecting these premises or does it mean the people are not complying to the notices being served?</p>	<p>Let me be very sincere, the performance in terms of inspection is not encouraging. I know people buy the 'standard' bin from ASEPA but they don't put it to actual use. They just buy it and keep it to present to officials. You'll observe that when people are going to the designated disposal points with their waste, they rarely come with standard bins</p>
<p>That's exactly my point and I have a problem with that. If I have a 'standard' bin which is a big bucket, I don't see how I can carry it to a distance of 2 to 2.5 miles to the nearest designated waste disposal point</p>	<p>That is right. Another problem is bad roads. It makes it impossible for residents to carry their 'standard' bins to the designated points as well as for the refuse trucks to access most of the residents.</p>
<p>Participant id = 10</p>	
<p>Do you have a standard waste bin or any kind of bin at all?</p>	<p>I have somewhere I pack my refuse and once the weather is dry, I burn it.</p>
<p>Participant id = 43</p>	
<p>Do you have a standard waste bin?</p>	<p>Yes. Every trader is expected to have one but there is also a central one for all the market to use.</p>
<p>Participant id = 47</p>	

Do you have a standard waste bin?	Not standard but I have a place I pack my refuse and once the water proof (polyethylene sack) is full, I will call one of these informal waste pickers to cart it away.
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The responses above shows that standard waste bins such as ‘wheelie bins’ (Figure 5.4) that are commonly used for temporary storage are not available to service users in the city. While the researcher thinks that that there is no place for such bins in the current MSW management system as it will be out of place for service users to wheel such bins to the skips, the introduction of such standard bins may help promote the habit of bagging waste, which could then be stored safely temporarily in the bins, pending when the bags are taken to the skips.



Figure 5. 4: Wheelie Bins used for temporary storage of waste [Credit: www.theworkplacedepot.co.uk/wheelie-bin]

Once the improvised bin was full or there was enough waste to warrant the transfer of the waste, there are usually three (3) common options available to the service users though not all three options are available to every service user group. These are:

(a) Transfer to the skip/secondary receptacle

ASEPA runs a system of secondary collection points where skips are placed at each point and service users are expected to take their wastes to the skips. The agency says there are about 30 such skips located strategically at locations where experience have shown that large quantities of waste are generated regularly. This study noticed that some designated points had about 3 skips while most had 2 skips. In all, the total number of designated points counted was 14. The agency declined to answer when asked how many designated points they operated in total but rather restated that they had about 30 skips which are evacuated regularly.

All households can drop off their wastes at these skips during the specified times of 5pm to 9pm daily at no extra costs. However, these skips are manned by ‘bucket minders’ during the specified hours and no one is allowed to drop waste there outside of those hours. Anyone dropping off large quantities of waste (as defined by the bucket minder) must pay a bribe, ranging from #100 to #2000 (One Hundred to Two Thousand Naira) depending on the quantity of waste to be disposed, to the bucket minder before they are allowed to drop their waste in the skip as evidenced by this excerpt in Table 5.7 below.

Table 5. 7: Excerpt Responses from Participants on Waste Transfer

Question	Answer
Stakeholder 30	
How much do you pay specifically to ASEPA for waste management?	I will have to visit my receipts
What services do you get for the fee?	We don't get any service. We dispose our garbage twice a week – Tuesdays and Fridays and when our driver takes the waste to the skip, they (ASEPA – i.e. the bucket minder) collect a compulsory #100 (One Hundred Naira). Failure to pay the #100 will result in the driver

	coming back with the waste; they will not allow him to drop it.
Stakeholder 32	
How much do you pay to ASEPA?	I don't want to frighten you but it runs into millions. No waste truck has ever come here to pick up any waste. They use the statutory powers that empower them to collect the fee and once they get it, it is assumed their job is done and they leave you with your waste. It does not matter to them how you dispose your waste. Ask anyone in the industry.
I agree with you as that is the common feedback I have been getting. What will normally be in your waste stream?	I don't normally have waste to be honest because I have installed several systems that reuse what will ordinarily be classed as waste. My waste will result as a matter of carelessness or accident.
Okay. I understand that aspect. What about papers, polyethylene and things like that?	This is the area I have problem with. We generate those papers, empty packaging, etc. etc. I have to hire trucks to evacuate these from our waste enclosure to the dumpsite where ASEPA also dump theirs and for each trip, I have to pay #2000 after paying my statutory fee.

Table 5.8 below is also a summary of the notes taken during an observation exercise of activities at the receptacle point/skip at Union Bank Junction, Aba by the researcher.

Table 5. 8: Observation note of waste transfer activities at Union Bank Junction, Aba

<p>At all times of the observation, a man (the bucket minder) was standing beside the waste skip.</p> <p>15 adults (ages ranging from 18 to 50, 12 female and 3 male) came with their waste in a bucket and emptied it into the ASEPA skip, and left with the buckets.</p> <p>A lady came with her waste in a bag and emptied the bag into the skip and left with the bag.</p> <p>Someone came with a bag full of waste and threw the bag into the skip and left.</p>

Some children (numbering about 7) came with their waste in buckets and made their way onto the waste skip to empty their buckets. They left with the buckets.

Another group of kids (numbering about 8 – 10), they climbed onto the skip to empty their waste and were ordered by the bucket minder to jump and mash on the waste, presumably to compress it.

A man carrying a wheelbarrow full of waste bags came and gradually emptied his bags into the waste skip. Afterwards, he went over the bucket minder and gave him some money and left.

Someone drove by and flung his waste bag in the direction of the waste skip and sped off.

A man came with his bag full of waste and flung it on the ground. The bucket minder went over and cautioned him and then swept the waste that had fallen on the ground around the skip together and packed same onto the skip.

A man came with a wheelbarrow full of waste bags. After emptying same into the skip, he brought out his broom and swept around the skip and packed the dirt onto the skip. He then went over to the bucket minder, paid him some money and left.

A lady drove to the skip with her waste bags in the car boot. She emptied them onto the skip and left.

The waste skip was now full and the refuse was falling on the ground uncontrollably. Suddenly the entire place was deserted.

The time now was 9:05 pm and the researcher retired.

Besides the issue of extortion at the skips, the number of designated points available to the entire residents of the city (the researcher counter 14 separate designated points but ASEPA treats the 30 skips as if they were 30 different points), is far too few. Consequently, several residents of the city will have to travel several miles before reaching their nearest skip. In response to this, ASEPA informed the researcher that while there were plans in the pipeline to roll out more skips and street collection services, it is currently the duty of the revenue consultants (RCs) to ensure waste was evacuated from such areas without accessible roads (see Fig 5.2). However, it is clear that much more will have to be done by all involved if more wastes are to reach the skips.

(b) Collection by informal waste recyclers/pickers

Informal waste workers in Aba operate in different modes (see section 2.9.2.5). Responses from participants in this study confirm that their services are often not available to most households as they often concentrate on the markets, street shop clusters and adjoining areas, and some wealthy suburbs (see table 5.9 below).

Table 5. 9: Participants responses relating to operation of informal waste workers

Participant id	Comments
3	You can get some of those in the markets but not in the residential area like this
31	Because there are many offices around here, they always come around and many people will bring their bins and pay the boys to take the waste.
37	As you can see, this place has been swept this morning. We will now pay somebody (informal waste worker) to cart away the refuse. Where they dump it, I don't know. How is it fair that we also pay ASEPA for doing nothing?
46	We pay them #30 or #50 daily depending on the quantity of waste we give them to dispose
47	I usually pay them #100 to #150 weekly depending on the quantity of waste.
48	Ranges from #100 depending on the quantity of refuse I give them and that is at least every 2 days, sometimes every day.

This study observed that itinerant waste pickers/buyers/cart pushers in Aba go about with their wheelbarrows or modified carts. They will often blow their distinctive horns intermittently to attract the attention of would-be customers. Some collect or buy recyclables such as cardboards, fabrics, plastics, etc. which they sell on to middlemen. Others collect all kinds of waste from customers who pay them according to the quantity of waste to dispose. Many participants from the TrMU stakeholder group lamented that some informal waste workers indulged in illegal dumping of the waste they collect but because ASEPA does not provide the services for which they (service users) paid for, they (service users) were helpless as their priority was ensuring the waste was taken out of their immediate vicinity.

(c) Illegal dumping and open burning

Illegal dumping is the dumping of waste or refuse in sites which have not been approved by ASEPA as a designated dumpsite. As highlighted in section 2.9.2.6, illegal dumpsites include abandoned pits that have not yet been approved as dumpsites, gutters, undeveloped plots, street corners, abandoned building sites, etc. Many participants in this study recounted stories of people dumping their waste in the gutters. They said the practice was common when it rained. The researcher observed that various types of illegal dumpsites were common in most streets in the city. It is common knowledge that biodegradable waste decompose faster under tropical conditions. The researcher is of the opinion that the unpleasant smell from these decomposing waste contribute to the foul smell that pervades most areas of the city at all times. Such sites are also a good breeding ground for flies which are reportedly vectors of several infectious diseases (UN-HABITAT 2011).

Open burning of waste is also commonplace in Aba. Responses from participants (Table 5.10) as well as Pictures 8 and 9, confirm the practice is prevalent. Picture 8 shows a burning heap of refuse in the city centre, along Asa Road while Picture 9 shows a place that appears to be repeatedly used for open burning of waste. The researcher thinks that many who engage in the practice do so in order to 'get rid of the waste' but inadvertently, they contribute to the poor air quality observed to be a constant feature in the city throughout the duration of the study.

Table 5. 10: Excerpt of Responses from Participants on Open Burning of Waste

Question	Answer
Participant id = 11	
In this area, do people also burn their waste openly?	Yes, that is very common here.
Participant id = 9	
In this area, do people burn their waste openly?	Yes, they burn it every day. People burn toilet wastes, waterproofs (polyethylene materials), etc. and for me it causes me instant catarrh which will linger for a very long time

Participant id = 24	
What about waste burning? Do people burn their waste?	Yes, when we go for inspections, we see people burning their waste
Participant id = 45	
What about waste burning? Do people burn their waste openly here?	There was a time the road was very bad and we used to gather our waste on the potholes and burn it. But since the road was rehabilitated, you dare not burn waste on the road. You will be rebuked as enemy of the government and accused of trying to sabotage government by destroying the road
Okay. So the focus in such a situation will be the road, not the health implications of open burning of waste?	Thank you. That is what I was coming to. You know the air pollution that burning waste openly causes. So many sicknesses and ailments can be attributed to air pollution which is common here.
Participant id = 50	
Do people burn their waste openly in this area?	People burn their waste so openly and sometimes you are forced to flee from your own place when your neighbours start burning their waste
Participant id = 10	
Do you burn your waste openly?	Not every waste. We burn the water proofs because it does not rot even after a million years in the soil.
Participant id = 6	
Do people burn their waste openly in this area?	Yes, they do. Actually, we do so too



Picture 8: Picture evidence of Open Waste Burning in Aba (I) [Credit: Researcher]



Picture 9: Picture evidence of Open Waste Burning in Aba (II) [Credit: Researcher]

5.1.4 Realities and Challenges related to Waste Transfer and Transport

The evacuation of waste from the skips is the signature service provided by ASEPA to the service users. Besides the inadequacy of the number of skips available highlighted above, the actual process and activity of carting away of the refuse in the skips is also bedevilled by several challenges. These include:

a. The skips

The skips used as secondary receptacles are of very poor quality. They are open and have no tailgate nor any sort of lid to secure the waste deposited in them. The immediate vicinity of every receptacle point observed was filled with the stench from decomposing waste. Vermin infestation was rife and of utmost concern to public safety. Often times, the bucket minders at several receptacle points were seen using ropes to close-off the open side of the skips so more and more waste could be deposited as shown in Picture 8 below.



Picture 10: An Improvised Waste Skip/Receptacle Point in Aba [Credit: Researcher]

During the carting away of the waste from the skips, staff of the agency used shovels and baskets to scoop the waste from the skips unto the compactor truck or tipper truck. Once loaded, the tipper truck would drive off and because the waste was not covered, several waste items were seen littering the road while the leachate from the fast decomposing organic content of the waste continuously leached unto the road surface with its attendant disgusting smell. Lighter items were been blown off through the open top constituting further environmental blight and hazard.

b. Manpower

MSW management reportedly employs six (6) workers per 1000 population in developing countries (UN-HABITAT 2010a). Nzeadibe et al (2012) estimated the number of informal waste workers in Aba to be about 600. If we worked with a conservative estimate of 800,000 as the population of the city of Aba, it means there should be about 4800 workers employed in the MSW management sector. Though the agency declined to provide the actual number of its workforce, it is understood (from sources who wished to remain anonymous) that less than three hundred (300) people are on the payroll of the agency. A significant number of these are alleged to only appear to collect salaries without doing any jobs whatsoever.

The environmental health departments (EHDs) of the three (3) local government councils in the study area employ a combined estimated 600 people. Though they now reportedly have very limited roles (as discussed in section 4.3), a combined possible total workforce of 1500 (ASEPA staff, EHD staff and informal workers) is still very far off the expected 4800 going by the UN-HABITAT report (2010a).

Moreover, the challenge is perhaps beyond staff numbers going by the current state of the environment. Responses from participants also suggest that the prerequisite training, organisational capacity and necessary equipment required for the jobs are not available. Others argued that employment into these roles were often given to political cronies and thugs sympathetic or loyal to the politicians in power. Table 5.11 is an excerpt from participants relating to manpower, training and equipment.

Table 5. 11: Excerpt of Responses from Participants relating to manpower, training and equipment

Participant id	Comments
40	<p>The biggest challenge is that of funding. We hardly have enough equipment to carry out the job effectively.</p> <p>All of that and compactors, bulldozers, pay loaders. We make use of all these.</p> <p>They only receive on-the-job- training. The agency has not engaged any professional trainers.</p>
42	<p>The biggest challenge is equipment.</p> <p>There are people everywhere looking for jobs so if we have equipment, we'll employ more people. For instance, if we had several compactors you will see them going street by street</p>
52	<p>Initially when I started this job some years back, I was employed by Duru (the former executive chairman of Aba South LGA), and he used to provide high visibility clothing, nose masks, helmet, hand gloves, shovels, brooms and everything we require for the job.</p> <p>I provide my broom, my shovel, my bucket and everything.</p>
54	No. You train yourself
28	Absolute no training, not even a seminar of any sort.
25	<p>No training opportunities. We occasionally have seminars - 2 in the last 10 years that I have been here to be precise.</p> <p>Yes, the major challenge is funding. We struggle to raise funds to fulfil our duties. We often do personal contribution from staff to raise money to procure the materials we need for our job.</p>
22	I don't know how somebody who doesn't have any basic knowledge of what a clean environment ought to be could manage an establishment as sensitive as Abia State Environmental Protection Agency (ASEPA).

	The people that are supposed to work in the field will all be political thugs who will be there for what they call 'empowerment', collecting salaries for nothing.
2	Yes. There's lack of manpower and lack of facilities and equipment. Removal trucks are in very bad shape.

One of the participants (id = 42), who functions as a senior officer at ASEPA explained that the main factor limiting the employment of more manpower is the unavailability of necessary equipment. He explained that each staff in the operations department is attached to a vehicle for waste evacuation, and in the absence of such functional vehicles, more staff cannot be employed.

c. Vehicles

As seen from the interview excerpt above, according to ASEPA the vehicles needed for effective evacuation of waste from the skips include trucks, pay-loaders and compactors. While there are legitimate needs for equipment and vehicles to ensure effective delivery of MSW management services in the city, a visit to the operational headquarters of the agency at the ministry of works compound along Ikot Ekpene Road, Aba reveals a more sinister problem. The common mistakes made by administrators of MSW management services in developing countries where huge amounts of money are spent on acquiring sophisticated equipment and vehicles such as those used in cities in developed countries, with the view that same results as seen in those cities will be reproduced back home have often been reported in previous studies (Abdulredha et al 2018; UN-HABITAT 2011; Nzeadibe and Ajaero 2010; Imam et al 2008). The case of Aba is a testimony to those reports. The compound at Ikot Ekpene Road is littered with all manner of broken dilapidated sophisticated MSW management machinery including trucks, compactors, caterpillars, etc. rotting away under the tropical rain and sunshine, a clear evidence of the abject lack of maintenance culture on the part of the management of ASEPA, as alleged by some participants who wished to remain anonymous.

Though employees of the agency prohibit the taking of pictures of the broken down vehicles, pictures 11 and 12 were covertly taken as evidence.



Picture 11: Broken down vehicles at ASEPA Aba operations HQ I [Credit: Researcher]



Picture 12: Broken down vehicles at ASEPA Aba operations HQ II [Credit: Researcher]

The few trucks that are still operational are more of threats to the environment as they pollute the air with thick clouds of carbon monoxide. Majority of the roads in the city are not passable with these vehicles and as such they are simply not suitable for most areas of the city.

Table 5.12 below is an excerpt of observation notes taken by the researcher on observation of the staff of ASEPA during the evacuation of refuse from the skips at Asa Road by Jubilee, while Video 1 was recorded during the exercise.

Table 5. 12: Excerpt of Observation of ASEPA staff on routine Evacuation of Waste in Aba

<p>There was no signage to warn motorists and passers-by that work was going on</p> <p>The refuse truck, skips and ASEPA staff were effectively blocking one lane each side of the road thus causing huge traffic jam and nuisance</p> <p>Clear evidence of noise, odour and particulate matter nuisance</p> <p>All 3 skips at the receptacle point were overflowing with huge heap of refuse dump along the road demarcation</p> <p>Staff were using (previously used and unwashed or disinfected) baskets and shovels to scoop and empty refuse into the standby truck</p> <p>As the truck was on standby, thick black smoke covered the area, further contributing to poor visibility and air pollution</p> <p>On interacting with a supervisor, he informed the researcher that PPEs were provided once in a while but some of the staff countered that they have never been given any since they joined</p> <p>Once the truck was full, the driver departed with one other worker while the remaining group of staff and the supervisor sat beside the road waiting for their return from the waste dumpsite</p> <p>Some of the waiting staff were seen throwing empty water sachets they had just finished drinking from indiscriminately on to the street</p>
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Video 1: Observation of Waste Evacuation Exercise in Aba [Credit: Researcher]

d. Routes and General Planning

The researcher's observations revealed an apparent lack of proper planning of not only routes for the carting away of the refuse but also of all aspects of the exercise. The staff were not organised into any formal teams nor were they aware of where and when they were supposed to be working. This meant that several frontline staff members were always found loitering within the ministry of works compound of the agency during supposedly working hours. It appeared that everything was done on adhoc basis as there were no timetables (see Video 1).

For an agency that is apparently short-staffed, the level of laxity observed among all cadres of staff was surprising. The obvious lack of commitment and poor levels of staff morale could not go unnoticed on Monday mornings when huge amounts of waste brought to the skips overflow into adjoining areas and even threaten to obstruct free movement of vehicles on some major roads. Picture 13 below suggests more planning is needed to effectively evacuate waste from the receptacle points especially during and after weekends.



Picture 13: Refuse accumulation near a receptacle point on a Monday morning in Aba [Credit: Researcher]

5.1.5 Realities and Challenges related to Waste Treatment

Generally speaking, the main aims of the treatment of MSW include volume reduction, and materials and energy recovery (Golomeova et al 2013). Also, the process of waste treatment should equate to a reduced environmental impact compared to untreated waste. The more common treatment types of MSW available include recycling, composting, mechanical biological treatment (MBT), incineration, etc.

In Aba, there is currently no requirement by policy to treat waste. The researcher was reliably informed by a senior member of staff of ASEPA that though there are plans in the pipeline to begin recycling of waste, currently all the waste carted away from the skips and around the city were dumped at one of three (3) dumpsites operated by the agency. This was also corroborated by other stakeholder groups and through observation. Table 5.13 below is an excerpt from interviews with stakeholders regarding waste treatment in Aba.

Table 5. 13: Excerpt of Responses from Participants on Waste Treatment

Question	Answer
Participant id = 40	
Is there any form of treatment of the waste?	We seldom fumigate the secondary and final dumpsites. No other form of treatment.
The researcher explains waste treatment and gives examples to include recycling, incineration, composting, etc. and then asks – Do you do any of those?	No
Participant id = 39	
What is the system of waste management in place in Aba?	I've been in position for 2 years. Ongoing waste management policy is led by the state government through ASEPA and under direct supervision of the state governor unlike in other states where it is directly under the supervision of the ministry of environment..... The process is simple – government provides buckets placed at several points (secondary collection points), the people are required to take their waste to the points and government will evacuate these buckets to the dumpsites. You can get more details regarding the day to day operations from the DGM.
Participant id = 26	
Does ASEPA carry out any form of waste separation or treatment?	Waste should be separated using colour codes but we have not graduated to that yet. The only sorting is done by scavengers at the dumpsites.
Participant id = 1	
So everything you generate as waste goes in there, no separation?	No separation. I knew you'll ask me that question. And everything they pack ends in the dumpsite along Umuahia express road. Sometimes, it spills out, taking over an entire lane along the express way.

5.1.6 Realities and Challenges related to Waste Disposal

As previously stated, all wastes collected by the agency in Aba are disposed at any one of three dumpsites operated by the agency. These dumpsites were converted from empty borrow pits that resulted from excavation of sands for construction. They were not designed to be dumpsites or landfills and as such were inappropriate for such purpose.

One of the dumpsites was situated along a busy expressway linking Port Harcourt to Enugu through Aba. Besides the odour nuisance and physical blight it causes, it was reported by participants that waste often overflowed onto the roads. When the researcher travelled through the route, the side of the road where the dumpsite was located was cordoned off as the section of the road had become impassable.

A visit to the Emelogu Street dumpsite in Ogbor Hill area revealed an even greater problem. The dumpsite was located in a place that could be described as the centre of the community with sprawling residential and commercial properties in close proximity. The odour emanating from the site could be perceived from at least a mile away. At the site, vultures and other birds of prey were plenty in number. Two broken caterpillar machines parked on the side of the road while one caterpillar was seen scattering the loads from two refuse trucks that had just dumped contents on the site. Thick cloud of black smoke filled the air as the caterpillar bellowed gingerly along the sinking terrain. Yet, the site was a beehive of activity for scavengers who were seen picking out 'valuables'. These set of scavengers basically lived on the dumpsite as a group and they informed the researcher of a ban on taking of photos and recording of videos to avoid confiscation by ASEPA thugs in supervision of the area. Notwithstanding the threat, the following images - video 2 and picture 14 were captured by the researcher.

Video 2: A short video of Emelogu dumpsite in Aba [Credit: Researcher]



Picture 14: Emelogu dumpsite in Aba [Credit: Researcher]

Besides the huge public health concerns, the site could only be accessed through a narrow strip of road. Considering that the Ogor Hill area is one of the worst areas of the city in terms of vehicular traffic movement occasioned by a combination of high population density and a concentration of other commercial activities such as several markets for food and fresh produce, timber, etc. the location of the dumpsite was perhaps unjustifiable.

5.2 Current Drivers (Motives) and Driving Mechanisms of MSW Management in Aba

Before highlighting the current motives of MSW in Aba, it is necessary to offer a clear definition of the term 'motive' as used here and make a case for differentiating it from what is termed here as 'driving mechanisms'. In the researcher's opinion, both terms have often been commonly referred to as 'drivers' or 'development drivers' in previous literature on MSW management such as Zaman and Lehmann 2013, Contreras et al 2010, Agamuthu et al 2009 and even in Wilson 2007 (See Chapter 2 above).

In Wilson 2007, 'drivers' of MSW was rightly defined as "mechanisms or factors that significantly impact development in solid waste management" and it also stated that understanding these 'drivers' was necessary to developing sustainable waste management systems around the world. However, in a place like Aba (and Nigeria in particular and perhaps in most other developing countries by extension), the discussions should begin with identifying the 'motives' of MSW management. Motives here are defined as the reason, motivation and or rationale for MSW management. It answers the basic questions of 'why'? Why does the city need MSW management? Why should huge amounts of money be spent on it? It explains why people (should) manage their waste. For a set MSW system to work, the motives have to be accounted for in the development drivers (or what is termed driving mechanisms in this thesis). For instance, no reasonable government will spend huge public funds on developing a state of the art MSW management system just because the technology has been made available but a government can take such decision if it feels a state of the art MSW management system will help improve public health. In which case, improvement of public health becomes the motive and technology (state of the art MSW management system) becomes the driving mechanism.

With this distinction in mind, here are the motives of MSW management observed and expressed by stakeholders in Aba.

a. Public Health

Perhaps against the commonly held belief or notion that people in Aba prefer a dirty environment, every stakeholder that participated in this research recognised good health as the main reason they have to clean their environment and ensure proper management of their waste. Many stakeholders linked the current prevalence of diseases such as typhoid fever, malaria and hepatitis to the poor state of the immediate environment while others recalled that the said sicknesses were not common features in the society when the general state of the environment was considerably cleaner (for example during the Mbakwe era, section 4.1). Table 5.14 below is an excerpt of some responses by stakeholders interviewed.

Table 5. 14: Excerpt of Responses from Participants link Public Health to MSW Management

Participant id	Comments
7	As a person I wish for a better approach and a better management because there is serious health hazard.
8	<p>I understand the need to live in a clean environment and that means I should manage my waste properly and I think I have been doing that because it is for my good first before that of any other person.</p> <p>Organic waste can be a breeding ground for so many vermin and rodents, so it is important that you tidy your environment to ensure it is not a breeding ground.</p>
36	The bank takes ambience very seriously and you can see our immediate environment is very clean.
9	<p>We should be hygiene conscious. We should not be littering waste here and there.</p> <p>I'm not a medical doctor but I know that the susceptibility to sickness we have now is not the same as before when we were children, when everywhere was very clean. I know when EHOs (Environmental Health Officers) were going around fumigating our surroundings. People were rarely sick then. Now sickness and death are so common. These are related to the air we breathe and the environment we live in.</p>
51	Every human knows the good of staying in a clean environment and the bad of staying in a dirty environment. If you stay in a clean environment, you will not have staph infections and things like that. In a dirty environment, you will be having several bad infections.
55	These people forget that our environment says a lot about whom we are – our perception, health, cleanliness; it's an identity of whom we are, and how we behave
49	I am sure we will be happy to pay because the smell in this market drives some of customers away. If the market was made very clean, more customers will come.
46	Absolutely. I am sure all the traders will pay because at the end of the day, everyone wants a cleaner market

2	When this happens, we'll get a cleaner and healthier environment. Yes, these sicknesses arise because there are not enough waste workers to patrol, monitor and enforce policies and to apprehend defaulters.
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It can be said without ambiguity that public health is the most common motive of MSW management in the city amongst the participants. This is against the common notion of 'Aba Syndrome' which suggests that residents of the city prefer a dirty environment to a cleaner one. Furthermore, when asked if they will be willing to pay higher sanitation fees to the authorities in order to guarantee a cleaner environment, most participants expressed their willingness and readiness to pay, as shown in Table 5.15 below.

Table 5. 15: Comments from Participants expressing willingness to pay higher fees to guarantee cleaner environment

Participant id	Comment
2	There's enough money but if they decide to collect more, we don't have a choice. People will pay much more if better services will be guaranteed.
3	Yes, I will. It's difficult for people to pay now but that is because service is not being rendered. I'll be happy to pay more if indeed a better service will be rendered.
11	Why not. They should start by providing service and once they do, trust me, Aba people will pay and I will be more than happy to pay.
29	Currently I pay #50 weekly to someone who disposes my waste (i.e. #2600 annually) and then I pay #1000 to ASEPA. So I am happy to pay more to ASEPA so long as I get the same level of service or better. If they are going to collect my waste which means I have no other expenses for waste, why will I not pay that money to them to make things work?
31	If they collect waste from house to house, people will be happy to pay much more so long as the place is clean
56	If government provides the services of clearing the refuse, the people are always willing to pay.

34	The problem is when people pay them and they don't provide any service. Once they work, people will pay.
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A few participants who declined to express their willingness to pay a higher fee argued that the money they currently pay is enough for ASEPA to provide the level of service that should guarantee a cleaner environment than is currently obtainable in the city. Others insisted that they have lost all faith and trust in ASEPA and do not believe they can offer anything better than they do even if they (ASEPA) are given all the money in the world. However, even participants in this group agreed with the others that poor MSW management was a concern for public health in the city. The implications of poor MSW management on public health is discussed further in section 5.3.

b. Source of Income

For some stakeholders such as the informal waste pickers and buyers, MSW management is their livelihood and the only source of income. For some others, it is the family business and for a few others like young teens, it is a means to some other ends such as raising money for school fees, etc. as shown by the conversation with informal waste workers in Table 5.16. Picture 13 below was taken by the researcher on a visit to a plastic recycling shop at Isi-Court, Aba, Abia State, Nigeria. It shows the display of wares (used plastics) by a middleman (see section 2.9.2.5) for sale to the public.



Picture 15: Informal Recycling (Re-use) - Plastics displayed for sale at Isi-Court, Aba [Credit: Researcher]

Table 5. 16: Excerpt of Responses from Informal Waste Workers

Question	Answer
Participant id = 20	
How long have you been in this line of job/business?	<p>Been a long time but I was collecting bottles before. I started collecting water proofs, cardboards, drink cans and sack bags. I was using bicycle before.....</p> <p>People (buyers) normally come here and tell me the kinds of stuff they want me to collect for them and once I have gathered large quantities of it, they will come and carry them and pay me. So virtually, I live on this dumpsite</p>
How much do earn monthly from scavenging?	<p>It's difficult to say because there are days or two days you won't earn up to #2000 but at the minimum I spend over #150000 to #20000 on food, medication and socials every month and all my earnings come from here</p>

In terms of the job, what do you think anyone or government can do to help you make more money or make the job easier or safer?	All I can think is if someone can bring a contract for more materials and may be offer higher prices per kilo of the items I collect.
Participant id = 19	
What kind of stuff do you pick or collect?	I collect cardboards
What do you do with them after collecting	I sell them to people that buy them at Old Court (a cluster for middlemen that deal on resalable waste materials)
How much do they pay?	They pay #13 per kilo
How old are you?	I am 15 years old
Are you doing it for someone or for yourself?	It's for me. I want to raise money to go to school.
Participant id = 15	
So how much business is it? How do you make it a business?	<p>It's a good business but we need sponsor (financier). Sometimes the people you give money to buy in the field can run away with your money. So there's the issue of trust too.</p> <p>One person cannot run the business on his/her own. You must have people involved.</p> <p>I've been in this business and in this very line a long time (over 30 years). It's the only business I know and do. It's my only source of income.</p>

Indications also show that the government views MSW management as a source of revenue. Besides that this was commonly alleged by different stakeholder groups and partly justified by the absence of a commensurate service for the fees paid by users, most government plans and actions in MSW management are mainly for the purposes of raising money. The monopoly of the sale of bin bags and waste bins by ASEPA and the

agency's determination that future plans of waste recycling will be a revenue source for the government are other examples to support this position.

This motive is very different from resource management because the focus or interest of the waste pickers is not related to the wider implications of efficient resource use and neither is it driven by scarcity of the materials collected as previously reported (Wilson et al 2015; Wilson et al 2012; Rodic et al 2010; Wilson 2007). It is simply their job and the major source of income.

c. Spirituality (Christianity), Culture and Customs

As mentioned earlier (section 5.1.4.1), indiscriminate dumping and littering is prevalent in the city. However, the researcher observed that the immediate vicinities of private spaces were considerably clean compared to areas considered as public spaces. Still, there were two (2) places observed to be extremely different in terms of level of cleanliness. The entire compound and the immediate external surroundings were very well kept and maintained (Picture 16). Consequently, the researcher enquired further to know why the 2 places were different and how such standards were achieved. It turned out that the 2 places were owned by religious organisations (churches) – The Church of Latter Day Saints Aba Temple (along Okpu Umuobo Road, Aba) and The Diocesan Headquarters of St. Michael's Cathedral (along St Michael Road, Aba). Picture 16 is a gallery of images taken by the researcher in the 2 locations.



Picture 16: Gallery of Photos showing a clean and well maintained environment in Aba [Credit: Researcher]

From the responses given by the 2 officers responsible for maintaining the grounds at the 2 locations, the researcher found spirituality to be the main thrust or motive. The 2 officers (participant is = 55 and 57) explained that “cleanliness is next to Godliness”. They enthused that as their places were a place of worship, cleanliness and tranquillity was of utmost importance. Both explained that in order to promote to the world the image of God they preached, it was not enough to maintain such standards only on the inside of the church premises but also on the outside. Along with spirituality, some other participants cited culture as a motive of ensuring that their immediate surrounding was adequately clean as shown in Table 5.17 below.

Table 5. 17: Responses form Participants suggesting Spirituality and Culture as Motives for MSW management

Participant id	Comments
57	Yes, cleanliness is next to Godliness. Here is the diocesan headquarters of Aba diocese and many of our members are very learned and have travelled far and near. In order to attract them to worship here, the environment must be clean. As a pastor, we are required to keep everywhere neat and we cannot depend on the government to keep the environment neat.
55	This is a church and as practical Christians we understand the scriptural injunction – cleanliness is next to Godliness.
3	They will certainly need more education. We have a culture of cleanliness and that is what has taken us thus far. A lot more educating will certainly help
50	Ordinarily our people are clean. As kids, part of our chores was to sweep and tidy our surroundings. We did that before we went to school. In the school, we were also required to clean our environment. So it’s part of our culture and way of life.

While one may argue that this disposition is not in agreement with the general state of the public environment, it does offer an explanation to why the very immediate vicinity of private places is considerably clean. It also lends further reasons to disprove the commonly held historical notion of Aba Syndrome.

5.2.1 MSW Driving Mechanisms in Aba

The common driving mechanisms of MSW management in Aba identified by this study include

a. Policies and legal frameworks

One of the most commonly known policies of MSW management in Aba is the ‘sanitation day’ which is held every last Saturday of the month (Figure 5.2). It is prescribed at the national level and contained in the national sanitation policy but its application is left to

the states. In Aba, the monthly sanitation day can be said to be central to the MSW management process implemented by ASEPA as all waste that are not properly disposed are expected to be properly disposed on that day. Many participants reported high levels of public co-operation going by the number of people that take part in the cleaning up of their surroundings. However, some participants stated that most of the waste that are gathered by the public from cleaning of their surroundings on the sanitation day are left to rot along the streets while others are washed back into the gutters during rainfall because ASEPA and the local government authorities fail in the evacuation of such waste as prescribed by the policy. Many participants, including senior officers of the EHDs at the local governments confirmed that both ASEPA and the local government authorities were more concerned about the fines and penalties that will accrue from would-be defaulters. They maintained that the monthly sanitation exercise have been converted by those in power to just another avenue to extort money from the public rather than an opportunity to instil public discipline and compliance. Some of the comments by participants are shown in Table 5.18 below.

Table 5. 18: Some comments by Participants related to the Monthly Sanitation exercise in Aba

Participant id	Comment
7	There's so much inefficiency in the system. During monthly clean-up, we clean the drainages but they (ASEPA) do not clear the rubbish and once there's rainfall, it will all go back to the drainage.
27	We see that on clean-up days when there is enforcement, people will do as expected.
26	For the local governments, the emphasis is always on raising money. Every drive on the sanitation day is geared towards making money from would-be defaulters and not to engender change.

However, participants from ASEPA maintained that funding and lack of vehicles were the major challenges affecting the efficiency of MSW management services including the evacuation of refuse gathered on monthly sanitation days. They insisted that the arrest,

and subsequent fine imposed on defaulters of the monthly sanitation exercise was aimed at discouraging people from defaulting.

b. Public education and awareness

Public education and awareness is perhaps one of the most important and most effective tools in driving changes in MSW management (Wilson 2007; Wilson 1999). Historically, the public are reported to be sceptical about MSW systems especially when it relates to citing MSW management facilities such as incinerators, Waste to Energy plants, landfills, etc. (Ezeah 2010; Wilson 2007; Tonglet et al 2004). The analyses of the responses from participants in this study support previous reports which suggest that when the public understand the motives behind what they are being asked to do and may be some implications of not doing them, then it is easier to achieve a positive behavioural or attitudinal change (Abila and Kantola 2013).

Clearly, there are efforts by members of staff of the education department of ASEPA and the EHDs of the local governments to educate the public on the need for effective MSW management and compliance with stipulated MSW management policy. However, the efforts are not concerted and the information provided was found to be grossly inadequate. This study found that the members of staff lacked the prerequisite training and level of knowledge to effectively carry out the responsibilities required of them. The situation was exacerbated further by the wrangling between the two responsible bodies (see Table 6.2).

c. Technology

The agency (ASEPA) has in its armoury some compactors, trucks, pay loaders, caterpillars, etc. Participants from the agency claim these machines are necessary for effective MSW management in the city. They insist that these technological machines help them to evacuate waste faster than they would without. This study is all for developing existing local technology and against investing huge sums of public funds in acquiring more high tech machineries developed abroad. This approach, the study believes, is in line with the political economy appraisal approach that is important in achieving sustainable development (Booth et al 2016; Long 2004), and against the modernisation approach which is often favoured by MSW management decision makers in developing countries (Wilson et al 2015; Nzeadibe and Ajaero 2010; Long 2004).

d. Intimidation and harassment

Many participants reported several incidences of harassment and intimidation by ASEPA and those working for the agency. Most of these incidences reportedly occurred in relation to the collection of sanitation levies and on sanitation days. Others alleged that this method was often used by people parading as officers of ASEPA and their thugs, to extort money from traders and shop owners. Analyses of the responses from participants suggest that intimidation and harassment can be classed as a driving mechanism used by ASEPA. This is discussed further in Chapter 6.

5.3 Implications of Poor MSW Management Practices on Public Health

As highlighted in the literature review (Chapter 2), the conclusion from the assessment of literature on the adverse health effects of poor MSW management practices on the general public and waste workers is insufficient and inconclusive (Giusti 2009). While there have been calls for further cohort studies involving direct human exposure measurements and supported by data on health effect and susceptibility biomarkers, it is perilous to disregard the reported linkages between poor waste management practices and public health (Ayomoh et al 2007).

In Aba, the prevalence of odour nuisance, pest infestations, air pollution and general environmental blight occasioned by poor solid waste management is very obvious for everyone to see (Odoemena and Ofodu 2016). Even though this study was not focused on identifying direct links between MSW management or absence of it, and certain ailments or health conditions, the responses from stakeholders suggest a correlation between poor MSW management in the city and public health. As shown in Table 5.15, most participants linked poor MSW management to public health and in Table 5.19 below, participants highlighted some of the most common ailments that could be associated with poor MSW management.

Table 5. 19: Some common Ailments linked to Poor MSW Management by Participants

Participant id	Comments
2	Yes. These sicknesses arise because there are not enough waste workers to patrol, monitor and enforce policies and to apprehend defaulters. Our gutters do not carry water they were built for anymore as they are blocked. Mosquitoes from the gutters bite us every time and we all know mosquitoes cause malaria.
29	The most common is malaria, typhoid, hepatitis, cough, diarrhoea and checking of blood pressure. Our environment might be one of the causes of typhoid – eating contaminated food. Hepatitis is caused by accumulation of malaria in the liver.
20	My number one sickness is tiredness, general weakness of the body and malaria.
9	Yes, they burn it every day. People burn toilet wastes, waterproofs, etc. and for me it causes me instant catarrh which will linger for a very long time.

Most stakeholders reckon that they only became aware of the names of certain ailments and diseases such as typhoid, hepatitis, etc. in the last 10 to 20 years, and they posit that the timing corresponds with the period when MSW management and the entire environmental condition of the city deteriorated. While extensive cohort studies may be needed to categorically establish the links between poor MSW management practices and specific diseases in the city (Giusti 2009), available literature suggests that the above mentioned ailments such as malaria, hepatitis, typhoid, etc. are related to poor sanitation, and hepatitis have been shown to be prevalent amongst waste workers in Iran (Marchand et al 2012; Gupta 2010; Gregory 2009). The influence diagram (Figure 5.5 below) summarizes the identified impacts on health of poor MSW management practices in Aba.

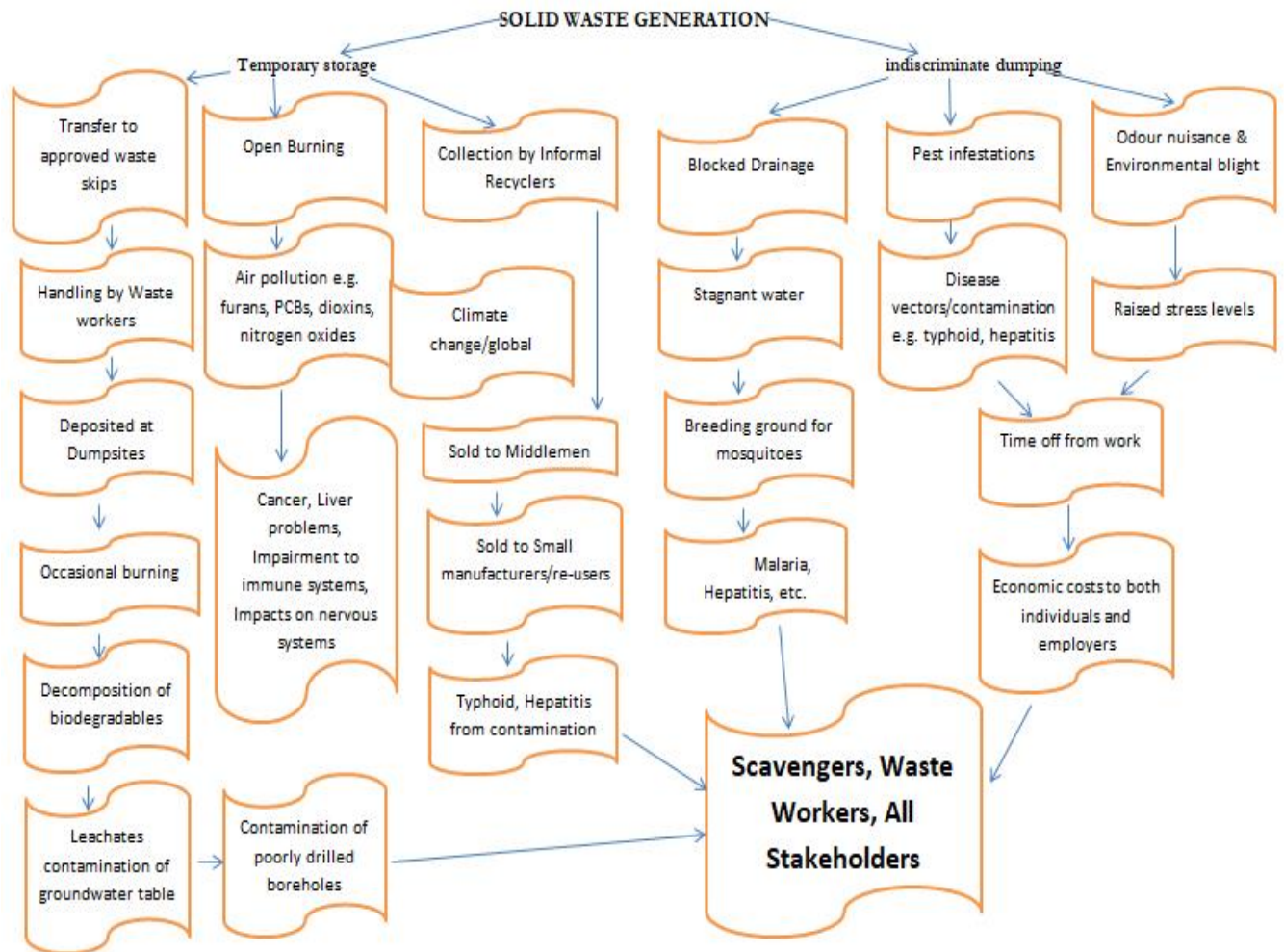


Figure 5. 5: Influence diagram showing the Implications of Poor MSW management practices on Public Health [Credit: Researcher]

To an onlooker, a littered street or a drainage blocked with solid waste may not seem very alarming but the influence diagram above highlights the far reaching implications such situation may have on not just the public health but also the economic fortunes of individuals and organisations. When the gutters are blocked by refuse, it may cause localised flooding resulting in unwanted loss of lives and properties as well as cause epidemic of cholera, dengue, etc. (UNEP 2015; Gupta 2010). In Aba, increased population of several pests and vectors of diseases such as rats and houseflies were often observed around uncollected heaps of refuse.

Improper disposal of biodegradable waste such as landfilling can cause leachate contamination of groundwater (Hettiarachchi et al 2018; UN-HABITAT 2014; EEA 2009). Responses from participants in this research show that there is no portable pipe borne water available to the public. This has given rise to the proliferation of private boreholes

as many now depend on them for their drinking water. Many participants stated that the standards of most of the privately owned boreholes were very poor. There are also other risks such as the effects of improperly disposed hazardous wastes containing substances such as heavy metals on agriculture and food production (Ezeah et al 2009). This raises further concerns over contamination (Giusti 2009). Added to the mix are the effects of open burning of waste which include poor air quality and the release into the atmosphere, of pollutants such as dioxins (Marchand et al 2012; Pheby et al 2002). Previous studies and reports highlighted that often, these conditions posed more danger to the health of children (WHO 2015; UN-HABITAT 2010a).

Indirect economic costs of poor MSW management practices include labour hours lost due to employees' affected taking time off work while direct economic costs to those affected may include costs of buying medication, lost income, etc.

5.4 Possible Economic Opportunities identified in MSW Management in Aba

The importance of adequate funding in ensuring the smooth and effective delivery of good MSW management services can never be overemphasised (Muhammad and Salihi 2018; Wilson et al 2015; Rodic et al 2010). As stated earlier, MSW management is an intensive service that requires huge amounts and steady flow of cash. For the system to be sustainable, procedures must be put in place to ensure that the short term and long term funding costs are met (Wilson et al 2012). Part of this planning must also take into account expected changes in demography that may affect waste generation rates, urban growth or expansions that may involve increase in the areas from which waste collection services are provided etc. (Rodic et al 2010; UN-HABITAT 2010b).

In Aba, this study found that the level of planning for the MSW management services can be described as abysmal at best. There are no budgets (or if there are, they are treated as top secret), and everything relating to funding or revenue is shrouded in secrecy. With rapidly deteriorating equipment and a pervasive culture of neglect and poor maintenance of existing equipment and machinery, the capacity of the management agency (ASEPA) to effectively render MSW management services in the city is hugely inhibited (Ezeah and Roberts 2012; Imam et al 2008). This situation means there are more openings and opportunities in the sector as a large section of the city population demand this service. This study found that the opportunities will be worth much more if the right policies and processes are put in place to outlaw indiscriminate dumping. This could be through a

combination of an effective public education emphasising the health implications of poor MSW management practices and a strict enforcement regime to serve as deterrent (Ezeah 2010; Nzeadibe and Ajaero 2010; Ezeah et al 2009; Adebola 2006a).

Currently, up and down the length and breadth of the MSW management chain, the following economically viable opportunities were identified. It is noteworthy to mention that all of these opportunities depend largely on the willingness of the government to liberalise the sector and allow participation of interested private and community based groups in MSW management service provision (Ezeah and Roberts 2012). Currently, the understanding from the studies carried out is that government is actively seeking partnerships and investments that will transform the MSW management sector in the state. Would-be investors will desire that there are adequate policies and laws in place to protect their investments (Nzeadibe and Ajaero 2010).

a. Sanitary Equipment

The observation of this study is that the city of Aba is under resourced in terms of basic sanitary materials and equipment. On the 4th of December 2016, a popular television channel in Nigeria (Channels TV) carried headline news that all stakeholders in MSW management in Aba would have welcomed rapturously. The title was “Abia Polytechnic Makes Waste Management Bins for State Govt.” The broadcast went further to emphasise the state governor’s commitment to make Abia State “the number one state and SME capital of Nigeria” (Channels Television 2016). However, till date, most residents and households in the city do not have standard sanitary waste bins. As highlighted earlier, the waste skips used by ASEPA are not fit for purpose. For health and safety reasons, households should have and use the kinds of sanitary waste bins shown in Figure 5.4, and all ASEPA skips should at the minimum look like these locally fabricated samples below.



Figure 5. 6: A Locally Fabricated Waste Skip [Credit: <http://www.nairaland.com/3496166/abia-polytechnic-manufactured-asepa-bins>]

There should also be a massive deployment of public waste bins such as those shown below to discourage indiscriminate dumping in public places.



Figure 5. 7: Locally fabricated public waste bins [Credit: <http://www.nairaland.com/3496166/abia-polytechnic-manufactured-asepa-bins>]

There are several ways of achieving these results but it must start by encouraging the participation of the wider stakeholder groups including but not limited to private

investors, community based groups, informal waste workers, all service user groups, etc. (Wilson et al 2015; Rodic et al 2010). Manufacturing these sanitary bins locally will present significant economic opportunities to would-be investors considering expected demand and the estimated population of nearly one million people.

b. Waste Collection Service

Currently, MSW is not collected from house to house in the city and most residents do not have access to any sort of MSW management services. Besides the teeming residential population that is currently not served, most business people and market traders expressed desire to have a reliable trustworthy service provision that guarantees the waste they pay to be collected is not indiscriminately dumped afterwards.

Responses from participants (Table 5.15) show service users are often willing to pay for the services if provided, and many expressed preference for a house-to-house MSW collection service to the current system. There may be lessons to learn from informal waste workers especially the itinerant waste pickers/buyers who currently offer similar services in selected areas in the city. The population of the city and the expressed willingness to pay by participants suggest waste collection service provision represent a viable economic opportunity in the city (Ezeah 2010).

c. Waste Processing and Conversion

Currently, several informal waste recyclers operate in different formats in Aba (2.9.2.5). Most operate at barely subsistence levels going by the researcher's observations of their operations and their stated incomes (see Table 5.16 and Table 5.20). Others who deal mainly on scrap metals operate at a much higher level as their trade requires higher levels of capital. Responses from these informal waste workers indicate that the scrap metals are sourced from several cities in the south of Nigeria, brought to base in Aba and then transported to metal processing companies located in Delta or Lagos states. The participants lamented the lack of processing companies in Aba even though their trade have thrived in Aba for more than 40 years. They said it costs significant amounts of money to transport the stock from Aba to the locations for processing. These participants also reported extortion by the police and other law enforcement agents in the country who usually mount roadblocks and see dealers of scrap metals as easy targets for

extortion and harassment. Issues relating to conflicts of interest are discussed further in chapter 6.

Table 5. 20: Responses from Informal Waste Workers on their Operations and Income

Participant id	Comments
14	<p>Yes. It will help (referring to organisation of the informal waste sector). Currently it is more a game of luck.</p> <p>We buy blindly and thus depend on the companies buying to make any profit.</p> <p>Usually, a trader will have so many boys in the field buying stock for him. Sometimes, the further your boys go, the more stock they can buy and thus the more business you do</p>
16	<p>Yes, they bring it here and I buy</p> <p>This is where I sell them. Do you not see buyers here? (a few people were checking some of the items and haggling prices). It's these people here that also buy it from me. That's how we sell here.</p>
18	<p>The pickers bring them. We buy 4 for #5 (4 pieces for Five Naira) {£1 > #450}</p> <p>Retails to: People that use them for kunu, zobo (local drinks), izal (local disinfectant), local bleaches, soaps, etc.</p>
20	<p>It's difficult to say because there are days or 2 days you will not earn up to #2000 but at the minimum I spend over #15,000 to #20,000 on food, medication and socials every month and all my earnings come from here.</p>
13	<p>We have a store just nearby here. We stock the scraps there until we accumulate enough quantity say 1 tonne or 2 tonnes before they are lifted.</p> <p>It's by the weight, the heavier the metal the higher the price. There are different metals too – Iron, Brass, Aluminium, Copper, Shoe break, etc.</p>
15	<p>You need to have 2, 3 4 or 5 different people buying scraps for you in the field. They can go as far as Calabar sometimes. When you</p>

	aggregate all they buy, you can have up to 12 – 20 tonnes and then you load it in trailer and transport it to the company that buys it (Asaba, Benin, Lagos, or the new one that just opened in Obehe).
17	We don't have fixed prices. We assess them once you bring them here and then we decide how much to pay you.

From the responses, the study finds that proper organisation and regulation of the informal waste sector will contribute immensely to the economic viability of the activities of the participants as has been previously reported (Wilson et al 2015; UN-HABITAT 2014; Scheinberg 2011; Rodic et al 2010; Ezeah et al 2009). It is also important to note the importance of quantity as a driving factor. The middlemen and the recycling companies often require the materials that are of interest to them in significant quantities, so much so that those dealers who can afford it have 'boys' who travel to other cities within Southern Nigeria to source the materials so as to be able to amass enough quantities for a trip to the (recycling) factory.

Based on the researcher's local knowledge of the city and the challenges highlighted by the informal waste workers that participated in the study, this study finds that establishing a waste processing/conversion plant that mirrors those in Lagos, Asaba and Warri, where the participants currently transport their wares to, will be economically viable given the central location of Aba and its proximity and road connectivity to several cities in the south of Nigeria.

This study also thinks it will be interesting to explore the opportunities in establishing a waste to energy (WtE) plant considering the observed shortage in electricity supply in the city compared to demand. Going by the guidelines provided by the International Solid Waste Association on waste to energy in low and middle income countries, the initial readings may not be very promising but considering that a steady regular uninterrupted supply of electricity could command premium pricing from consumers, it is worth consideration (ISWA 2013). There could also be further benefits accruing to the operator of such plant considering that MSW management authorities in neighbouring cities and states may require the services of the plant thus providing it with regular free raw materials (waste) and possibly income from charges for treating the waste.

d. Sanitary Waste Disposal

Currently, waste is indiscriminately dumped. From Abayi to Ogbor Hill, Ngwa Road to Port Harcourt Road and environs, empty spaces and streets in the city are potential waste dumps going by the spate at which refuse dumps were observed in the neighbourhoods. This study is of the opinion that unless something is done very quickly to arrest the situation, it may spiral out of control. Even the waste collected by ASEPA is disposed uncontrollably in dumpsites that are not properly planned and thus unsanitary. To arrest the outbreak of an epidemic, there is need to institute a sanitary waste disposal regime in the city. This means that all waste produced in the city has to be handled, transported and disposed in a way that not only guarantees the sanitary condition of the environment but also those of the waste generators and waste workers.

This study identifies the establishment and operation of a sanitary landfill or landfills as of utmost importance in actualising a sustainable MSW management in the city (SEPA 2017; Sharholy et al 2008). It will ensure that the actual cost of waste disposal is properly taken into consideration in decision making and thus help in the safeguarding of the environment (Scheinberg et al 2010; Seadon 2010). It will also help to drive resource efficiency measures.

Constructing a sanitary landfill will cost considerable amount of money but with the right policies and systems in place, it could provide viable economic opportunities (EEA 2009; EEA 2013) and contribute immensely to limiting the effects of poor waste disposal practices (Giusti 2009).

e. Human Resource Development and Training

One of the major problems identified through this study is the use of non-professionals and poorly skilled staff by ASEPA and EHDs. To make any significant progress in MSW management, there need to be a cohesive effort aimed at developing the requisite human resources that is currently almost non-existent. From top to bottom, MSW management roles need to be filled with trained personnel appropriate for each role. Field workers and other specialist positions also need to be filled with people with the requisite skills and training.

As highlighted earlier in section 5.1.4(b), trainings are not provided to staff of the different agencies and departments concerned with MSW management. For these, and the many more employees that will be required to deliver the much needed effective services, a lot of teaching and training will be required. That is a huge economic opportunity for those with the capacity and know-how to provide the sort of development and trainings required.

f. Monitoring and Enforcement

The lack of monitoring and enforcement was also cited by many stakeholders as some of the key issues and challenges in MSW management. Thus there is an economic opportunity for anyone or organisation with the capacity of providing such services or developing technological gadgets that may be deployed to aid monitoring and thus enhance enforcement.

g. Finance

Finance is the lens through which every economic activity is perused and as mentioned previously, financial sustainability is of paramount importance in the governance of MSW management (Wilson et al 2015; UN-HABITAT 2014; Rodic et al 2010). For a corruption-laden Nigerian government agency, finance is even more paramount. The study found that current arrangements between ASEPA and revenue consultants (contractors) are not sustainable. The level of secrecy surrounding the arrangements and the observed determination on the part of agency (ASEPA) leaders to avoid providing any details of such arrangements confirms them as phoney. That said, judging by the current system of MSW management, it is expected to be in the best interest of the agency and the government to realise as much money as possible from the service users. This study is of the opinion that there is a great opportunity available for a finance solution that will ensure that all service users of MSW management services pay for the services rendered e.g. a payment app that allows service users to pay directly to the ASEPA with added functionalities such as the ability to request service, report sighting of uncollected heap of refuse, etc. The same applies for finance solutions that will leverage the collection of statutory fines in MSW management and associated penalties e.g. an app payment can help identify repeat offenders by flagging them during a payment, etc.

5.5 Profiling the Current Performance of MSW Management in Aba

The current realities and challenges of MSW management in Aba have been presented in previous sections in this chapter. The researcher believes it is helpful to profile the city's MSW management performance using an established and acceptable method such as the 'Wasteaware' ISWM benchmark indicators (Wilson et al 2012). This will make it possible and easier to compare the city's MSW performance to those of other cities in developing countries, with similar income levels. It is also a first attempt at profiling MSW management performance in Aba using the 'Wasteaware' ISWM benchmark indicator model. The profiling also provides an easy to understand summary of the current MSW management situation in the city and makes it easy for anyone with vested interest to identify areas with satisfactory performance, and those needing priority attention for improvement (Wilson et al 2015).

Due to the unavailability of some vital information, this profiling does not show values for the sub-indicators and values used are subjective to the researcher's observations during the study. Muhammad and Salihi (2018) used similar approach in profiling the performance of MSW management in Kano, Nigeria.

Profile

Country: Nigeria

Background Information on City

Country Income level: World Bank Income category – Lower middle; Gross national income (GNI) per capita \$5,680 (The World Bank 2017)

Population of the city: 897,560

Key Waste related data

MSW Generation (tonnes per year): Not available

MSW per capita: Not available

Waste composition: 4 key fractions – as % of total waste generated

Organic: Not available; Paper: Not available; Plastics: Not available; Metals: Not available

Physical Components

Waste Collection coverage: based strictly on the percentage of the city with access to skips as observed during the study - 20%

Waste captured by the system: Only a fraction of the waste generated in the city goes into the MSW management system. The majority of the waste is littered indiscriminately. 25% is a generous estimate.

Quality of waste collection service: Based on stakeholder feedback, public opinion and field observations, a score of <10% is given as almost everyone was grossly dissatisfied with ASEPA.

Controlled treatment and disposal: 0%

Degree of environmental protection in waste treatment and disposal: 0%

Recycling rate: There are no official records of the quantity of materials recycled. However, the researcher estimates that most metals find their way into the recycling path of the scrap metal dealers. The question though is what percentage of the waste generated is metals? <5%

Quality of 3Rs – Reduce, reuse, recycle- provision: There is nothing on reduce and the only reuse activities are those by informal waste pickers. A lot of reuse-able materials such as those picked or bought by informal waste pickers end up in the drainage and illegal dumps. <10%

Governance Factors

User inclusivity: Absolute zero – 0%

Provider inclusivity: Absolute zero – 0%

Financial sustainability: Even in the face of the current failings and inadequate service provision to which the public are subjected, there is a surprisingly high willingness to pay expressed by most people. This and the fact that many people showed evidence of their payment of current levies points to the likelihood of financial sustainability of the sector. The main problem though is the inherent corruption and nepotism which ensures cost

accounting and budgeting is either non-existent or shrouded in secrecy. Overall score of 30% seems sufficient as it is difficult to attract investment in the sector without reforms.

Adequacy of national solid waste management (SWM) framework: 20%. The National Environmental Sanitation Policy does not pack a punch in terms of clarity on MSW management. It also appears obsolete and not in touch with the trend as it rarely mentions waste minimisation, climate change and global warming.

Local institutional coherence: 0%. Strictly speaking, institutional coherence is non-existent. If anything, the 2 most direct agencies for MSW management i.e. ASEPA and EHD are at loggerheads.

Table 5.21 below shows how the city of Aba compares with three cities – Monrovia, Lahore and Belfast, which were some of the case study cities used in developing the ‘Wasteaware’ ISWM benchmark indicators (Wilson et al 2015). Monrovia (low income level) and Lahore (lower middle income level) are cities in developing countries, Liberia and Pakistan respectively. Belfast on the other hand, is in the UK and income level is high. The table shows a snapshot overview of how MSW management performance in Aba - a city in Nigeria with lower middle income level, compares with the three cities.

Table 5. 21: Benchmarking MSW Management in Aba using the ‘Wasteaware’ ISWM Benchmark Indicators

Category	Indicator	Result			
	City	Aba	Monrovia	Lahore	Belfast
	Country	Nigeria	Liberia	Pakistan	UK – Northern Ireland
Back ground information on the cities					
Country income level	World bank income category	Lower middle	Low	Lower middle	High
	GNI per capita	\$5680	\$370	\$1140	\$38250
Population	Total population of the city	897,560	1,021,768	8,160,000	218,000
Waste generation	MSW generation (tonnes/year)	Not available	287,000	1,916,000	149,000
Key waste related data					

Waste per capita	MSW per capita Kg per year	Not available	230	219	683
Waste composition:		4 key fractions – as % of total waste generated			
Organic	Organics (food and green wastes)	Not available	50%	65%	35.1%
Paper	Paper and card	Not available	5%	2%	21%
Plastics	Plastics	Not available	13%	12%	6%
Metals	Metals	Not available	2%	0.1%	3.3%
Physical Components					
Public Health - Waste Collection	Waste collection coverage	20% (L)	33% (L)	77% (M)	100% (H)
	Waste captured by the system	25% (L)	30% (L)	80% (M)	98% (M/H)
	Quality of waste collection service	10% (L)	58% (M)	58% (M)	100% (H)
Environmental control – waste treatment and disposal	Controlled treatment and disposal	0% (L)	70% (L/M)	8% (L)	98% (H)
	Degree of environmental protection in waste treatment and disposal	0% (L)	45% (M)	37% (L/M)	100% (H)
Resource management – reduce, reuse and recycle	Recycling rate	<5% (L)	8% (L)	35% (M)	35% (M)
	Quality of 3Rs – Reduce, reuse, recycle - provision	<10% (L)	33% (L/M)	17% (L)	83% (H)
Governance Factors					
Inclusivity	User inclusivity	0% (L)	67% (M/H)	37% (L/M)	79% (M/H)
	Provider inclusivity	0% (L)	60% (M)	50% (M)	80% (M/H)
Financial sustainability	Financial sustainability	30% (L)	46% (M)	54% (M)	100% (H)

Sound institutions, proactive policies	Adequacy of national SWM framework	20% (L)	Red	17% (L)	Red	29% (L/M)	Red/Amber	66% (M/H)	Amber/Green
	Local institutional coherence	0% (L)	Red	46% (M)	Amber	62% (M/H)	Amber/Green	100% (H)	Green

Key: Performance and colour coding – Low (L) = Red; Low/Medium (L/M) = Red/Amber; Medium (M) = Amber; Medium/High (M/H) = Amber/Green; High (H) = Green.

[Credit Researcher]

5.6 Summary

ASEPA Aba zone is responsible for managing MSW in Aba. The agency cites poor funding and lack of equipment as its major challenges. However, the realities from the analyses of responses from participants and observations by the researcher show that the challenges related to the elements of MSW management are perhaps much wider. Current guidelines and policy for MSW management as set at the federal level does not consider waste minimisation. The current system of MSW collection as implemented by ASEPA Aba zone involves the use of secondary receptacles, where service users are expected to drop-off their waste pending evacuation by the agency. However, the system is riddled with inefficiencies in planning, manpower and resource allocations. The monthly sanitation exercise which should be a safety net for removing improperly disposed waste does not also work as it should.

Consequently, indiscriminate dumping, littering and illegal dumping are pervasive in the city. Decomposing heaps of refuse and open burning of waste give rise to various concerns related to public health including pest infestation, blocking/clogging of gutters, poor air quality, etc. and other attendant consequences such as diseases, environmental blight, localised flooding, etc. Officially, there is no waste treatment and the most common disposal option practiced by the authorities is open dumping in dumpsites that are unplanned and unsanitary.

The study found it unsuitable to use the term ‘drivers’ to describe what affects MSW management in Aba so instead the term ‘motive’ was proposed. The common motives identified were public health, source of income, spirituality, culture and customs. The study also identified policies and legal frameworks, public education and awareness,

technology and intimidation and harassment as the driving mechanisms used by the agency in administering MSW management in the city.

On comparison, Aba performed worse than Monrovia and Lahore – 2 cities in developing countries with similar income levels; when profiled using the ‘Wasteaware’ ISWM benchmark indicators. However, the identified inefficiencies and the expressed willingness to pay for better levels of service by most participants mean there are possible viable economic opportunities for would-be investors, given an appropriate operating environment. The areas identified that could present the most viable economic opportunities include production and supply of sanitary equipment, waste collection, waste processing and conversion, sanitary waste disposal, human resource development and training, monitoring and enforcement, and finance.

CHAPTER SIX

MSW Governance and Potential areas of Conflict between Stakeholder Groups

6.0 Introduction

In chapter five, the realities and challenges related to the elements of MSW management were presented. This chapter will focus on the second overlapping triangle concerned with MSW management governance – aspects and stakeholders, in ISWM (Wilson et al 2015). The potential areas of conflict between service providers and service users as identified through the analyses of responses by relevant participants and observations by the researcher will also be highlighted.

6.1 Governance

Often times, poor governance is the main reason why MSW and other urban systems fail (Wilson et al 2013b; Rodic et al 2010). Governance issues in MSW management focuses on stakeholders and aspects from Figure 2.4 (pp.29). It is the human, and otherwise soft, component of the analytical framework and includes policy or policies, the institutions, economics, finance, technology, etc. that are involved in the MSW management system in the city. For simplification, these are organised into three (3) sub-headings or indicators – Inclusivity, Financial Sustainability and Proactive Policies and Institutions.

6.1.1 Realities and Challenges relating to Inclusivity

Inclusivity refers to the level of involvement, interest and influence of key stakeholder groups in planning, policy formulation, implementation and evaluation of MSW management in the city. Stakeholders include service users and service providers (Wilson et al 2015; Scheinberg et al 2010).

Service users

Several factors determine the level of inclusivity in the MSW management system. For users of the service, this has been found to include: equity of service provision, involvement in planning, policy formation, implementation and evaluation (Al Sabbagh et al 2012; Wilson et al 2012). Further details on the ISWM indicators for service user inclusivity are shown in Appendix 6.

a. Equity of service provision

There is equity of service when all users of the service irrespective of what part of the city they live have access to a good level of service they can afford, that meets their

expressed needs as well as protect public health and environmental quality (Wilson et al 2015).

Going by the responses of participants in this study and what was observed by the researcher, it is safe to say that the level of MSW management services in the city is not good. To most participants, it does not meet their needs and there are very obvious public health concerns. The system of MSW management in place appears to disenfranchise many service-fee paying users who reckon they do not get any service for their pay. Similar findings were also reported in Kano where many residents do not have access to the MSW management they pay for (Muhammad and Salihi 2018). Considering the significant quantities of waste observed in the gutters, the level of indiscriminate dumping and littering, and the poor air quality, of which offensive smell from rotting waste and fumes from open burning of waste are contributory factors, this study finds that there is no equity in service provision.

b. Involvement in planning, policy formation, implementation and evaluation

All the participants in this study stated that they have never been consulted on any issues relating to MSW management by the agency. The participants from the TGGO stakeholder group, who are the service providers and by extension, policy makers also confirmed that they do not consult service users. As can be seen from excerpts from the interviews with senior officers of the agency (Table 6.1), there is an apparent disregard to views and opinions of service users.

Table 6. 1: Excerpt of Responses from Participants on Service User Involvement

Question	Answer
Participant id = 39	
<p>That brings me to proper stakeholder consultations. Has there been any such discussions or forums where everyone has come together to deliberate?</p>	<p>I believe in participatory government. I believe everyone has a right to be heard out but I must say we have not done this. We will do something like that once we have the resources. The only consultations we have had weren't in the perspective you are talking about but only when we had resistance to siting of waste dumps in the communities</p>

Participant id = 40	
Ok. When these decisions are taken, are the other stakeholders consulted for inputs towards may be developing the process or the running of it?	Naturally, it is difficult to consult the waste generators. You take decisions, design the system and communicate the decisions to them. It is the business of the agency to design waste management strategy and tell them the strategy so designed. If any of them has anything to add, they can come forward with such.

Clearly the stance and attitude expressed above is not in line with Principle 10 of the 1992 Rio Convention which states in part that “environmental issues are best handled with the participation of all concerned citizens, at the relevant level”.

c. Public awareness and education

Public awareness and education has become an important factor and driver of changes and developments in MSW management and rightly so. If we consider that most developments towards a better environmental protection and resource management such as repair, reuse, recycle, compost, etc. all require some kind of behavioural change, then it is not too difficult to see why public awareness and education has such an important role (Abdulredha et al 2018; Scheinberg et al 2010). By extension, principle 10 of the Rio Convention also places some importance on public awareness and education.

In Aba, responses from participants (Table 6.2) suggest current efforts at providing public awareness and education are not streamlined as members of staff of the EHDs and ASEPA run parallel services aimed at achieving the same purpose. Further investigations by the researcher revealed wider problems and conflicts between the 2 bodies as discussed further in section 4.3.

Table 6. 2: Excerpt of Responses from Participants on Public Awareness and Education by EHDs and ASEPA

Participant id	Comments
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41	The normal thing is that we should work together but they cannot make the sacrifices we make here. The common perception is that in civil service nobody cares, it's nobody's business. The forces should be combined or make a clear differentiation in the duties of both. That is not within my control.
40	Well, conflicts to the extent that we both can abate the same nuisance. We are not looking at the conflicts for now because the law, to a great extent, defines roles for every one of us.
26	Absolutely, there are conflicts. The situation ends up confusing even the people because they seem not to know whose advice to follow
24	Another challenge is duplication of duties. This creates confusion for even the citizenry as they do not know whether to follow the EHOs or ASEPA.
25	Streamlining the activities of both organisations will help a lot.

Excerpt from observation notes (6.3) taken by the researcher while accompanying ASEPA staff on a routine awareness and sensitisation exercise in one of the markets shows that beside the alleged friction between the 2 government bodies (EHDs and ASEPA), there are obvious gaps in the knowledge of those saddled with the responsibility of educating the public as well as issues related to attitude and commitment.

Table 6. 3: Excerpt of notes taken during Observation of ASEPA staffs on a routine Awareness and Sensitisation exercise

<ul style="list-style-type: none"> • Start time was 11am. • There were about 15 staffs participating in the exercise. • They had one small hand-held megaphone. • They all went in one group while the person holding the megaphone spoke. • The speaker admonished the traders in the area to ensure they cleaned the area to avoid odour nuisance. • He also told the traders to use the designated refuse skips to dispose such refuse.
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- The traders were also advised to ensure payment of their ASEPA fees.
- Most of the traders were heckling and shouting abuses at the ASEPA team.
- Most ASEPA staff were chatting among themselves and not contributing positively in any way to the ongoing exercise.
- Some of the staffs were shouting back at the traders.
- When the area became very rowdy and noisy, the ASEPA team informed the researcher that they were done for the day and were heading back to their office.
- The time now was about 12:45pm.

d. Effectiveness of desired behaviour

Having observed some of the staffs on a routine public awareness and sensitisation exercise and considering that both service provider and service users have confirmed that there are no consultations between parties, the researcher was not surprised to learn that there are often many incidences of dissident behaviour amongst residents. Responses from participants (Table 6.4) also revealed that authorities cared more about the penalties and fines payable by MSW management policy defaulters than correcting behaviour or instilling attitudinal change. While some of the participants argued that the penalties and fines should be reviewed upwards to achieve the desired aims, others stated that penalties and fines are often reviewed upwards without consultation. Others argued for a sustained public enlightenment and education and a better monitoring and enforcement regime. However, the most interesting of the suggested solutions came from one of the participants (id = 45) from the TrMU stakeholder group. He said “At our level, government should have designed a better way (of managing our waste). With a little help from technology, we can do much better. We should also start educating our people right from the nursery school. We should teach it (waste management) as a subject at all levels of our education system. They should also look at it long term and not just for a few years”.

Table 6. 4: Responses from Participants on public compliance

Participant id	Comment
22	If you arrest an environmental offender and bring the person to court, rather than set an example with the person, the magistrate is more interested in the fine the person will pay to the government because the government is looking for money to pay the political thugs. It is only the poor people who cannot pay the fines that are thrown into the cell. Only the poor and those without connection to people in power get punished for MSW management offences.
24	ASEPA also uses ‘fire brigade’ approach. Their emphasis is always on fines and levies and not really on educating people. This approach does not solve the problem as the people do not learn even after paying penalties or fines.
5	You will be apprehended and charged to court. There, you will pay a hefty fine and also pay the fee
26	For the local governments, the emphasis is always on raising money. Every drive on the sanitation day is geared towards making money from would-be defaulters and not to engender change
32	You can’t challenge them and there is nothing you can do. If we don’t pay, they won’t even allow you to open this place. They will come with their thugs to harass you and destabilise your business

Service Providers

The main indicators of inclusivity on the part of service providers of MSW management in the ISWM analytical framework revolve around the involvement, encouragement and acknowledgement of the roles and interests of both the public and private and or formal and informal/community groups (Al Sabbagh et al 2012; Scheinberg et al 2010).

According to the UN-HABITAT report (2010a), the informal and micro-enterprise recycling sector in some developing and transitional countries have recorded average recycling rates of 29% in the last 10 – 20 years. These figures are reportedly similar to

those recorded in some developed countries. In many developing countries around the world, private sector participation in MSW management service provision is the norm (Guerrero et al 2013; Al Sabbagh et al 2012). But in Aba, so many people make a living dealing on materials regarded commonly as waste. These informal waste workers operate in different modes (see section 2.9.2.5 and table 5.9) and they are responsible for all the reuse and recycling activities in the city. However, there is no provision in the current system to recognise and quantify their inputs to the MSW management efforts. To make matters worse, the government through ASEPA does nothing but disparage these people.

The researcher was duly informed of an exercise carried out by ASEPA to have a register of all informal waste pickers and scavengers operating in the city. To be on the said register and thus to be allowed to operate as an informal waste picker in the city, each waste picker was mandated to pay #500 (five hundred Naira) and was to be issued with an identity card. At the time of this study, the identity card had not been issued to those who paid the said levy. So the registration exercise was not for the purposes of having a record of their contribution to resource management efforts of MSW but rather because the agency viewed the group as criminals, accused of dumping human corpses on the agency operated dumpsites as well as suspects for other sundry offences. Most of the informal waste workers recounted stories of the agency's high handedness, extortion and incessant harassment with the use of thugs, police and other law enforcement agents. This is discussed further in section 6.2 (j).

6.1.2 Financial Sustainability

An effective MSW management system is often a structured set of components that include collection, transport, resource recovery, processing and disposal each of which could be provided by a separate actor in the system (Rodic et al 2010). In a tropical city, effective collection of MSW could mean daily collection and could cost 10 to 20% of a city's budget (Wilson et al 2001). Furthermore, because MSW management is a public service, which by law should be provided for all regardless of the interest of the market to supply the service or users' ability or willingness to pay for the services supplied (Wilson et al 2013b; Rodic et al 2010), it is essential to have adequate financial planning in place.

Some of the indicators of financial sustainability as developed for the ISWM framework include transparent cost accounting procedures, adequacy of the total budget, local cost recovery from service users, affordability of user charges, pricing of disposal and access to capital investment (Wilson et al 2015, Rodic et al 2010). The cost accounting procedures should accurately detail the full costs of the MSW management services as well as the relative cost of the different activities within the MSW management while the budget should be adequate to cover the full costs of running the services. The records should also be open to public scrutiny. This means that the role of government in either service provision or regulation remains central to whether or not the MSW system succeeds (Rodic et al 2010).

Consequently, city governments adopt different strategies in order to achieve set goals. In Kano state, the government almost completely provides the funds for the operation and maintenance of MSW management services in the city with private operators directly charging the small fraction of service users they serve (Muhammad and Salihi 2018). In some other cities in developing countries such as Kunming (China), Bengaluru (India) and Managua (Nicaragua), the service fees are intentionally kept very low and no punitive measures are applied on non-payers even though only about 40-50% actually pay the fees (Rodic et al 2010). In Abia State, a government official (participant id = 39) told the researcher that the government was more inclined to providing MSW management services to the people irrespective of whether or not they are paid for by the users. However, this is not reconcilable with responses from participants in the study and what was observed by the researcher in Aba. Inefficiency and insufficiency characterised the services provided by ASEPA so much that participants decried the fees paid to ASEPA for services as they spent additional sums on informal waste workers for the same services. For most participants, their regret over the charges was not hinged on affordability but rather on perceived lack of service on the part of ASEPA as discussed further in section 6.2(e).

On budgets and costs of running the MSW management system, each of the participants from the TGGO stakeholder group were quick to cite lack of funds as the main mitigating factor to the provision of efficient MSW management services in Aba. However, they refused to provide any information relating to the size of the budget, expenditure, margin of shortfall (if any), actual costs of running the service or total receipts from service user

charges. Table 6.5 below provide some of the exchanges between the researcher and some participants from the relevant stakeholder group.

Table 6. 5: Excerpt of Responses from Service Provider on Budget, Costs and Finance

Question	Answer
Participant id = 39	
What is the budget for managing waste in Aba	I don't have access to that information but I know it's huge. I also know the biggest challenge we have in managing waste properly is because of the huge amount of funds required
What revenue or percentage of the costs does government expect to generate from the levies?	We have not done those calculations that would have made the process smarter. Government is also more inclined to providing the service irrespective of whether people pay for it or not because it is a public or social service
Participant id = 40	
Okay. Now that you have mentioned funds, what is the budget like? I know it must cost a lot	I may not be competent to speak on that
Participant id = 56	
How many zones do you cover?	Just one
For your zone, what are the costs like?	I am not in a position to disclose that

In terms of access to capital and investment in the MSW management system, it was unsurprising, albeit not to government officers, to learn that several efforts to attract investment to the sector and for certain government plans such as waste recycling and processing plants have not yielded the commensurate results. In the excerpts (Table 6.6) below, the senior government officer all but confirms the prevalence of corruption (financial indiscipline) as one of the major problems bedeviling public services in Nigeria, and a key reason why attracting investment in MSW management which is solely controlled by government and its agency is very difficult.

Table 6. 6: Excerpt of Responses from Participant on Financial Indiscipline

Question	Answer
Participant id = 39	
<p>Do you think waste separation will help the scavengers by reducing the risk associated with scavenging or even form a source of revenue?</p>	<p>We are actively looking for an investor or investors who will invest in waste conversion. The governor has travelled to Turkey to woo would-be investors to come and invest and mine not only waste that has been in the dumpsite for ages but also new waste that will be dumped at the dumpsites. We have a 100 hectare land to be made available for such and the hope is that such investment will be successful and generate revenue for government.</p> <p>We are of the opinion that government does not presently have the technical ability, funds and financial discipline to manage such tertiary waste management process now. In the future, that may change.</p>
<p>The sector can create massive employment for the people and there is massive unemployment in the state. Why can't government do the investment and run the scheme and take credit for the employment?</p>	<p>Even Lagos state government could not successfully run a waste conversion scheme even with all the money they have. Government does not have the technical capability, financial discipline and administrative management it entails.</p> <p>Such level of waste management should be pure business minded in order to be sustainable.</p> <p>Governments in developing countries cannot manage business because of corruption and nepotism.</p>

Besides the difficulties in attracting investment in the sector, other studies have reported on the misappropriation, embezzlement and poor investment decisions leading to the mismanagement of funds allocated for MSW management (Krawczyk and Sweet-Cushman 2016; Ezeah 2010; Nzeadibe and Ajaero 2010). Other studies have also often reported the preference of MSW management authorities in developing countries to

pursue modernisation programmes involving the spending of significant amounts of money on imported sophisticated machinery and equipment such as the splashing of about \$5.5million on the importation of refuse collection vehicles by the Abia State government in 2006 (Ezeah and Roberts 2014; Nzeadibe and Ajaero 2010; Bhuiyan 2010; Wilson et al 2001).

6.1.3 Proactive Policies and Sound Institutions

Part of what forms good institutional coherence under the ISWM framework is existence of clear policies and legal frameworks as well as the institutions to effect the implementation of these policies and legal frameworks (Wilson et al 2015). Transparency and clarity of management structures, lines of accountability, contracting procedures, budgets, cost recovery and corruption, as well as labour practices are often examined in the determination of institutional coherence (Rodic et al 2010). The ISWM framework also takes into account the differences in policies that may exist at different levels or tiers of government (Wilson et al 2015; Scheinberg et al 2010). In Nigeria, this is very important as the National Environmental Sanitation Policy developed at the federal level is expected to be implemented in the states by the local councils (FME 2005). Accepted that the national policy is inadequate and needing urgent modernisation if Nigeria is to achieve ISWM, one may also argue that it (the national policy) forms a good basis to begin as it contains some strategies to engender improvements in MSW management. This study notes that interpretation and implementation by states are the keys to achieving the desired objectives. Consequently, the detachment of the state environment agency (ASEPA) from the ministry of environment has been identified as a potential major issue. The reason being that unlike in other states such as Lagos and Cross River states where the state ministry of environment supervises the activities of the state environmental protection agency and thus ensures synergy and the streamlining of the management processes (Nzeadibe and Ajaero 2010), the agency in Aba (ASEPA) is directly under the supervision of the governor and runs as a parallel entity. This deprives the agency of the inputs of the 'professionals' at the ministry of environment. Actually, the problem is more severe than that as shown in the excerpt from interviews with the relevant participants in Table 6.7 below.

Table 6. 7: Excerpt of Participants Responses related to institutional coherence

Question	Answer
Participant id = 24	
<p>In your role as the head of department, what is the contribution of your department to the waste management policy? What is your role?</p>	<p>Presently, no meaningful role as policy is made at the top. FME makes the policy, the states and local governments are expected to implement the policy but interpretation differ markedly at both state and local government levels.</p> <p>Aba is the way it is because of the use of non-professional in the management of waste. ASEPA is responsible for managing waste in Aba but there are no professionals in that agency so they do it their own way. That is the greatest challenge.</p> <p>Another challenge is the duplication of duties. This creates confusion for even the citizenry as they do not know whether to follow the EHOs or ASEPA. Streamlining the activities of both organisations will help a lot.</p>
Participant id = 25	
<p>In your own words, what is your opinion of waste management in Aba?</p>	<p>Legally, it is supposed to be a function of the local government as the third tier but in Abia state, it is given to ASEPA.</p> <p>Because the job is given to ASEPA, I have a limited role in waste management. ASEPA simply does crude dumping which is a lay man approach. There are no technical inputs at all.</p>
Participant id = 23	
<p>In your own words sir, what is your perception of waste management in the Aba</p>	<p>The fact is that the town planning authority is not in any way involved with municipal solid waste management in Aba.</p>
Participant id = 40	

From the description, it sounds a lot like what the environmental health department are required to do as well. Do you work in tandem or synergy with the department?	No, no. Theirs is a different thing all together. Our education department go to schools to teach people so that when they go home it becomes easier and they can tell their parents what they were taught in the school.
So you don't work together then. I have seen the national policy on sanitation and the practice guide for EHOs	[Cuts in].... Originally, ASEPA used to be under the ministry of environment until it was separated and put under the office of the governor. We no longer report to the ministry of environment.
It seems there's a duplication of duty then	Yes, it's the same law we both operate
Is there no conflict between the two units?	Well, conflicts to the extent that we both can abate the same nuisance. We are not looking at the conflicts for now because the law, to a great extent, defines roles for every one of us.
Participant id = 27	
That's a great insight. So as it is, there is no clear delineation of duties between what ASEPA and EH (Environmental Health) should do?	There is none. ASEPA staffs do whatever they deem fit. Waste management should begin from households. Waste should be separated to ensure proper management but the households get conflicting guidance from the 2 bodies – ASEPA & EH.
Participant id = 41	
From what you have said so far, the job description is very similar to what the environmental health department are supposed to	Those people are civil servants and ask anybody in Nigeria, all they do is with the mouth; they don't have anything to offer. The normal thing is that we should work together but they cannot make the sacrifices we make here. The common perception is that in civil service nobody cares, it's nobody's business.

do. Do you work in tandem or synergy at all?	
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Contrary to findings previously reported (UNEP 2015; Wilson 2007), most participants argued that new laws and policies were needed in the city to tackle the challenges of poor MSW management. However, participants from the LEPI stakeholder group agreed with such reports. They opined that there was nothing wrong with current laws and argued that the institutions are still present but moribund compared to the era when things worked comparatively better, and the institutions were active and effective. The group blamed politicians for overlooking professionalism in the appointment and recruitment of members of staff of sensitive agencies responsible for MSW management. They alleged that only cronies and thugs/loyalists sympathetic to the political causes of the politicians get recruited into those agencies. The group suggested that irrespective of the risks to life involved, what is required is a platform or avenue of a peoples' action that will seek to protect peoples' rights and hold government accountable for the failures. The small town of Ghorahi in Nepal, with lower GDP is a good demonstration of how committed leadership with genuine participatory approach can ensure institutional coherence and help overcome financial constraints (Rodic et al 2010).

6.2 Areas of Conflict between Stakeholders

As highlighted in section 6.1.1, the consultation and involvement of service users in decision-making on policy, planning and siting of facilities, as well as the existence of formal procedures for measuring customer satisfaction and effective feedback mechanisms form core measures or indicators of inclusivity in MSW management governance (Wilson et al 2012; Rodic et al 2010). In cities in developing countries where significant progress has been reported in their MSW management development journey, one common recurrent feature is the existence of active stakeholders' platforms established to enhance communication, exchange, and a participatory approach to planning and operations of solid waste services (Rodic et al 2010). From Moshi (in Tanzania) to Bamako (in Mali), these stakeholders' platforms exist. In Ghorahi (in Nepal), the committee involving all key stakeholders regularly monitors and contributes to effective management of the local modern landfill, and is headed by a local person (Rodic et al 2010).

Generally speaking, and on a much wider scale, the importance of stakeholder partnerships in development interventions have been widely advocated for but often neglected especially in developing countries (Matsaert et al 2005). Though there are several benefits of citizens' participation in the local governance of systems such as MSW management, including improvement in the management of public resources, reduction in corruption by enhancement of accountability of public office holders and political leaders, and a positive impact on democracy; such opportunities for participation are often very minimal in West Africa (Krawczyk and Sweet-Cushman 2016). This is arguably true for most MSW management systems in Nigerian cities though Muhammad and Salihi (2018) reported that in Kano, members of the MSW management agency seldom hold talk shows in public media as an avenue for the general public to lay their complaints and suggestions. While this study thinks that the arrangement in Kano doesn't go far enough, this study finds that nothing like it is even available for service users in Aba, and the researcher believes the power relationship between ASEPA and other stakeholder groups is contributory. Responses from an overwhelming majority of participants show that the power relationship between government (ASEPA – service provider) and other stakeholders (service users) is greatly distorted as the government wields all the power. There are no consultations with service users, so people are compelled to do what the government say or be harassed and intimidated. There is not even a formal avenue for complaints or suggestions. The situation has degenerated to the level that while most participants have resorted to self- help by paying informal waste workers, others divulged plans to beat up agents and staff of ASEPA as reflected in the following comments – “I don't think so but people are just powerless to make the place better. It is the responsibility of government first, and then the people. I know many people do what they are expected to do which is pay their money but when government does not do what they are required to do especially after collecting money from people, then people have every right to be angry” (Participant id = 11) and “Let me tell you, they must die when next they come here. The level of extortion here is utter ridiculous and we won't tolerate it anymore” (Participant id = 37). The tensed relationship between service providers and users was also observed by the researcher during a routine sensitisation exercise by members of staff of ASEPA as shown in Table 5.12.

While the study believes that the apparent lack of consultations and ineffective exchange of communications between ASEPA (service provider) and other stakeholders (service users) is a major contributor, existing tensions may also be caused by inadequate policies or implementation of policies, perceived neglect of the public by the government and political leaders, and other operational inefficiencies and shortfalls. Common areas of conflict identified by the study include:

a. Allocated/Stipulated Disposal Times

ASEPA requires service users in areas where there are designated receptacle points (skips) to deposit their bagged waste between 5pm to 9/10pm. Even though many participants stated that the allocated times were announced at the inception of the policy, most participants maintained that the schedule is not suitable for most service users. They argued that most professionals and people who worked in offices were inadvertently excluded from using the service as they will often be held up in the congested traffic in the city’s roads on their way back from work. They also argued that the traders and artisans who spent most of their days in the city’s major markets and business clusters were deprived of the services in their various residential homes unless they had the services of house-helpers or made alternative arrangements. Table 6.8 below show some of the comments made by participants.

Table 6. 8: Responses from Participants on Stipulated Disposal Times

Participant id	Comments
1, 2, 4, 5, 7, 8, 49	Does not work for professionals and people who work in an office.
3, 6, 9, 11, 12	They should change the time for people to bring their waste as it makes it difficult for most people.
2, 5, 33, 35	The waste skips are always manned and if you put any litter there out with the designated times (5pm to 10pm), they will catch you and extort money from you. The timing doesn’t work for most people.

The researcher observed that most illegal dumping happened in the dark (at night). Therefore, if times restrictions for the transport of waste by service users must be

implemented, such restrictions should limit the transport of waste at night times. However, this study did not identify any inherent benefits of such time limitations except that it creates a possible avenue and opportunity to penalise and fine defaulters, and thus generate revenue which often times is not accounted for by the collectors.

b. Rejection of the #50 (Fifty Naira) Waste Bag and Dissident Behaviour

As highlighted previously in chapter 5, indiscriminate dumping and littering is prevalent in the city. Though this study thinks the current system of waste collection implemented by ASEPA and the general lack of standard temporary storage bins like wheelie bins makes the use of plastic waste bags redundant, the agency insists the solution to indiscriminate dumping and the prevention of the stench from rotting refuse rests on the use of such bags by service users. Consequently, ASEPA enforces the monopoly of the sale of such bags at #50 each but service users have simply refused to buy or use it. Most participants cited affordability issues while others see it as another avenue of extortion as reflected in the comments shown in Table 6.9. The researcher believes that the action of the service users (in rejecting the purchase and use of the bags), and other evidences of dissident behaviour and non-compliance to expected behaviour e.g. indiscriminate dumping, illegal dumping, littering, etc. is not unconnected with the distorted power relationship between ASEPA as a service provider and service users.

Table 6. 9: Responses from Participants relating to the #50 Bag and Dissident Behaviour

Participant id	Comments
3, 5, 7, 9, 11, 12, 40, 41, 44	The bags sell for #50 each and that is one of the major problems and the people are complaining seriously. It is not affordable and the people have rejected it.
42	Yes, another challenge is that there is an ongoing education campaign educating people to use our refuse bags but people do not want to buy the bags.
24	Actually, the law gives us power to act as some sort of constables and to enforce the environmental health law but people are very wild these days and because my staffs are not armed, we rely on the police and the court for enforcement.

2	Market women do not dispose their waste accordingly.
1	I call them recidivists. It's common when it rains so enough men should be provided to monitor and enforce at such times.
56	Also, Aba residents are very stubborn. People still dump their refuse indiscriminately and in such situations, there is very little anyone can do.

c. Sanitation Levy and Funding Issues

Most participants in the study stated that they did not know the method (if any) used in deciding the amounts demanded from them by ASEPA as sanitation fees. They also did not know why the said fees increase year after year without any significant improvement in level of service. Some other concerns raised by participants include the duplication of sanitation/environmental levies and intimidation and harassment for non-payment even after payment has been made; as shown in Table 6.10 below.

Table 6. 10: Responses from Participants relating to Service Fees

Participant id	Comments
9, 11, 38	They increase all the time. There's duplication of environmental taxes in Abia state.
7	Last year it was #1,200 but now it's gone up to #2,000 (Two thousand Naira) for a store like this.
3, 8	Yes, we pay but not directly to government but to revenue collectors. It's actually a problem because there is no link between what is paid and disposing of waste as there is no service provided.
30	Most issues relate to either increased sanitation levy or clients who have paid and are erroneously being chased for non-payment. I think because people are not properly oriented as to what they ought to pay and when. The mode of collection is also not perfect and people will find ways of avoiding to pay.

	I think the authorities usually contract these revenue collections out which means some of these contractors accept tips which they pocket without collecting the actual revenue.
32	It's always changing. Between #25,000 to #50,000 per annum.
49	I can't find my receipt now but it's over #500 yearly. It used to be just below #300 yearly but they almost doubled it this year.
39	Most challenges are tied to lack of funds. The collection of sanitation/environmental levy has not been very effective probably due to poor enforcement by the government agencies responsible for the collection.
40	The margin is huge because most people tend to dodge the payment.
42	But from January to December, an Aba man will not come to pay except you use force. A typical Aba man will not pay tax willingly.

When the researcher posed these issues to a revenue consultant (RC) that participated in the study, he showed the researcher a document which purportedly details the formula for determining the amount to be paid as sanitation levy based on dwelling type or type of premises or size of stall (in markets) as enshrined in the law of Abia State. However, the RC refused to let the researcher examine the said document or obtain details of it. This behaviour suggests foul play on the part of the authorities and is a further proof of the one-sided power relationship between service provider and service users. Other participants from the TGGO stakeholder group maintained that a typical service user in Aba was stubborn and will go to any length to avoid paying the statutory levy or any tax.

d. Lack of Consultation and Perceived Neglect

The participants from the TGGO stakeholder group cited the sensitisation and awareness efforts of the members of staff of the education department of ASEPA as ongoing efforts to reach out to service users and stakeholders. One participant (id = 42) also informed the researcher that the "DGM has been on air to tell people (service users) what to do to help the agency". There is no doubt that these statements are true but as highlighted in

section 6.1, the researcher’s observations identified several reasons why the public education and awareness efforts of the members of staff of the education department of ASEPA are not effective. The DGM being on air to tell people what to do does not also equate to proper consultations with stakeholders as prescribed for effective governance in MSW management (Muhammad and Salihi 2018; Wilson et al 2015; UN-HABITAT 2014; Rodic et al 2010); and the position of most participants reflect that reality as shown below in Table 6.11.

Table 6. 11: Responses from Participants show lack of Consultation and Neglect

Participant id	Comment
7	In this part of the country nobody cares about the masses. They only care about filling their pockets. They lack both ethical and moral value here unlike in the western world. The leaders here are morally bankrupt so how could they even think of consulting the masses?
8, 20	Never. Actually, this is the first time anyone is asking me anything on waste management like this.
9	It is like that because this present democracy that is almost 20 years has no program, no positive and practical program. They may claim to have ASEPA and what have you, but they are all empty claims that can be likened to building a house without foundation.
10	You’re talking within yourself not for people in Aba. go and research something else. This will not work here in Aba. Aba is a dump. Go to Obohia road and Port Harcourt road and talk about sanitation. Here is heaven and you’re talking about sanitation.
12	Who are you going to complain to? Are you new in this country? It’s the same all over though it’s worse here in Abia state. Nobody cares about your complain. You can cry from now till thy kingdom come, they will collect the money if they want to.
13	I don’t know what anyone or government can do. I don’t think the government is interested in this kind of our business because it is a dirty business

14	The government is aware, but they have chosen not to help us. There was a time we even protested and patrolled the city with scrap to buttress our point but still the intimidation and extortion remains.
22	Zero. Let me tell you why I said zero [explains with a scenario]. The usual modes of campaigning for votes should be used to engage the people. It all boils down to corruption. Because our government is corrupt and the people are all thugs, if they do things the way it's supposed to be done, it will delay the looting.
24	We are poorly motivated. As a civil servant, you work for your salary but here we don't get paid as at when due. We are now in October and we are still waiting for May salaries. I have up to 200 staff in this department but less than 100 come to work because they have not been paid and morale is at an all-time low.
25	Also we do not have any mobility. We sponsor ourselves to deliver our duties. We print our abatement notices; pay our transportation fares to sites, everything. There is no provision by the government at all.
27	We hardly get salaries to be honest and the local government council don't have any provisions for waste management. They seldom do on clean up days and they look to recover that money from fines too.
28	We (people working in waste management) are always looked down upon as the lowest cadre of people in the society. As a result, staff morale is very low and getting staff is even difficult.
30	To the best of my knowledge, there is nothing like that. Government just do their thing the way they feel conducive and the masses are expected to play along. I have never been consulted before.
31	Complain to who (whom)? Leave that matter oo, we are suffering and smiling here. They can do whatever they like and nobody can do anything. Everyone likes their life abi you no like your life? (Meaning Or do I not like my life?)
33	There's absolutely no communication. Even the inspection teams don't give you any information

34	<p>We need a workable system because so much waste generated here can be put to better use but the government don't seem to be thinking about that.</p> <p>Honestly I am not aware of any such enlightenment campaign. All I have heard about on the radio is that people should pay their sanitation levy</p>
35	<p>I am not. There is none. What I know is that every year I get a fat bill from ASEPA for waste management.</p> <p>At the moment what we see with the very disgusting odour oozing out of the environment is insensitivity on the part of government and absolute lack of planning and direction on the part of ASEPA.</p>
36	<p>It's a challenge here in Aba because waste cannot be managed in isolation. People need to be carried along and there are different ways - town hall meetings, at the park, in their homes or however the different people will understand. Even the best intentions will never work if people don't key into it.</p> <p>Here, the government doesn't have any vision for waste management in the state. The people they have outsourced it to (ASEPA) are only keen on making money so people just care less as they see it as their (ASEPA) thing.</p> <p>The only consultation I know of is that whenever they come, they come to collect or demand money. I have actually challenged them before on that front but they don't care. I am not aware of any such consultation.</p>
39	<p>I believe in participatory government. I believe everyone has a right to be heard out but I must say we have not done this. We will do something like that once we have the resources.</p>
40	<p>Naturally, it is difficult to consult the waste generators. You take decisions, design the system and communicate the decisions to them. It is the business of the agency to design waste management strategy and tell them the strategy so designed.</p>
42	<p>We have not done anything like that. I believe the education is in charge of that area</p>

43	If you go near the toilet facility in the market I mentioned earlier, you will realise how strong the stench coming from there is and how far it reaches. That should not be the case. The government should know we are suffering here and they should do something to help.
45	Here, people are charged levies but the government do not care to know whether or not the services for which the people were levied are being provided Government is just using the waste management portfolio to generate funds from the masses. They do not understand what it takes to provide the waste management services needed.
47	In terms of opinion or suggestion, nobody gives us that chance here, they just do as they like. You can talk till tomorrow and nobody will give you a listening ear.
49	The truth is that if it is a government that has respect for people's rights, they will seek the views and opinions of people in this market. But this government don't care; they just enforce whatever they decide. Absolutely not. If they carry us along in their decision making, the traders here will unite to ensure this whole place is kept in order. But a situation where they use the army to bully and even physically manhandle people, everyone adopts a 'not my business' attitude.
57	That's where we find ourselves as common people in this city. We are tired of complaining because no one listens to you. We are left to fend for ourselves because even if you wait for them till thy kingdom come, nobody will come to your rescue.

The researcher thinks that some of the comments above show some degree of despondency (for service users) and oppression (by ASEPA), and it was a common observation. Many residents of the city who declined participating in the research cited their belief that nothing will change because the government was not interested or

willing to effect the changes needed as their main reason for not taking part. Oppression and how to overcome oppression are discussed in further details in section 6.3.

While it may be premature to herald the success of the PNS approach adopted by the researcher in terms of the stimulation of the participants' concern about the environment and taking action aimed at protecting the environment (i.e. their environmentalism), it was very obvious that the approach allowed for quality exchanges of relevant vital information between researcher and participants as depicted by the following comments by a participant (id = 27) – "I must say I have learned a lot from you and I can't wait to share this information with others. I wish we can get you here to give us a seminar and talk, we really need this". A planned follow-up exercise with the participants, and possible future studies will perhaps contribute more to our understanding of the effectiveness of PNS as a tool for encouraging environmentalism as reported by Fetalvero et al (2013).

e. Perceived Lack of Service Provision for Levy Paid

Only one (1) participant (id = 7) in this study from the service user groups gave ASEPA any sort of credit for service. He said "Sometimes, they (ASEPA/RCS) do go around with their truck to collect waste but that too is not regular or timely". Most times, it took the researcher's pensive explanation of the extensive planning and resources required for effective MSW management for most participants to dilute their anger or curb the expletive hurled toward ASEPA for their perceived lack of service provision. Even after such explanations, most participants insisted that they do not get value for money for the levies paid to ASEPA as shown in the comments in Table 6.12.

Table 6. 12: Responses from Participants show a Perceived lack of Service Provision by ASEPA

Participant id	Comment
2	Levy payment is by compulsion because government does not provide any service for which levies are paid for.
11	They will chase you to death rather than deprive you of service if you don't pay because there's no service to deprive you of.
3	It's actually a problem because there is no link between what is paid and disposing of waste as there is no service provided.

6	Absolutely nothing. The nearest designated skip is about 10 minute drive away. I don't know the distance in km.
9	There are multiple extortionate levies and there are no services rendered. Yes, no services rendered. They just use law enforcement agencies like police, Bakkasi, army, etc to intimidate you.
10	It's very disappointing though that all they do is come and collect money. They provide no service at all.
37	All they do here is harass you with police and other law enforcement agents to extort money. They can promise you heaven and earth but once they get your money, they are gone. You get no service or whatever that was promised.
12	Honestly I couldn't tell you. When you live in a city like Aba, you are chased for all manner of levy but once you pay, that's it. You only see them again when they need another money from you.
29	Well, if I can trek from here to Asa Road (the nearest designated skip – about 1 – 2 miles away), I can drop my waste in their (ASEPA) skip but that is more expensive than paying someone (informal waste collector) to dispose my waste.
31	More money? Yes. More work? Which work? Did anybody tell you ASEPA does any work? Absolutely nothing. You just pay to avoid them and their troubles because they will harass the life out of you until they collect that money.
32	Absolutely nothing. I still have to pay a private contractor between #15,000 and #20,000 every month to dispose my waste. It will help if the government can just deliver the services for which we pay. It will go a long way to motivating people to keep paying even more.
33	We don't get any service. We dispose our garbage twice a week – Tuesdays and Fridays and when our driver takes the waste to the skip, they (ASEPA) collect a compulsory #100 (One hundred Naira).

	Failure to pay the #100 will result in the driver coming back with the waste; they will not allow him to drop it.
34	<p>It has gotten worse because we used to have street collection by ASEPA once in a while but for over 3 years now, that has ceased. Now we have to pay local vendors whom we don't even know where they dump the waste. Now, we just pay that levy as a statutory levy because no service is rendered at all</p> <p>They also charge drainage fee to remove rubbish from the gutters but they do not cart away the rubbish removed so you have to contract someone else and pay another fee to have the removed rubbish carted away.</p>
35	I have to hire trucks to evacuate these from our waste enclosure to the dumpsite where ASEPA also dump theirs and for each trip, I have to pay #2,000 after paying my statutory fee.
36	ASEPA have never collected our waste from here before. The person that disposes the waste for us also pays them at the point of disposal on top of the annual levy which we normally pay.
43, 44	You get nothing for the #1000 but you have to pay it.
45	Government contracts the revenue collection to individuals but the worst part is that once they collect the revenue, they disappear. You are left to pay private people to dispose your waste.
48	<p>They don't provide any service. They don't!</p> <p>See, when I pay for electricity bill, I expect electricity supply every day. Likewise, when I pay for sanitation, I expect service from them. That's all; nobody is asking them for favours.</p>
56	These days, the only times you find heaps of refuse in the streets of Aba is when we have breakdown of vehicles but still, the refuse heaps are cleared within 48 hours unlike before when you can have such heaps occupying the streets for more than 2 weeks. In such situations, people are not happy to pay for the service.

	<p>So, paying is not the problem, it is the provision of the service.</p> <p>Yes, there are money mongers amongst the revenue contractors who don't follow the instructions.</p>
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When these concerns were posed to some participants from the TGGO stakeholder group, they insisted that service users in Aba are simply hard to please. But when the researcher informed these participants that some of the service users that participated in the research started softening their stance once a proper explanation of how the system work and what is required to run it, they (participants from the TGGO stakeholder group) reluctantly accepted that perhaps a more participatory approach and effective communication could be a panacea for achieving the much desired changes in MSW management in the city. One RC that participated in the study admitted that some RCs were just after the money as they did not provide the services paid for by service users.

f. Non-recognition of Informal Waste Workers

Since the nineteenth century, informal waste workers have been on the fringes of the urban waste landscape, working away as unrecognised stakeholders (Scheinberg 2011). Previous studies into the activities of informal waste workers in Nigeria often reported the intimidation, harassment and maltreatment meted out to them by MSW management authorities (Nzeadibe et al 2012; Nzeadibe and Ajaero 2010; Nzeadibe and Iwuoha 2008). This study found informal waste workers in Aba to be in identical situations. Collectively, the informal waste workers account for all the reuse and recycling activities that go on in the city but their contributions are not recorded as is the case in so many other cities in other developing countries (Wilson et al 2015; Wilson et al 2009; Wilson et al 2006). The researcher believes that apart from being regarded as the 'forgotten of the society' – a phrase used by one participant in the study, the distorted power relationship along the chain is also a major contributory factor. The recycling companies wield all the power as they decide what they pay for the materials they receive from the middlemen. The middlemen, in-turn wields their power on the waste pickers and scavengers who are at the lowest base. For the itinerant waste pickers/buyers, their vulnerability is escalated by the possibility of buying 'fake' metals and incidences of arrest and extortion by the police as they do not have receipts for their purchases. Corrupt officers often arrest them

for stolen goods as they are seen as easy targets for extortion. Some of the concerns are as captured in Table 6.13.

Table 6. 13: Responses from Informal Waste Workers on Intimidation, Harassment and Extortion

Participant id	Comments
13	It will help us in so many ways. If we are recognised formally, it will reduce the various security problems we face.
14	We suffer a lot of intimidation and extortion on the roads when transporting our goods for sell. The corruption is simply too much. Even soldiers do come and harass us when loading as well as extort on the roads.
15	Exactly. Most times, we get better rates in Lagos but the extortion on the road (Police, Army) and transportation costs make it not worth it. For a typical trip to Lagos, it can cost up to #200,000 for transportation and also about #200,000 to 'settle' police and army. For Obehe, it's about #60,000 for transport and roughly #30,000 for settlement of both police and army. It's really bad. We get intimidated all the time. Police seldom arrests street urchins and use them as baits to come and arrest our members because they know they can extort money easily. Sometimes you're framed up for stolen goods and all sorts of things
41	Yes, they paid for their identification cards. No, the DGM has not produced it yet.

Further responses from participants show that informal waste sector in Aba include children (trying to raise money for various reasons including going to school); adults (for whom it is the only job and source of income), and families (who may or may not have other sources of income). This study believes that members of this group in Aba are highly vulnerable, as is the case with informal waste workers in several other climes where their conditions have often worsened with time (Scheinberg 2011). Giving them a formal recognition, possibly through a reform and regulation of their sector as well as

integrating them into the mainstream MSW management services provision may alleviate their sufferings by providing them with more opportunities (Scheinberg 2011), and ensuring their contributions to MSW management in the city are recorded. Some members of the TGGO stakeholder group confirmed to the researcher that ASEPA embarked on a programme to register all informal waste workers in the city and to issue them an identity card, for which each informal waste worker paid the total sum of five hundred Naira (#500 = approximately £1.08) but at the time of this study, no informal waste worker had received any identity card, and no formal register of registrants was provided when requested from the authorities. Further enquiries by the researcher revealed the said registration exercise was not initiated so that the informal waste workers could be recognised but rather to make them easily reachable for extortion as the agency accused them of several malpractices at dumpsites and other sundry offences.

g. Lack of Monitoring and Enforcement and Focus on Fines and Penalties

Various participants from the service user side accused the MSW management authorities of focusing mainly on fines and penalties from defaulters instead of providing the manpower necessary for effective monitoring and enforcement that could possibly act as deterrent to would-be defaulters. Most members of staff of the EHDs corroborated this stance and added that ASEPA employs a ‘fire brigade approach’ (in local parlance, it means a last minute action on an issue that requires adequate long time planning and execution). Some of the comments are shown in Table 6.14 below.

Table 6. 14: Responses from Participate suggest MSW Management Authorities focus on Fines and Penalties at the Expense of Behavioural Change

Participant id	Comments
22	<p>Only the poor and those without connection to people in power get punished for MSW management offences.</p> <p>Penalties and fines for MSW management offences are constantly reviewed upwards without appropriate consultation and communication.</p>
24	<p>ASEPA also uses ‘fire brigade’ approach. Their emphasis is always on fines and levies and not really on educating people. This approach does</p>

	not solve the problem as the people do not learn even after paying penalties or fines.
25, 26	For the local governments, the emphasis is always on raising money. Every drive on the sanitation day is geared towards making money from would-be defaulters and not to engender change.

However, members of the TGGO stakeholder group that participated insisted that perhaps the fines and penalties are too low. They recommended significant hiking of the amounts to deter would-be defaulters of MSW management policies.

h. Absence of Synergy and Conflicts between relevant Agencies of Government

This study believes the best way to describe the mode of operation of ASEPA Aba zone will be as a ‘task force’ – a group of people who are brought together to do a particular job (according to the Cambridge dictionary definition). Observations and responses from participants from other stakeholder groups show that ASEPA operates in a very unilateral way. They do not seek the input of anyone else in the management of MSW in Aba even though they lack the services of relevant professionals in their employment. Even within ASEPA, most senior members of that spoke on the condition of anonymity claimed that the DGM does not listen to suggestions or inputs from staff members. Considering that ASEPA in Abia State is no longer under the MOE, this study believes that arrangement and mode of operation deprives it (ASEPA) of useful contributions from relevant professionals out with the organisation. Ordinarily, one will expect that the town planning authority and the ministry of health will be key partners to the MSW management agency, working hand in glove to achieve set goals and objectives. Table 6.15 show some comments from participants.

Table 6. 15: Responses from Participants suggest a lack of Synergy between Relevant Agencies and Departments in MSW Management

Participant id	Comments
23	The fact is that the town planning authority is not in any way involved with municipal solid waste management in Aba.

24	Another challenge is duplication of duties. This creates confusion for even the citizenry as they do not know whether to follow the EHOs or ASEPA. Streamlining the activities of both organisations will help a lot.
25	Waste should be separated to ensure proper management but the households get conflicting guidance from the 2 bodies – ASEPA & EHD.
26	<p>Because the job is given to ASEPA, I have a limited role in waste management. ASEPA simply does crude dumping which is a lay man approach. There are no technical inputs at all.</p> <p>However, because the responsibility is now with ASEPA, the local governments are no longer conscious of refuse disposal and environmental management. And more so because the agency (ASEPA) is now directly under the Office of The Executive Governor, the ministry of environment does not have supervisory function over them.</p> <p>Absolutely, there are conflicts. The situation ends up confusing even the people because they seem not to know whose advice to follow.</p>
27	Waste management used to be the sole responsibility of the local governments but now it is the sole responsibility of ASEPA.
40	Well, conflicts to the extent that we both can abate the same nuisance. We are not looking at the conflicts for now because the law, to a great extent, defines roles for every one of us.
41	<p>Those people are civil servants and ask anybody in Nigeria, all they do is with the mouth; they don't have anything to offer.</p> <p>The normal thing is that we should work together but they cannot make the sacrifices we make here. The common perception is that in civil service nobody cares, it's nobody's business.</p>

	<p>These civil service people have been there for a long time, what impacts have they made?</p> <p>We are doing better than the EH so we cannot possibly work together. Their own problems are too much.</p>
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While some members of staff of ASEPA that participated in this study agree that there are conflicts between them and the EHDs, they (ASEPA) insist that members of staff of the EHDs are civil servants who are simply not motivated enough to match their (ASEPA) level of commitment.

i. Imposition of Leaders on Market Traders’ Unions

All the traders at the Ekeoha Shopping Centre that participated in this study insisted that their union leaders were imposed on them by agents of the government. They maintained that the situation meant they (traders) could not make demands on ASEPA regarding the poor state of MSW management in the market. They argued that previously, when they had elected leaders representing them, they had collective bargaining power and could disagree with ASEPA on rates to be paid for sanitation levies. They also insisted that they could withhold such levies pending if and when their complaints were resolved. Many traders who spoke on the condition of anonymity stated that they had no interest in cooperating with a government that imposes stooges on them as leaders. Table 6.16 captures some of the comments from the traders.

Table 6. 16: Comments by Traders show Anger over Imposition of Union Leaders

Participant id	Comment
44	The market leadership is imposed by the government and the traders are generally unhappy with the situation.
45	The market leadership here is imposed by the government and as such the market leadership cannot challenge any decision by the powers that be. You just do as you are told.

	It was different when we were allowed to elect our market representatives and leaders.
46	But now, government doesn't allow us to elect our leaders again. They just appoint their cronies who will dance to their tones. The leaders now are there to represent government in the market instead of representing the traders. Yes, we are helpless. We are forced to accept whatever the government decides.
48	There will be need but the government imposes the leadership of the market. So do you expect the leader who is imposed to take a complaint to the person that imposed him on the market? You will be implicating yourself and they will just remove you. They will see you as becoming anti-government.

The researcher believes that the situation with the traders at Ekeoha is further evidence of the distorted power relationship between government on one hand and the public on the other. Other responses from participants show that members of traders and market unions who still elect their union leaders still have collective bargaining power as shown by these comments in Table 6.17.

Table 6. 17: Members of a Union with Elected Leaders enjoy Collective Bargaining Power

Participant id	Comments
47	Sometimes we protest when we feel the levy is too high and we will tell our chairman how much we can pay and he'll inform ASEPA of our decision.
33	We have a union (hotel operators association) and the only form of information or communication with ASEPA is driving a bargain through our leaders to reduce the amount on the demand notice (sanitation levy).

29	Because I am in a union (Patent Medicine Union), I now pay #1,000 (One Thousand Naira) per annum (shows me receipt). I used to pay #3,000 (three thousand Naira) per annum before I joined the union.
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j. Intimidation and Harassment by Thugs working for ASEPA

As mentioned in section 5.2(d), this study found that intimidation and harassment was a commonly used driving mechanism by ASEPA. While this tactics was often used in relation to the collection of revenue, the researcher also witnessed first-hand how thugs and agents working for ASEPA molest unsuspecting members of the public in a bid to extort money from them. On the said occasion, the thugs removed the number plates of the vehicle and made ridiculous bribe demands from the driver as settlement. Table 6.18 below shows some of the comments and views of participants.

Table 6. 18: Comments by Participants Intimidation and Harassment is widely used by Thugs and agents working for ASEPA.

Participant id	Comment
49, 50, 51	The government also uses touts and thugs to harass our customers when they park their cars on the road side to shop in this market. They remove their registration plates and extort money from such customers.
20	The personnel are taken as political compensation for political thugs, just as it is done in every other facet of the Nigerian system. Everything in Nigeria is based on political consideration, basically compensation for political thugs. Now these people come in as politicians, they don't come in to do anything. They now come in to also build a political structure for the man that kept them in place there. The people that are supposed to work in the field will all be political thugs who will be there for what they call 'empowerment', collecting salaries for nothing.
10	All they do here is harass you with police and other law enforcement agents to extort money.
11	What I know though is that some of the ASEPA operatives are harsher than others. Some will come with thugs while others will approach you calmly.

12	You really are new here. They will come with all manner of thugs, task force and all what have you. They will threaten fire and brimstone and seize anything of value to you to inconvenience you and force you to pay.
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6.3 Oppression

The Oxford English Dictionary defines oppression as “prolonged cruel or unjust treatment or exercise of authority”. Cohen (2014) adds that those so subject may be unaware of their unjust treatment or control. This study believes that for the majority of participants who recognise that the government, through its relevant agency and departments have failed by not providing adequate MSW management services and thus forcing them to live in the current abject environmental conditions, it is forced oppression. It is not dissimilar to the kind described by Karl Marx and Friedrich Engels in their very influential book titled *The Communist Manifesto* (Cohen 2014). The study also believes that for the few participants whose responses and posturing suggest they may have accepted the situation as the norm probably because the problem is prevalent in many Nigerian cities or simply because they do not have an alternative, it can still be construed as wilful oppression (Cohen 2014).

If the deployment of technologies of mass production can be seen to be a forced oppression and enslavement of the working class (Cohen 2014), and rightly so then the MSW management situation in Aba (and most cities in Nigeria) is most certainly a more severe form of forced oppression when you consider that:

People who desire a better level of services pay a statutory fee as demanded by those in power; and yet they do not get the desired level of services and benefits for their pay.

The government and its agencies are fully responsible for the current situation as they make all the decisions without any inputs from the residents and service users.

The residents and service users are regularly harassed and brutalised for non-compliance by those in power. This is often extended to informal waste pickers and recyclers who should be viewed as partners in the service provision.

Even the employees of government blame those in the higher echelons of government for the current situation. Many of these workers are often owed several months of salaries.

As highlighted in section 6.2, the relationship between the public (service users) and the government (service provider) is strictly one-sided with the government wielding all the power. This study thus proposes the classification of poor MSW management services in Aba, and similar urban centres as a form of oppression of the residents. Furthermore, there should be available legal grounds upon which citizens who feel oppressed by the highhandedness or inactions of municipalities and government agencies in MSW management could seek legal redress. In India, the Public Interest Litigation (PIL) is one such policy which has given rise to the closure of industries deemed to be polluting and the ban of plastics (UN-HABITAT 2010a). The case of B. L. Wadhwa versus the Union of India and Others (1996) further illustrates this position. Dr Wadhwa contended that the Municipal Corporation of Delhi (MCD) and New Delhi Municipal Council (NDMC) had been negligent in fulfilling their statutory functions of keeping the city clean and as such had violated the citizens' right to a clean environment. The outcome was a new approach after top municipal functionaries were publicly humiliated as they were summoned to explain their non-performance (UN-HABITAT 2010a).

6.3.1 Overcoming Oppression

Recognising the current MSW regime in Aba as oppressive is not an end. Therefore it is even more important to identify ways by which the oppressed can overcome or mitigate the effects of the oppression. In his autobiography – *The Long Walk to Freedom*, Nelson Mandela provided several illustrations of how he overcame oppression even as a prisoner of the very repressive apartheid South African government (Mandela 1994).

Clearly, as highlighted in section 6.2, there is an imbalance in power relations between the residents (service users) on one hand and the government (agency and service provider) on the other. Going by the responses from participants from both sides, the dominant power group appears unwilling to negotiate the status quo. Thus, one real option for the oppressed to close the power gap is to increase its relative power in order to force a negotiation. The two possible ways of achieving that goal are (a) enhance the power of the oppressed OR (b) decrease the power of the oppressor (Deutsch 2005). The focus of this section will be on enhancing the power of the oppressed through empowerment.

In chapter 7, the data analysis showed that public education, awareness and sensitisation ranked highest in the list of solutions suggested by participants from the different

stakeholder groups. Fulfilling this need will increase the amount of requisite knowledge and information in the possession of the oppressed, and thus enhance their power (Fetalvero et al 2013; Deutsch 2005). But this is only one of two ways of enhancing the power of the oppressed; the other being through increased efficiency in their use of the power they possess (Deutsch 2005). The latter is accomplishable through organised advocacy and environmentalism (Fetalvero et al 2013).

6.3.1.1 Public Education, Awareness and Sensitisation

All the participants interviewed for this research believe that a sustained effective public education, awareness and sensitisation programme will help in improving the current MSW management situation in Aba. Twenty seven (27) participants (47% of interviewees) explicitly or indirectly suggested it as part of their recommended solution. Even the agency (ASEPA), acknowledges that it is a priority for them towards solving the observed problems of MSW in Aba. The staff of the educational department of ASEPA informed the researcher of school campaigns that were carried out in 2015 to educate primary school pupils about MSW management. While that is a step in the right direction, the programme was not sustained and far too few schools were involved. The content and quality of information given to the school pupils was also found to conflict with current MSW management policies and practices. For example, pupils were taught to separate their waste into different classes of waste such as glasses, organic, fabrics, etc. but the agency runs a 'pack and dump' service without any provisions for materials recovery or recycling. This study also found huge gaps in the knowledge of the agency staff responsible for educating the public. None of the staff was aware of the waste hierarchy and most could not enumerate the benefits of proper MSW management and the implications of poor MSW practices on public health. During an observation of one of the agency's public education, awareness and sensitisation exercise, the lack of knowledge and poor attitude of the staff was brazenly displayed, as highlighted in section 5.14 and 5.2.1(b).

Therefore, for the right levels of public education, awareness and sensitisation to be achieved, this study believes there is need for the right numbers and quality of staffs that are well trained and are committed to providing the service to the public. The researcher also thinks it is important to develop a standard template of educational materials enriched with all the necessary information required to achieve set MSW management

goals in the city. This will perhaps ensure that the public, irrespective of where they live in the city receive the same quality of education and thus improve public compliance (Wilson 2007).

The study also observed a surprisingly high level of awareness amongst the market traders. Most of them showed very good understanding of current MSW management issues in the city and also made sound practicable recommendations towards finding solutions. Their knowledge however was drawn from their experience in places like China, Taiwan and Hong Kong where the traders travelled regularly to purchase their wares.

6.3.1.2 Advocacy and Environmentalism

It is natural to expect that service users may occasionally be dissatisfied with certain aspect or aspects of the service provided to them (Wilson et al 2012; Rodic et al 2010). That is one of the reason why organisations make provisions for customer service or customer care so dissatisfied customers have a contact point where they can raise any service related issues. There is no such provision for MSW management service users in Aboja. All the participants interviewed stated that even though they were dissatisfied with the level of service, they had nowhere to lay their complaints. ASEPA as an agency do not have a customer service or care department either which corroborates the participants' stance. The researcher thinks that consequently, even those that have relatively high level of knowledge and information (power) cannot effectively use it in the absence of advocacy.

The role of advocacy thus includes finding allies with a common focus and establishing a common forum so that efforts of the oppressed can be concerted (Fetalvero et al 2013; Deutsch 2005). In this situation, this study identifies possible allies to include environmental interest groups, legal practitioners with knowledge of environmental rights, environmental activists, waste workers, general public, etc. This is an effective way of using the power of the oppressed (Adebola 2006a). A readily available example is the case of the African National Congress (ANC) in fighting apartheid in South Africa. Deutsch (2005) narrates the important roles played by the allies that were formed by the ANC with organisations with sufficient economic, political and moral influence over the then apartheid government. Environmentalism compliments advocacy by injecting the much needed passion in defending a particular cause which in this case will be the right to a

clean environment. PNS has been shown to be a very effective method of fostering environmentalism (Fetalvero et al 2013).

This study believes that while there may be some of the requisite knowledge, needed to overcome the current oppression, the structures and institutions are absent (or moribund) in the city. However, such provisions for overcoming this oppression are inbuilt in the vision and action plan detailed in Annex 1. Further research activities have also been planned as a follow up to this, to help achieve the desired changes.

6.4 Summary

Effective governance of MSW management is key to the running of an efficient MSW management system. The key indicators of MSW governance include inclusivity for service users and service providers, financial sustainability and policy and institutional coherence. In cities where remarkable progress have been recorded in MSW management, the existence of stakeholder platforms that encourage genuine participation of the different relevant stakeholder groups in policy decisions, design, implementation and evaluation is common. In Aba, ASEPA maintains the monopoly of service provision and even though findings show the agency do not possess in their employment, the requisite professionals to deliver efficient MSW management services the service users, they (ASEPA) do not engage or work in synergy with other relevant government bodies such as the planning authority, EHDS, etc.

Besides the acute shortcomings highlighted in all 3 key indicators of MSW management governance (section 6.1), this study finds there are several broad areas of conflict between ASEPA and other relevant stakeholder groups. These include intimidation and harassment by thugs and agents working for ASEPA, imposition of leaders on members of market unions, lack of synergy and engagement of other relevant agencies, focus on fines and penalties, exclusion and non-recognition of informal waste workers, etc. These conflicts have escalated to a point that some service users are threatening violence while most others feel despondent and oppressed.

This study does not think violence will solve any of the observed problems in MSW management in the city. But while the government (through the agency) refuses to engage and discuss with the service users, this study believes that increasing the amount of requisite information available to the service users and encouraging the service users

to form advocacy groups will enhance the effectiveness of their environmentalism – their concerns and actions at protecting the environment. PNS is one approach that has been cited as an effective way of improving environmentalism of participants. While it is premature to declare the success of PNS as used in this study in Aba, further planned studies will add to our understanding of the benefits, or otherwise, of the approach.

CHAPTER SEVEN

Suggested Solutions by Participants toward an ISWM System in Aba

7.0 Introduction

In chapters 4, 5 and 6, the researcher presented the analyses of the responses by participants in the study and the researcher observations. The findings provide answers to the first research question – what are the current realities and challenges of waste management in Aba? This chapter, together with Annex 1, addresses the second research question – what approaches can be used to remedy the situation and to what extent?

In the original design of this study, there was supposed to be FGDs where the representatives of participants from the different stakeholder groups would have met to negotiate policies and agree trade-offs. Their resolutions would then be used to create a vision and action plan for MSW management in the city. However, due to constraints (discussed in chapter 9), the FGDs did not hold. Consequently, the researcher have used the analyses of the responses from participants and researcher observations to create a vision and action plan (Annex 1) while this chapter presents the various solutions suggested by participants. The issues have been discussed in further details throughout chapters 4, 5 and 6.

Table 7. 1: Possible Solutions Suggested by Participants

	Participant	Count	Suggested solutions
1	1, 2, 3, 5, 6, 7, 8, 9, 20, 22, 24, 25, 26, 27, 31, 32, 33, 34, 35, 36, 39, 40, 41, 42, 45, 46, 47	27	Public education, awareness and sustained sensitisation to encourage good behaviour
2	2, 4, 5, 9, 22, 24, 25, 26, 30, 31, 33, 34, 39, 42, 47, 49, 50, 51, 57	19	Establish an effective monitoring and enforcement. Task force.
3	2, 3, 6, 8, 22, 24, 26, 27, 29, 30, 31, 33, 34, 39, 42, 44, 47	17	Street to street or House to house collection.

4	2, 3, 10, 20, 24, 29, 30,31, 32, 33, 34, 38, 43, 47, 48, 49	16	Service must be provided for fees collected.
5	3, 9, 11, 29, 31, 32, 33, 34, 35, 38, 41, 43, 44, 46, 49, 55	16	Provide waste bins and relevant sanitary facilities in public places including in public vehicles
6	9, 12, 22, 24, 26, 27, 28, 32, 35, 36, 39, 45, 47, 48, 55	15	Staff training, manpower development and the use of professionals
7	1, 5, 6, 8, 12, 19, 22, 24, 26, 27, 31, 32, 33, 35, 39	15	Waste separation
8	1, 2, 7, 10, 22, 24, 28, 29, 30, 34, 36, 37, 38, 44	14	Eradicate corruption from the system
9	4, 8, 20, 32, 37, 41, 42, 47, 48, 50, 51	11	Learn from what others have done. New and clear policies to make waste management a focus
10	1, 20, 22, 24, 26, 28, 34, 41, 49, 55	10	End political interference and nepotism
11	22, 24, 26, 27, 28, 36, 37, 52, 54	9	Prompt payment of staff salaries
12	24, 25, 26, 35, 36, 39, 40, 41, 45	9	Provide adequate funding
13	7, 24, 27, 29, 30, 31, 33, 51	8	Prompt evacuation of the waste to avoid accumulation. Use of timetable.
14	3, 20, 24, 32, 33, 35, 39, 45	8	Incentivise waste management so people can see it as a resource
15	3, 6, 11, 27, 42, 44, 46	7	Increase service fee for better services
16	8, 24, 25, 26, 31, 35, 37	7	Infrastructural development e.g. power will be needed to recycle materials; good roads to

			enable efficient collection of waste; hi-tech vehicles for waste collection and transportation
17	13, 15, 38, 41, 42, 43, 44	7	Stop the intimidation, harassment and extortion from waste workers and other stakeholders
18	4, 13, 32, 35, 40, 45, 51	7	Establish waste recycling and processing companies in Aba. Waste is a source of electricity and raw materials
19	11, 27, 32, 29, 33, 43, 48	7	Provide more waste skips
20	6, 12, 28, 30, 33, 34, 44	7	Constitute a stakeholders' forum where all concerned will discuss how best to manage our waste
21	1, 2, 12, 20, 38, 40, 45	7	Vote out this crop of politicians as they have failed.
22	7, 9, 48, 49, 51, 55	6	Sincerity of purpose and a clear committed focused leadership
23	2, 14, 20, 22, 35, 42	6	Establish advocacy groups for waste workers and recyclers
24	1, 11, 27, 33, 44, 49	6	Remove time restrictions on when users can drop off their waste
25	4, 8, 13, 14, 24, 45	6	Create, develop and regulate the recycling market
26	6, 26, 28, 52, 58	5	Change the perception that waste workers are the downtrodden and forsaken of the society.
27	2, 31, 32, 34, 38	5	ASEPA have failed and should be scrapped or they should go back to the drawing board

28	4, 36, 37, 41, 45	5	Start waste education from family level to create the culture and awareness
29	2, 32, 35, 45	4	If government does not have the capacity, they should syndicate it to private investors and they (private investors) should be protected by legislation
30	44, 45, 46, 48	4	Traders should be allowed to choose and elect their leaders
31	24, 25, 26, 36	4	Clear delineation of duties between ASEPA and EHD. Avoid current duplication of duties and possibly create synergy
32	24, 25, 30	3	A collaborative approach involving other sectors so information can be shared
33	13, 14, 24	3	Formal recognition of the waste recyclers
34	13, 14	2	Training of waste recyclers
35	2, 8	2	Non-governmental support/sponsorship as we have in football.
36	2, 8	2	Establish waste management cooperatives.
37	25, 45	2	ASEPA should be supervised by the MOE
38	34, 40	2	Service users should bag their waste, dispose it at the stipulated times and pay their levies
39	6	1	Provide private waste bins for each category of waste for collection by the agency
40	41	1	A proper deep clean of our environment first before any discussions on improvements
41	22	1	Eliminate open burning of waste

42	22	1	Introduce polluter pays policy and let those who generate more waste pay more
43	24	1	Return responsibility of MSW management to municipal councils
43	40	1	Establish a separate ministry for waste management as it is too important
44	28	1	Perfect the mode of revenue collection and communicate same to all.
45	32	1	Carry out a full waste audit to determine the quantity and types of waste we generate
46	30	1	Mandate traders in busy locations to undertake regular clean-up of their environment
47	25	1	Clean portable water needs to be provided by government as it is a basis for hygiene
48	2	1	International aid and supervision by an international agency
49	56	1	The executive governor is currently distracted by legal battles. Political opponents should allow him to perform his duties.

Table 7.1 above clearly shows that public education, awareness and sensitisation ranked highest in the list of solutions suggested by stakeholders. The table provides an indication of the kinds of changes that participants want to see in MSW management in the city.

7.1 Summary

The richness and range of solutions proffered by the participants reemphasises the importance of involving all stakeholders in solving environmental problems, and the need to have a functioning stakeholders' platform that will be involved in policy decisions, design, implementation and evaluation of the MSW management systems as is

the case in Moshi, Bamako and Ghorahi (Wilson et al 2015; Rodic et al 2010). That is also a key recommendation of the ISWM framework and principle 10 of the Rio Convention of 1992.

CHAPTER EIGHT

Discussion

8.0 Introduction

In chapters 4, 5, 6 and 7, the analysis of the data collected during the research was presented. As well as providing answers to the research questions, the chapters contribute to reaching the aims and objectives of the study. In this chapter, the key results are further discussed and aggregated. The conclusion and recommendations of the study are hence drawn from this aggregate and presented in chapter 9.

8.1 Review of the Problem

As highlighted in chapter 1, MSW management has become topical. It is an issue of great concern in most urban centres and municipalities, especially for those cities and municipalities in middle and low income (developing) countries, where the impacts of poor MSW management practices are still devastating (Abdulredha et al 2018; Chalhoub 2018; WHO 2015; UN-HABITAT 2014). Common challenges militating against efficient MSW management in developing countries as detailed in chapter 2 include lack of reliable city specific data, poverty, poor planning and organisational capabilities, lack of adequately trained personnel, lack of commitment and negligence, poor infrastructure, poor funding, etc. (UNEP 2015; Ezeah 2010; UN-HABITAT 2010a; Hazra and Goel 2009; Moghadam et al 2009; Abdullahi et al 2008). Further literature review (2.9.3.1) revealed that even though there is a specific agency responsible for MSW management in Aba, like in many other Nigerian cities, the MSW management situation had become critical (Ajaero and Chigbo 2012; Izugbara and Umoh 2004). While Nzeadibe et al (2012) reckons that MSW management is very low in the governance agenda of the city, others (Odoemena and Ofodu 2016; Eneh 2011) adds that the outcome is the weak implementation of the national sanitation policy. Consequently, besides social, economic and environmental protection concerns, there are severe implications on the public health of the city's residents (Odoemena and Ofodu 2016; Izugbara and Okon 2000).

8.2 Overview of Key Results

The key findings of this study have been aggregated into six (6) main themes (or key results). These are History of MSW management in Aba; The notoriety of Aba as a dirty place (Aba Syndrome); Realities and challenges of MSW collection, treatment and disposal; Realities and challenges of MSW management governance; Investment and

funding in MSW management; and Operation and integration of informal waste workers. Each of these key results will be discussed in separate sections and reference will be made to relevant sections in chapters 4, 5, 6 and 7 where the data analysis was presented.

8.2.1 History of MSW Management in Aba

The detailed analysis and data used in reaching this result has been presented in chapter 4. By analysing the oral testimonies of participants, this study identified 4 distinct periods or eras that it believes are important in the history of MSW management in the city. Most of the stakeholders that provided these testimonies had lived in Aba for over 20 years. This historic review is particularly important to any future improvements in MSW management in the city because any significant improvements, as reported in previous studies, are often dependent on identifying and solving historical problems in the system (Ezeah 2010; Wilson 2007; Brown 2006; Wilson 1999). There is a common belief in Nigeria that most of the problems in Nigeria exist because Nigerians do not attach value to history and therefore useful lessons are not learnt from mistakes. The findings from this study and reports from other studies suggest this is particularly true for MSW management in Nigeria (Abila and Kantola 2013; Nzeadibe and Ajaero 2010; Imam et al 2008).

Lessons from the first era - of stability, and the third era – of adhoc remediation, show that intention and commitment matter (Wilson and Scheinberg 2010). In both eras, participants paid tribute to the commitment of the 'leaders' and how it enhanced discipline in not only their staffs but also the wider public. Perhaps, one can also argue that findings from the third era support the view from previous studies which reported that with strong commitment from political leaders and stakeholders, financial challenges in MSW management can be overcome as is the case in Moshi, Bamako and Ghorahi (Wilson et al 2012; Wilson and Scheinberg 2010; Rodic et al 2010).

On the other hand, the second and fourth eras show how lack of commitment from the leadership, unclear, unsuitable or weak implementation of MSW management policy can have devastating and far reaching implications, not only on public health but also the social, environmental and economic wellbeing of the populace (WHO 2015; Marchand et al 2012; Nzeadibe et al 2012; Contreras et al 2010). Table 4.9 (pg. 96) shows a summary of the different eras.

The lessons from these eras show that while the systems of MSW management have remained rudimentary, often involving the evacuation of refuse from one point to the other without treatment (Odoemena and Ofodu 2016; Nzeadibe et al 2010; Ezeah et al 2010; Ogbonna et al 2007) there are perhaps no justifications for the significant investments in sophisticated machinery and equipment often imported from developed countries in the hope of modernising the MSW management system and processes (Nzeadibe and Ajaero 2010; Imam et al 2008; Wilson et al 2001).

8.2.2 Aba Syndrome

Previous studies have reported the alarming and critical state of MSW management in Nigerian cities (Ezeah and Roberts 2014; Batagarawa 2011; Ezeah 2010; Imam et al 2008, etc.). Historically, the city of Aba has developed the notoriety of a dirty place (Odoemena and Ofodu 2016) with many expressing the opinion that the residents of Aba prefer a dirty place to a clean one. The researcher coined the term 'Aba Syndrome' to represent the notion that residents of Aba prefer a dirty environment to a clean one. Several participants in this study also expressed similar views as shown in Table 5.4. A few of the reasons advanced by the proponents of Aba Syndrome include (but may not necessarily be limited to): the prevalence of indiscriminate dumping of refuse in the city; the discharge of sewage and refuse into water ways; the generation of increasing amounts of refuse; non-payment of sanitation fees; and most residents of the city are traders and they know nothing about waste management.

However, findings from this study do not support the viewpoint. As highlighted in the previous section, MSW management in Aba has remained rudimentary, and like in many other cities in Nigeria, the level of MSW management service provision have been described as insufficient, inefficient and improper (Muhammad and Salihi 2018; Ogwueleka 2009; Whiteman et al 2006). Despite significant investments in the importation of refuse disposal vehicles by the state government in 2006 (as highlighted in chapter 6), this study finds that inefficient collection system and a weak implementation of an unsuitable MSW management system means littering and indiscriminate dumping of refuse have remained a common feature in the city.

Observations by the researcher also show that the immediate vicinity of most private premises and surroundings were often significantly cleaner than supposed public spaces. This means that the residents of the city made necessary efforts to keep their

surroundings neat, and suggests a disconnection in public governance between the government and the governed (Krawczy and Sweet-Cushman 2016; Abila and Kantola 2013; Adewuyi et al 2009). Responses from participants (as detailed in chapters 5 and 6) also show that while the service users often adhered to stipulated guidelines relating to MSW management including paying their statutory sanitation levies, unsatisfactory service provision and inefficient communication exchanges on the part of the service provider were often culpable for the observed failures in MSW management in the city. And that is even without mentioning the admittance by participants from the TGGO stakeholder group that service users are always willing to pay if services are provided. It is therefore surprising that the same service provider will turn around and accuse the service users of preferring a dirty place to a cleaner one.

This study also found that most of the traders that participated in this study showed a high level of knowledge of MSW management issues contrary to commonly held opinion. This is strongly linked to gained experience from their travelling (Singh and Livina 2015). Others, including members of staff of ASEPA who accused the residents of preferring to live in a dirty environment, expressed the view that residents of Aba also comply with MSW management regulations in other places they visit. They highlighted cities like Enugu and Calabar where waste management facilities such as bins are available for public use. This suggests that the currently observed dissident behaviour of indiscriminate dumping and littering can be overcome in Aba by the provision of the much needed waste bins in public places and an effective regime of monitoring enforcement, as is obtainable the other cities mentioned.

Admittedly, city authorities in developing countries face huge challenges in the delivery of effective and efficient MSW management services for several reasons including rising waste generation rates, lack of commitment, poor funding, poor organisational capabilities, etc. (Ezeah and Roberts 2012; Wilson et al 2012, UN-HABITAT 2010b; Olley et al 2010). However, that does not exonerate governments and their institutions from the responsibility of providing adequate MSW services to the populace. Instead of playing the blame game, MSW management authorities in Aba should learn from what has been achieved in places like Moshi and Ghorahi – 2 cities with even lower income levels; where a genuine participation approach involving all stakeholders have been used to overcome limitations in funding (Nabegu and Mustapha 2014; Wilson et al 2012; Rodic et al 2010).

8.2.3 Realities and Challenges of MSW Collection, Treatment and Disposal

This study found that the national policy on sanitation, developed at the federal level (FME 2005), upon which the MSW management policy implemented by ASEPA Aba zone (section 5.1) is premised, does not mention waste minimisation. The analysis of the responses from participants in this study (chapter 5) also show that there appears to be an unwillingness or unpreparedness to take measures that will prevent the generation of the most common types of waste seen in the city. For instance, countries such as Kenya banned plastic bags in 2017 (BBC 2017) by outlawing the manufacturing, selling and usage of all such products. The researcher observed that in Aba; empty ‘pure water sachets’ and empty plastic bottles of soft drinks and similar products constitute the majority of waste. However, most participants frowned at the idea of banning pure water in sachets citing affordability of alternative products as there is no public portable pipe borne water available. The point made by these participants regarding availability of portable water to the public perhaps emphasises the importance of an integrated approach to MSW management (WHO 2015; Wilson et al 2015; WHO 2014; Abdullahi et al 2008; Ijgosse et al 2004b). If the MSW management authorities needed a reminder to re-emphasise the need for a MSW management approach aimed at waste minimisation or reduction, the following comments from participants perhaps will suffice - “It is costing us a lot to dispose our waste after paying ASEPA so any information that will help people reduce the waste and spend less on waste disposal will be very useful” (Participant id = 47); “We generalise these issues but I know that I suffer malaria and the root cause is that our gutters are blocked and we have stagnant water everywhere. Waterproofs have taken over our farmlands as well as other contaminants from waste. We are easily reaching an epidemic stage and it should be taken seriously” (Participant id = 35).

In the absence of a suitable MSW management policy aimed at minimising waste generation and increasing urbanisation, MSW generation rates in cities in developing countries have continued to grow at a faster rate than MSW management agencies can cope (Kaza et al 2018; Muhammad and Salihi 2018; Ogwueleka 2009). Besides government policies, other major factors that reportedly affect waste generation include population and socio-economic factors such as poverty, income levels, education, attitude to waste, etc. (Senzige et al 2014; Diaz and Otoma 2013; Afroz et al 2011; Cox et al 2010). In Aba, this study found ASEPA does not keep records of the quantity of waste evacuated and their method of estimation was very unreliable. There were also no records of the

number of households paying for and receiving MSW management services. The irregularities and inefficiencies in their system make these calculations almost impossible. There is no doubt though, that efficient collection of waste is capital intensive and costs significant amounts of money to implement (Kaza et al 2018; Wilson et al 2013b; Scheinberg et al 2010).

Source separation of waste is perhaps the most important and most effective step towards disposal efficiency and minimisation of waste (Kuusiola et al 2012; Zhang et al 2012; Chung and Poon 1999). The most basic separation of waste involves separation into two classes – organic and inorganic (Agarwal et al 2015). The household is the first place that children should learn and understand issues of consumption and waste recycling (Singh and Livina 2015). This study found that in Aba, there is no government policy on waste separation. The basic facilities necessary for effective source separation of waste are also not available. However, as reported in section 5.13, some households (especially those who live in their own homes (not rented) with access to back gardens and informal waste workers already practice some form of waste separation. Informal waste workers operate in several modes in Aba (2.9.2.5). By observation, this study finds that they (informal waste workers) account for almost all materials recovery and reuse activities in the city. However, like in other cities around the world, their livelihoods have continued to worsen as approaches adopted to tackle their challenges have reportedly failed (Nzeadibe et al 2012; Scheinberg 2011; Wilson et al 2009, Nzeadibe and Iwuoha 2008; Wilson et al 2006). Public perception, personal environmental habits and beliefs inform individual attitudes towards source separation of waste (Barr et al 2003). To encourage source separation of waste, previous studies have shown that effective communication of government policies that emphasise source separation and the provision of the necessary facilities are needed (Zhang et al 2012; Tai et al 2011; Jiang et al 2009; Li et al 2009).

In ISWM (chapter 2), the collection of waste was directly linked to public health in that the higher the percentage of the waste effectively collected by the MSW management authorities in a city, the safer the public health and the cleaner the city's appearance (Wilson et al 2015; Wilson et al 2013b; UN-HABITAT 2011; Rodic et al 2010). As shown in section 5.1, indiscriminate dumping and littering is rife in Aba. There are no waste bins available in public places and standard facilities for temporary storage of waste are often

unavailable as shown in Table 5.8. As shown in Figure 5.2, the agency runs a system where residents are required to bring their waste to a designated receptacle point (skip). However, the numbers of designated points are insufficient. Many participants reported that it was not practicable for them to carry their waste to the skips as the nearest skips was too far from them. In the areas without accessible roads, the RCs do not provide regular waste collection services as required (see section 5.1.4). The study also found that the designated points were situated mostly along busy roads. With the poor quality of the skips which are at best described as improvised, the waste often spilled onto the busy roads thus posing attendant public health risks, environmental blight and a danger to road users (Kaza et al 2018; Marchand et al 2012; Ezeah 2010; Giusti 2009) as shown in Picture 17 and Picture 18 below.



Picture 17: Refuse collection along a busy Road in Aba [Credit: Researcher]



Picture 18: Environmental Blight caused by refuse in Aba [Credit: Researcher]

As with all other aspects of MSW management in the city, waste collection is not spared from the palpable lack of planning, commitment and know-how by the management agency. An observation exercise by the researcher at one of the receptacle points (Table 5.8) and another accompanying the agency staff on a waste evacuation exercise (Table 5.12 and Video 1) revealed the situation was worse than imagined. There was gross shortage of manpower, equipment, machinery and vehicles, and no formal planning of any sort involved. There were no schedules of receptacle points to be evacuated on given dates or times; no staff rota or allocation and therefore no operational cohesion. Everything was simply ad-hoc, grossly ineffective and thus posed great levels of risk to even the waste workers who are predominantly untrained (see Table 5.11) and vulnerable considering that most of them had no job security, were poorly remunerated and often owed for some months going by the researcher's observations and these comments by relevant participants – "Honestly it is very confusing. They pay us around 20th of the month and they have owed us for some months now. They just paid us yesterday (20/10/2017), for me I take it that it was for July, others may take it as for August. Because we are not paid regularly, it is so confusing. No body to ask and no receipt. We are paid cash by hand. They normally pay us Ten thousand Naira" (Participant

id = 52); “I will say 1:10 even. We have only 1 driver who is a civil servant (permanent staff) but over 10 adhoc drivers. All the mechanics are adhoc staff. Even myself, I am an adhoc worker. Like I said before, it’s a political appointment and I can be fired anytime” (Participant id = 42). These findings support the reports from previous studies that MSW management in developing countries are often characterised by lack of or poor organisational capabilities, incompetence and negligence, lack of trained personnel, etc. (Abdulredha et al 2018; Guerrero et al 2013; Nzeadibe et al 2012; Sarkhel and Banerjee 2010; Ezeah 2010).

In terms of vehicles for transporting waste, this study found that most vehicles in the fleet of ASEPA Aba zone were dilapidated and no longer fit for purpose. The operations HQ of the agency along Ikot Ekpene Road were littered with broken vehicles and sophisticated machinery as shown in Pictures 11 and 12 while the few ones still in use are very polluting as can be seen in Video 1. While most of the staff of the agency that participated in this research decried the untold levels of corruption, nepotism and impunity at the higher echelons of the organisation, the researcher observed obvious display of laxity, lack of commitment and ‘I don’t care’ attitude amongst the field staff. For e.g. during the observation exercise accompanying the evacuator on their daily activities (Table 5.12), the researcher observed some of the evacuators littering and when they were asked why they were littering, they responded that the city was already dirty.

Going by reports from previous publications (Kaza et al 2018; UNEP 2015; The World Bank 2012), waste collection rates correlate positively with income levels as well as vary in regions, with sub-Saharan Africa and South Asia posting the lowest rates (as shown in Figures 8.1 and 8.2 respectively). However, the generous estimate of current collection rates in Aba of 20 – 25 % (see section 5.5) still fall far short of the expected 44 – 51% for a city in a sub-Saharan country with lower-middle income level (Kaza et al 2018).

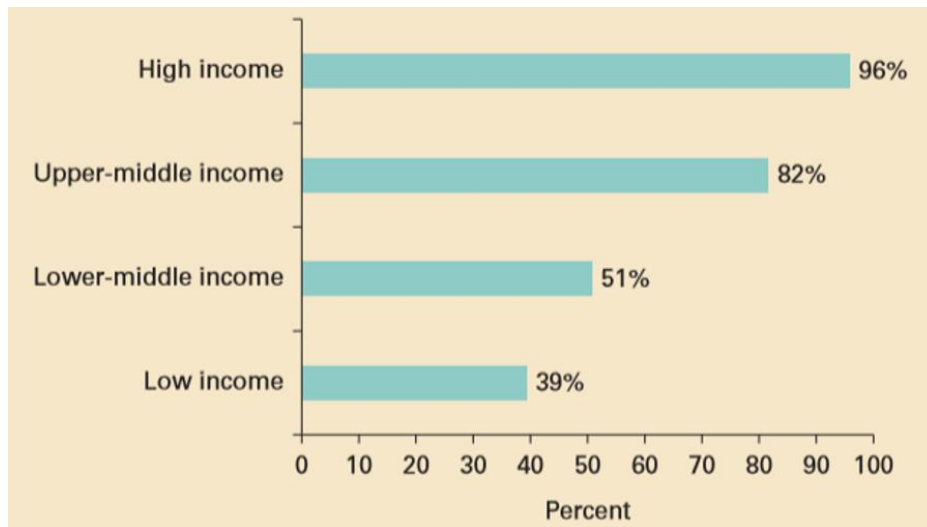


Figure 8. 1: Waste Collection Rates Correlate Positively with Income Levels [Credit: Kaza et al 2018]

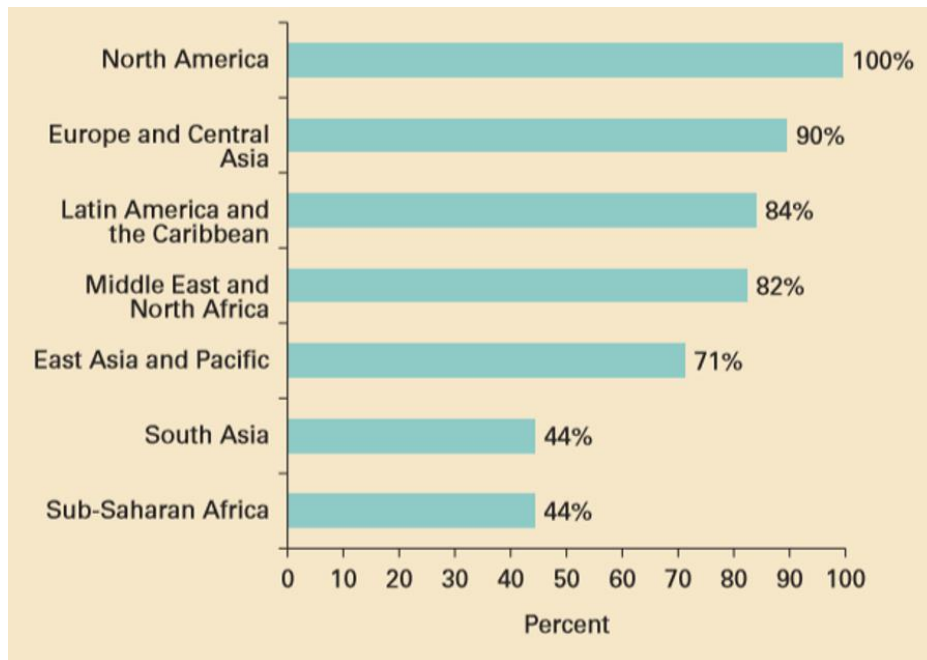


Figure 8. 2: Waste Collection Rates vary with Regions [Credit: Kaza et al 2018]

The analysis of responses and suggestions by participants (see Table 7.1) show that practicable solutions to improve waste collection rates in Aba will include the development of a detailed route plan and schedule for evacuating refuse in the city, staff recruitment and training, provision of waste bins and management facilities in public places, a locally adapted house-to-house collection system and effective communication of policy changes and public education that will effect public compliance through

attitudinal change. The approach and investment options to reach these goals are discussed further in section 8.2.5.

Usually, along with volume reduction and energy recovery, the aims of waste treatment include ensuring a reduced environmental impact compared to the untreated waste (Golomeova et al 2013). In order to adopt the most suitable treatment option, it is important to know the composition of the waste generated in a city (Golomeova et al 2013; Ezeah and Roberts 2012). This study found that a waste audit to determine the waste composition of the waste generated in Aba has never been carried out as shown by the following excerpt from conversations with a senior officer at ASEPA, Aba zone (see Table 8.1 below).

Table 8. 1: Responses from a key Participant on Waste Audit Information

Question	Response
Participant id = 42	
How long have you been in the job and how long in the current position?	I have held several positions in the agency – altogether over 6 years, and over 2 years in my current position.
Has your agency carried out any form of waste audit? By that I mean a detailed study to find out the composition of the waste generated or evacuated.	No, we have not done anything like that.
Do you think that will help?	Yes. The governor is talking about recycling so may be along the line it will happen.
Does the agency have trained manpower to carry out such task? Do you have any waste professionals within the agency?	We don't. As far as Aba is concerned, we don't have anyone who can do it. Most of our workers here are adhoc workers.

Currently, there is no provision for waste treatment in the MSW management system implemented by ASEPA Aba zone (see Figure 5.2). The researcher did however observe that open burning of waste was prevalent in the city as shown in Table 5.10 and Pictures 8 and 9. As can be inferred from Table 8.1 above (and also section 5.1.5), the waste treatment option preferred by the state government and its agency is waste recycling.

Though opinions vary on the economics of recycling mainly due to local factors (Erikson and Baky 2010; Bartelings et al 2005; Leach et al 1997), the key advantages of waste recycling include reduction in the quantity of waste disposed, a reduction in the demand and mining of new materials through the return of materials to the economy, job creation and the attraction of investments (Van Beukering et al 2014; Golomeova et al 2013; Wilson et al 2006; Velis 2004). Further discussions with participants from the TGGO stakeholder group reveal an apparent misconception in their understanding of how recycling works. The agency and state government believe a single recycling company can be set-up in the city to recycle all the waste generated in the city and thus make huge sums of money for the state. Meanwhile, as highlighted previously, informal waste workers operate in Aba in different modes and are responsible for almost all current recycling activities in the city. As discussed further in section 8.2.6, this study believes that organising and integrating their activities into the mainstream MSW management service provision in the city will be beneficial to all parties.

As described in section 5.1.6, all the waste evacuated by ASEPA Aba zone is dumped at an open dumpsite. Picture 14 and Video 2 are images captured on a visit to the open dumpsite at Emelogu Street, Aba. Like most dumpsites in Nigeria it is unplanned (Ukpong et al 2015; Ezeah 2010; Imam et al 2008) as it is a converted burrow pit that arose from the excavation of sand for construction works. This researcher thinks that the location of the dumpsite is arguably the centre of a relatively highly populated community. On the visit to the site, the researcher could perceive the stench from the dumpsite from at least a mile away. Birds of prey such as Vultures, and pests and vermin, previously reported as vectors of diseases (WHO 2014; Lino and Ismail 2012; Giusti 2009) were also observed in multiple quantities. Considering that there is virtually no control on the movement of waste in the city and realising the ease with which hazardous waste such as contaminated hospital and industrial waste could be mixed with MSW, the researcher thinks that the dumpsite poses a heightened public health risks to the scavengers observed on the site, the local community, ecosystem and environment. As a measure to curb such risks, the study believes that the establishment of an engineered landfill that is properly sited and managed will be a suitable and appropriate step toward a sustainable MSW management considering prevailing local conditions, land availability and costs. The success of the

small town of Ghorahi in Nepal (Wilson et al 2015; Wilson et al 2013b; Rogic et al 2010) is a reference worthy of emulation.

8.2.4 Realities and Challenges of MSW Management Governance

Governance issues in ISWM have been reviewed in section 2.5 while the researcher presented the data analysis related to governance issues in MSW management in Aba in chapter 6. The indicators for governance in ISMW include inclusivity, financial sustainability and policy and institutional coherence (Abdulredha et al 2018; Muhammad and Salihi 2018; Wilson et al 2015; Scheinberg et al 2010). Stakeholders in MSW management often includes governments, municipal councils, planning departments, engineering firms, community groups, investors, churches, schools, healthcare facilities, households, consultancies, markets, traders, professional associations, labour unions, NGOs, hotels, restaurants, informal waste workers, etc. (Tai et al 2011; Geng et al 2009; Shekdar 2009; Sujauddin et al 2008). All of these stakeholders will either be service users or providers (UN-HABITAT 2010a). The participants in this research were grouped into 7 different stakeholders groups (section 3.3.4).

Inclusivity in ISWM simply means engaging all stakeholders in the decision making process, design, implementation and evaluation of the MSW management process (Wilson et al 2015; Rodic et al 2010). While the MSW management systems of Moshi, Bamako and Ghorahi provide good examples of what could be achieved through an inclusive approach (Wilson et al 2012; Rodic et al 2010), the case of MSW management in Naples, Italy in 2008 is an example of how bad things could easily go if an inclusive approach is not adopted. It was reported that in early 2008, the MSW management in Naples completely broke down. Waste piled up on the streets and the waste collectors had nowhere to take them to as all the region's landfills were full. There were allegations of corruption, mismanagement, mafia involvement in garbage collection and the refusal of residents of the city to sort their waste. The authorities were arguing with each other and did not involve the citizens and other stakeholders in decision making. Trust between authorities and citizens was so eroded that it became impossible to site new disposal facilities (Veltri 2014; UN-HABITAT 2010a; Pasotti 2010). The researcher thinks that the current situation in Aba as described in chapters 5 and 6 is similar to that of Naples in 2008 as described above; just that it appears to have become a norm in Aba, so much so that many use the situation to justify their notion of Aba Syndrome (section 8.2.2). As

detailed in section 6.3, service users do not get service worth the value of their money; they are not engaged in the decision making, design, implementation and evaluation of the MSW management processes; and to cap it all, many especially the traders at Ekeoha Shopping Plaza, feel they are oppressed and intimidated by government and thugs working for them.

To borrow the popular phrase of Lord Acton, the current position of ASEPA as the service provider of MSW management in Aba can be likened to “power tends to corrupt, and absolute power corrupts absolutely”. From the responses by participants as detailed in chapters 5 and 6, the researcher believes that ASEPA sees itself as the supreme adjudicator in MSW management in Abia State mainly because it is under the direct control of the state governor and receives regular funding unlike other public service agencies and departments that are largely comatose and neglected. Whereas ASEPA is mainly comprised of political appointees with little or no background in environmental issues, the EHDs are headed by people who have had varying amounts of professional environmental training. Before the establishment of ASEPA, they (EHDs) were responsible for MSW management in Abia State and as detailed in chapter 4, the state of MSW management in Aba was reportedly better than it is currently. As described in section 6.3, rather than forge harmonious working relationships with other relevant departments in order to create synergies (Ezeah and Roberts 2012; Ezeah 2010), the study observed obvious signs of conflicts between the relevant bodies mainly because of ASEPA’s crude ways of operation and disregard of other stakeholders.

The indicators of financial sustainability in ISWM are described in section 6.1.2. The provision of efficient MSW management services in a tropical city could take up as much as 20% of a municipality’s budget (Wilson et al 2001). Usually, by law, the service should be provided for all regardless of the interest of the market to supply the service or users’ ability or willingness to pay for the services supplied (Wilson et al 2013b; Rodic et al 2010). In order to meet set goals, MSW management authorities adopt locally adapted strategies that are suitable to them for example, in Kano (Nigeria), Muhammad and Salihi (2018) reported that the state government provides all the funds needed to operate and maintain the MSW management system while the small fraction of service users that engage informal operators pay directly to the informal operators. Rodic et al (2010) also reported of different arrangements in Kunming (China), Managua (Nicaragua) and Belo-

Horizonte (Brazil). In Aba, residents are charged usage fees which they are compelled to pay irrespective of whether they use the service or not. This study found that even though good practice requires that the accounting records are made available to the public for scrutiny (Whiteman et al 2006; Wilson and Scheinberg 2010), relevant officers of ASEPA were very unwilling and resistant to all requests relating to finances. Similar experiences were also reported in previous studies of MSW management in Nigeria (Batagarawa 2011; Ezeah 2010). Though the public officials were quick to highlight lack of funds as the main constraint and reason for their inefficiencies, they would not provide any information on budgets, costs or what fraction of the costs are recovered through the statutory levy paid by service users. This study believes that their attitudes to questions relating to finances lend credit to the prevalence of corruption as alleged by various participants with insider knowledge and information (chapter 6).

In terms of policy and institutional coherence, the one-dimensional approach of ASEPA as a supreme adjudicator in MSW management in Aba, thus creating a lack of synergy has already been highlighted above. The inadequacy of the national sanitation policy for not considering waste minimisation was also highlighted in section 8.2.3. However, while most participants in this study believe that new laws and policies are required to enable the desired changes in MSW management in the city (chapter 6), most participants from the LEPI stakeholder group agree with reports from previous publications that the necessary laws and policies are often available even areas with remarkably poor performances in MSW management (UNEP 2015; Ezeah 2010; Wilson 2007). The researcher joins participants from this stakeholder group in arguing for a stronger implementation of the national sanitation policy and the introduction of a better monitoring and enforcement regime that will be geared towards behavioural and attitudinal changes as against the current focus on fines and penalties (section 6.3). In addition, the researcher also thinks that the MSW management sector should be liberalised to make it competitive and service driven so as to encourage the participation of a wider variety of service providers. ASEPA should also be under the supervision of the MOE, supposing the later has in its employment, adequately trained and qualified personnel.

8.2.5 Investment and Funding in MSW Management

As previously mentioned (in chapters 2, 5 and 6), governments and MSW management authorities in developing countries have often pursued a modernisation agenda, often involving the spending of significant amounts of money on the importation of sophisticated equipment and machinery when it comes to the development of their MSW management systems (Booth et al 2016; Ezeah and Roberts 2014; Bhuiyan 2010; Imam et al 2008; Wilson 2007). However, several studies have also reported that this approach, though often taken with good intentions – to replicate the results seen in those developed countries in their home country; has often failed, and in many cases saddling the developing country with foreign debts which they continue to repay long after the imported equipment and machinery have broken down and become non-functional (Njoroge et al 2014; Marshall and Farahbakhsh 2013; Scheinberg et al 2010; Wilson 2007; Imam et al 2008; Rushbrook and Pugh 1999). This view is also supported by other authors who have argued for a political economy analysis approach to MSW management development (Booth et al 2016; Long 2004), that is locally sensitive, creative and a critical approach owned by the community of stakeholders (Booth et al 2016; Coffey and Coad 2010; UN-HABITAT 2010a; Konteh 2009; Henry et al 2006; Schubeler 1996). All through this study the most common reason advanced by members of the TGGO stakeholder group for the observed failures in MSW management was lack of funding as captured in excerpt below (Table 8.2).

Table 8. 2: Participants from TGGO cite Lack of Funds as Key Challenge in MSW management

Question	Answer
Participant id = 40	
You mentioned that so many things are in the pipeline. What will you say is the biggest challenge for the agency?	The biggest challenge is that of funding. We hardly have enough equipment to carry out the job effectively.
What do you mean by equipment? Is it manpower or buckets or trucks?	All of that and compactors, bulldozers, pay loaders. We make use of all these.
Participant id = 42	

I understand the job you do is capital intensive. Outside that, what will you say is the biggest challenge?	The biggest challenge is equipment
If you are given all the equipment required, do you have the requisite manpower to run them?	There are people everywhere looking for jobs so if we have equipment, we'll employ more people. For instance, if we had several compactors, you will see them going street by street.

As can be seen from the exchanges, lack of funds is also blamed for lack of manpower. As explained by the participant, the staffs are often attached to operational vehicles for refuse evacuation. Therefore it makes sense that in the absence of vehicles, more staff cannot be employed. But, Nzeadibe and Ajaero (2010) reported the spending of five and a half million US dollars (US\$5.5m) on refuse collection vehicles in 2006. This study found that, true to form, most of those vehicles are broken down and non-functional as shown in pictures 11 and 12. The main reasons often reported for why these imported vehicles do not stand the test of time include their unsuitability for local roads, differences in waste composition, lack of a culture of maintenance on the part of MSW management authorities in developing countries, poor planning, inappropriate use of the vehicles owing to poorly trained or skilled operators, and negligence (Ezechi et al 2017; UNEP 2015, Ezeah and Roberts 2012; Ezeah 2010; Nzeadibe and Ajaero 2010; Imam et al 2008; Wilson 2007; Wilson et al 2001).

Despite previous experiences of the failure of these imported vehicles to deliver the expected results, and the numerous reasons advanced for their failure (as highlighted above), this study found that (as reported in chapters 5, 6 and 7) ASEPA is still desirous of these machineries and equipment. Many participants believe such preference is not because there are no local alternatives available as they are quick to reference the operations of informal waste pickers who do not have access to the advanced equipment. They reckon the main reason is corruption. The following excerpt from a conversation with a participant echoes the thoughts of many others who expressed similar opinion on the prevalence of corruption – “So you find out that when you budget money for

equipment, the money is being siphoned to pay political cronies and the environment remains the way it is and nothing is being done. From your governor to the president and down to the chairman of your local government Obingwa, that is the problem with Nigeria. So when you're talking about anything, the manpower is not there, but money is voted for it" (Participant id = 22). Most participants opined that embarking on the importation of these refuse collection vehicles provides an easy avenue for politicians to inflate the sum total of the contracts, syphon public money and enrich their cronies who are often the contractors, all in preparation for the next election circle where the accumulated monies will be used to perpetuate electoral crimes including vote buying, thuggery and rigging. There are grounds to believe these allegations. As highlighted in section 5.4, some success can be achieved by engaging local educational institutions such as polytechnics and small and medium enterprises (SMEs) as reported by Channels TV in 2016. This study believes that a local approach to developing and manufacturing adapted waste skips, carts and bins through public-private partnerships will be a better step to take and offer better value for money. Figures 5.6 and 5.7 prove that such technologies and know-how already exist locally.

On the choice of recycling as the ultimate goal of MSW management in the state (Table 5.2) and current efforts of the executive governor to attract investments into the sector, Nzeadibe and Ajaero (2010) reported similar drives where state governments had signed memorandums of understand (MOUs) with interested investor. Their report however noted that often the investors showed little zeal in following up such partnerships beyond putting pen to paper. They argued that even though on the surface of it, there appears to be a reasonable chance for such projects e.g. WtE, recycling, etc. to be successful, the apparent cold feet of investors appear to emanate from the seeming unwillingness of government to guarantee the security of investments and personnel of these firms (Nzeadibe and Ajaero 201). This reaffirms the position of this study that any expected positive changes and viability of investments in MSW management in the city are predicated upon holistic reforms of the sector to ensure transparency and public accountability (section 5.4). Such reforms must also consider the integration of informal waste workers and encourage the participation of community-based groups in service provision (UNEP 2015; Ezeah and Roberts 2012; Sceinberg et al 2011; Ezeah et al 2009). Nearer home, a practicable example of this approach is the establishment, by the Ondo

State government, of an integrated waste recycling project, that involved the conversion of organic matter into organic and organo-mineral fertilizers and a number of other products by local producers, using indigenous technologies (Nzeadibe and Ajaero; Olarewaju and Ilemobade 2009). Further afield, the example of the small town of Ghorahi, Nepal (detailed section 2.2.2), is also valid (UN-HABITAT 2010a; Rodic et al 2010).

8.2.6 Operation and Integration of Informal Waste Workers

As highlighted in section 6.3(f), informal waste workers have been on the fringes of the urban waste landscape, working away as unrecognised stakeholders for a very long time now (Scheinberg 2011). The livelihood and vulnerability of this group of very important stakeholders in MSW management have worsened over time owing mainly to their harassment and maltreatment by MSW management authorities and an unsuitable approach to tackling their challenges (Nzeadibe et al 2012; Scheinberg 2011; Nzeadibe and Ajaero 2010; Nzeadibe and Iwuoha 2008; Adebola 2006b). This study found that in Aba, within small clusters of informal waste workers, there are structures of authority. For instance, on a visit to the dumpsite at Emelogu Street (Picture 14 and Video 2), the researcher was taken to the leader of informal waste workers' cluster based on that site. Without him giving the go ahead, no informal waste worker would speak to the researcher. As shown in Table 8.3 below, comments by participants from the IRWP stakeholder group suggest there was also a form of apprenticeship in the 'trade'.

Table 8. 3: Comments by Informal Waste Workers on Apprenticeship

Participant id	Comment
13	Before you start, you'll follow someone who has been in it and learn from them before you can go on your own.
15	We go out with our magnet plus if the colour of the metal is red, you can use the magnet. If it is not magnetic then it's copper. Brass is normally light yellow. You learn all these before you start
21	I learnt from another boy who has done it for a longer time.
14	Usually, a trader will have so many boys in the field buying stock for him.

While Table 8.4 provides further insights on informal recycling, this study also found that quantity was a major driver of the activities of informal waste workers in Aba. As highlighted in section 2.9.2.5 and Table 5.16, informal waste workers operate in different modes. Often times they concentrated on areas where they can amass sufficient quantities of the materials that were of interest to them. This is so because their income depended on it (section 5.2(b)). These findings suggest that integrating the informal waste workers into the mainstream MSW management services provision in Aba, will contribute to their specialisation as well as help them scale up their operations, with attendant benefits that will include higher income and better livelihoods (Scheinberg 2011; Olanrewaju and Ilemobade 2009).

Table 8. 4: Insights on Informal Recycling and Informal Recycling Systems

Insights	First wave - 1990s	Second wave - 2000s
Informal Recyclers and their activities	<p>Informal recyclers choose activity owing to lack of formal education or paperwork</p> <p>Eliminating children’s participation requires parental and community involvement in decision making</p> <p>They are often more interested in improving their business model than in ‘better work’</p> <p>Either waste pickers do the activity for less than 6 months or a lifetime, involving multiple generations</p>	<p>Informal Recyclers make up as much as 1% of the world population – large numbers are in Asian, Latin American, and North American cities</p> <p>Formalisation trends favour men</p> <p>Informal recyclers perform environmental services for their cities, some of which can be quantified and generate value that cities do not pay for or support</p>
Informal Recycling Systems	<p>Earnings often surpass minimum wage</p> <p>Privatised landfills and waste collection disrupt informal livelihoods</p>	<p>In most developing country cities the majority of recycling happens informally</p> <p>More people work in the informal waste sector than the formal</p>

	International and charity efforts to move waste pickers out of the system fall short because the income they offer is not comparable	European cities have active informal systems Pro-forma costs of informal recycling and waste collection are lower than formal service costs. Formalising and legalising informal recycling depends on social and governance factors, including the establishment of identity of internal or cross-border migrants
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(Credit: Scheinberg et al 2016)

For MSW management authorities considering how to integrate informal waste workers into formal MSW service provision, Table 8.5 below provide a guideline on how informal waste workers have been integrated in different cities and countries, often to great effects as high recycling rates have been reported (Scheinberg et al 2016; UN-HABITAT 2010a; Scheinberg et al 2010; Wilson 2007).

Table 8. 5: Examples of Inclusive Recycling

City / Country	Project or intervention in line with the ideas of inclusive recycling
Brazil Philippines	Municipalities give informal recyclers /junk shops concessions to collect or receive materials /to operate recycling centres.
Mali (W. Africa)	Communities give local platforms concessions to operate recycling transfer and community disposal and sell the decomposed soil to farmers.
Egypt Columbia	Informal recyclers use city land for post-collection sorting, tip areas (Colombia, Cairo). Mostly they don't pay but they have no rights to stay there if the city changes its mind.

Bangalore, India	An NGO introduces waste pickers to large business generators. Each waste picker gets a service fee for cleaning, and guaranteed access to that business' materials
Tanzania Bulgaria micro-franchise	Cities and municipal districts allow micro-and small enterprises to tender to have exclusive rights to waste collection and in some cases recyclables (Dar, Tanzania), sweeping (Bulgaria). But the MSEs and CBOs have to collect money from households.
Bangladesh, India, Malawi, Kenya PPPs	CBOs and MSEs pay market managers for the right to collect market waste, separate and wash plastics, compost organics from markets
Brazil China PPPPPs	State and city governments organise collection privatisation tenders that require working with the informal sector.
USA, Canada, Netherlands PPPs	Cities collect organic waste and bring it to private compost producers to process for a fee. Some cities agree to use a certain volume of compost for parks, road berms, cemeteries, public spaces, pay a lower fee for composting.
Sri Lanka, Belgium PPPs	The agriculture ministry provides subsidies and technical assistance to farmers to accept source separated organics and make and use compost from municipal collection
Netherlands	NGO second-hand shops and clothing collectors also function as a workplace for former collectors. The shops can claim an output-based payment per tonne from the municipality, for the tons that they have recycled or repaired and sold.
India, Brazil, Mali, Columbia, & globally	Global organisations pay local organisers to support informal recyclers to form, unions, NGOs, co-operatives; platforms; associations, and get health care from the city.
PPP Philippines, USA, Canada, Costa Rica	Recycling co-operatives rent warehouses so they can store material, and share transport to better markets. They get a subsidy from the municipality, the port authority, or other public entities, as part of economic development. The official diversion rate includes these materials.

Indonesia, Canada & California USA, Bangladesh	Community development officials support and pre-finance recyclers to develop hybrid or new businesses combining services with valorising the materials e.g. composting, deposit return, carbon financing.
Costa Rica, Netherlands, Canada	National governments make laws requiring producers to take their products back and recycle them (EPR). In Costa Rica, the producers hire informal recyclers to dismantle the computers in a workshop with good working conditions.
Costa Rica, Brazil, Cairo, India	NGOs get funds from the municipality to train waste pickers and value chain actors; give them income support; keep children in school; teach parents to read; pay health insurance
New York (NY Times); Brazil, Peru, Manila	Informal recyclers organise themselves to manage waste at sporting events, outdoor concerts, fairs, and markets. They get a fee from the organisers but get to keep the recyclables.
Peru, India, Brazil, Philippines	The city authorities provide waste pickers and value chain actors with uniforms, shoes, gloves, eye protection, and ergonomically correct carts. They provide insurance and give them ID cards which allow them to enter residential areas and collect recyclables without being harassed. Or to manage municipal depots to which the private informal recyclers have a key. The collectors keep the recyclables and sell them; do not receive any salary. The City claims the diversion as part of their reporting to the environmental authorities.

While some forms of these arrangements may be practiced amongst informal waste workers in Aba, the quantity of materials they recover or recycle, and hence their contribution to MSW management, are not being recorded. This study believes that getting the benefits associated with the integration of informal waste workers in Aba will also hinge on a genuine engagement of the different stakeholders and the transparency of the reforms as previously suggested.

CHAPTER NINE

Conclusion and Recommendations

9.0 Summary

In an attempt to understand the real issues, challenges and contexts of MSW management in developing countries, this study adopted a PNS and case study approach to peruse MSW management in the city of Aba, Abia State, Nigeria. The main methods of data collection involved unstructured guided interviews, field notes and researcher observations. These data collection methods reflect the importance accorded by the study to the participation of the different stakeholders and their different perspectives on MSW management in the city. Details of the statement of the problem, the literature review and research methodology are presented in chapters 1, 2 and 3 respectively. The analysis of the data are presented in chapters 4, 5, 6 and 7, with each chapter addressing a research aim and objective as set out on page 7. In chapter 8, the discussion of the key results from the data analysis was presented. The conclusions presented in the next section are drawn from the key results while the recommendations for future studies are informed by the experience gained through this research and the challenges encountered.

9.1 Conclusion

The major conclusions from this investigation include:

- This study was the first systematic attempt to evaluate the history of MSW management in Aba. As detailed in chapter 4, the analysis of the data show that while the processes of MSW management in the city remained rudimentary over the period evaluated, often involving the evacuation of refuse from one point to another, analysis of the different eras reveal a clear policy and committed leadership had positive impact on MSW management while perceived population growth and rising waste generation rates had a negative effect.
- ASEPA (Aba zone) has the overall mandate of managing MSW in Aba. The MSW management system implemented by ASEPA is informed by the national sanitation policy designed at the federal level. The policy did not consider measures targeted at waste minimisation. The data analysis as detailed in chapter 5 show that the system implemented by ASEPA is unsuitable and inefficient. Consequently, indiscriminate dumping and littering, illegal dumping and open burning of waste are prevalent in the city. Waste bins are not provided for public

use in public places and standard storage facilities for waste such as wheelie bins are not used in the city.

- Contrary to the commonly held popular notion that residents of the city prefer a dirty environment to a clean one (termed Aba Syndrome), this study found that most participants, as well as having an understanding of the need for a cleaner environment mainly for public health benefits, also expressed willingness to pay higher sanitation fees if it will guarantee a cleaner environment (see chapters 5 and section 8.2.2). The data analysis also showed that traders in Aba showed a very high level of understanding of MSW management challenges and processes, mainly gained from travelling.
- ASEPA operates like a task force – running unilaterally without engaging other relevant departments such as planning, environmental health, etc. As shown in chapter 6, their relationship with other relevant stakeholder groups is one dimensional, with ASEPA seemingly wielding all the power. They do not consult with or seek the input of anyone else. Within ASEPA, there were also allegations of the marginalisation of other key members of staff by the DGM. Consequently, MSW management scores very poorly on all indicators of governance – inclusivity, financial sustainability and policy and institutional coherence (section 6.1).
- ASEPA's alleged highhandedness and inefficiencies means there are several areas of conflicts with other stakeholder groups. As highlighted in section 6.2, they include: the allocated times for waste disposal; non-recognition, intimidation and harassment of informal waste workers; perceived lack of service provision; Focus on penalties and fines at the expense of behavioural and attitudinal change; and lack of synergy with other relevant departments.
- While all current efforts by the executive governor have not yielded any meaningful results, this study believes that it may not be unconnected with current structure of the MSW management service and alleged high levels of corruption prevalent in the system (as well as other realities and challenges highlighted in chapters 5 and 6). With scarce resources and competition from other needs ensuring public finances are increasingly stretched, an integrated approach is needed to move the city's MSW management situation towards a sustainable system. In line with the recommendations of the ISWM framework and the Rio Convention, this study proposes an all-inclusive transparent approach

that will involve the participation of all the stakeholders. Feedback and suggestions from participants (chapters 4, 5, and 6) have shown that by involving the citizens at all stages of the decision making process, a better understanding of the issues and challenges are gained as well as a wider range of practicable solutions (chapter 7).

- Finally, this study believes that the direction of travel for MSW management in Aba must change, focusing instead on harnessing local competencies that already exist such as the production of suitable locally adapted waste management facilities like skips, sanitary bins, push carts, etc. instead of pursuing modernisation programmes that end up being white elephant projects. The recognition and integration of the informal waste workers in Aba (as discussed in 8.2.6), into the mainstream MSW management service provision will benefit all parties, improve the livelihood of this much maligned group and count toward meeting goals for both sustainable and millennium development.

9.2 Challenges Encountered during the Study

This study commenced in September 2014 and the initial plan was to conduct an extensive field work and data collection between July 2015 and September 2016, a period of about 14 months. However, the political destabilisation that ensued from the general elections held in Nigeria in early 2015 meant it was unsafe to travel to the area as scheduled. Between January to February 2016, for a period of 3 weeks, the researcher embarked on a preliminary field study to assess the MSW management situation first hand and to build upon the contacts with would-be stakeholders that had been established through telephone calls, emails and social media. However, it was still impossible to establish firm contacts with the new government and officers with responsibilities in MSW management. The researcher was intimated on ongoing legal challenges involving the election of the state governor which meant that the government was not settled and could not commit to the research as a stakeholder.

In October 2017, for a period of 7 weeks, the researcher undertook the data collection exercise during which a total of 58 interviews were completed with participants from 7 stakeholder groups as detailed in section 3.3.4. Figure 3.3 (pp.64) is a flow chart that details the research design. However, this research did not receive any funding or financial support of any kind from any private individual or organisation. The shortfall in

resources meant it was not possible to undertake a focus group discussion that was planned at the end of the data collection and initial data analysis where stakeholders would have had the opportunity to deliberate on the issues that were raised.

During the data collection exercise, while members of all the other stakeholder groups were steadfast in participating and providing useful information to the research, most staff of ASEPA were demanding money to take part and once their request was turned down on ethical basis, they declined participation. The senior members of staff of ASEPA also declined answering any questions or providing any information related to finances. In most cases, a long conversation ensued between the researcher and senior members of staff of ASEPA on the choice of methodology. They insisted that the researcher should follow common practice, which they said involved giving them a questionnaire to complete and a return on a later date to collect the completed questionnaire.

Many stakeholders accepted the invitation to participate on strict conditions of anonymity. Most expressed genuine fears of victimisation by the government while others simply declined to speak on tape. The researcher's local knowledge of the culture of the inhabitants of the city, contacts and connections proved most useful in getting stakeholders to participate.

9.3 Recommendations for Future Studies

This research recorded the first evaluation of the history and contexts of MSW management in the city of Aba using oral responses of lived experiences of participants. The findings will improve the understanding of the issues, challenges and contexts of MSW management in the city. However, there are a few limitations which future researches can overcome by following the recommendations below.

As a result of time and resource constraints, the entire duration spent in the field was 10 weeks. Much more time was spent liaising with would-be participants as some constraints (highlighted in section 9.2) made it impossible for the researcher to spend more time in the case study area. Further studies should be longer to allow for the participation of more citizens and to cover more areas of the city.

There is still a huge gap in the availability of reliable quantitative data on MSW management in the city. Though it is expected that the implementation of the vision and

action plan of this study (Annex 1) will address that issue, future studies will also contribute immensely in bridging the existing gap.

The influence and contribution of informal recyclers in MSW management have continued to grow over the years as reported in previous studies. This study found that many informal recyclers operate in Aba but their contributions are not recorded or accounted for by the MSW management authorities. The findings from this study also indicate that this group of stakeholders are very vulnerable. Future studies should seek ways of positively influencing the livelihoods of this important stakeholders and making their contributions count.

Effective public education, awareness and sensitisation were identified by most participants as one of the solutions to current MSW management challenges. ASEPA, have reportedly been carrying out exercises aimed at achieving effective public education, awareness and sensitisation but without noticeable success. Future studies could investigate effective steps and measures that will ensure success.

This study identified several investment opportunities that could arise if the necessary policy changes and the opening up of the sector were effected. They include waste treatment, provision of transfer and transport vehicles, sanitary facilities, technology, etc. Future studies could investigate specific potentials and challenges associated with each of the opportunities and the wider implication to the local economy.

This study found spirituality to be a motive or driver for MSW management on the part of many service users in Aba. It will be interesting to find out if this was the case in other cities in Nigeria and other developing countries.

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ANNEX ONE - Vision and Action Plan for Sustainable MSW Management in Aba

Introduction

MSW management is one of the most intractable problems for urban administrations. The efficient management of MSW require considerable “political commitment, sufficient budgetary allocations and a dedicated workforce” (UN-HABITAT 2010b), all of which can be argued to be conspicuously absent in Aba. Having done a detailed expository of the

current realities and challenges of MSW in Aba in the previous chapter, this chapter presents the vision and action plan – a series of prescribed changes or a solution set, based on the principles of ISWM aimed at achieving sustainable MSW management in the city of Aba. While this vision and action plan is not designed to be a one size fits all solution for all MSW management problems, it is reasonable to expect the solution to be effective in cities with similar realities and challenges as Aba. The idea is that the system will be continuously reviewed and set goals and objectives will reflect current realities and challenges.

It is also very important to mention that adequate levels of consultations with all stakeholders will be needed to agree on these proposals before proceeding with implementation. This chapter addresses the second research question – what approaches can be used to remedy the situation and to what extent?

For consistency and to ensure all aspects of MSW management are covered, the vision and action plan will also mimic the 2-overlapping-triangle format used in Chapter 2, proffering solution for both physical and governance issues in MSW management identified in Aba.

Physical

The physical comprises of all elements of MSW management activities from waste generation to disposal.

Waste Generation

For effective planning and implementation of adequately improved levels of MSW management services in the city, it is important to know the quantity of waste generated by the service users. In chapter 5, population was shown to be the most influential factor affecting waste arising in the city. Therefore it is very important to ascertain the population of the city and the number of units of household using the service. That way, it will be possible to deduce the waste generation rate. It will also make it possible to prepare an appropriate budget that effectively costs the service.

To achieve these, the government (or the agency) will need to divide the entire areas for which the services will be provided into small zones that are manageable for easy enumeration. These boundaries must be well noted and maintained as it will also be used

to schedule the MSW collection services. Table 1 below is a summary of the proposal and the expected result.

Table 1 Vision and Action Plan for Waste Generation

Action Plan	Vision
Divide city into zones. Each zone having clear boundaries and of easy to manage size	Acquire and maintain adequate records of income levels, population, and all necessary data for easy comparison between zones in the city and with cities around the world.
Enumerate each zone to ascertain the number of units paying for MSW management services e.g. households, stalls, businesses, etc. Also collate socio-economic parameters such as income levels, age, education, population, etc.	

Waste Separation

Getting the service users to separate their waste into organic and inorganic could possibly be one of the most important steps to quelling the current spate of unwanted smell and pest infestation in the city. Once waste is separated into organic and inorganic at source and collected efficiently, it is much easier to process. While organic waste can easily be biologically treated through composting and anaerobic digestion, inorganic waste that cannot be reused or recycled can be incinerated and energy recovered, or landfilled without detriment to the groundwater table. To a very large extent, it also takes away a lot of the disgust associated with waste management as decaying organic matter which produces the foul smell is kept apart from the inorganic waste. Suffice to say that a lot of public education and sanitary waste equipment will be required to effect this change. Table 2 below is a summary of the proposal and the expected result.

Table 2 Vision and Action Plan for Waste Separation

Action Plan	Vision

<p>Provide clear and effective information on the needs and benefits of source separation of waste. Educate users on colour codes that will be used as well as the schedule for collection of the different streams of waste. Provide clear details of how the process will be implemented and how the different streams of waste will be processed. Where possible, incentivise the scheme to encourage mass participation and compliance.</p>	<p>Reduce the instances of odour nuisance and the associated pest infestation and thus improve public health. Protect the cities groundwater table and reduce emission of greenhouse gasses associated with MSW management. Improve the quality of the MSW management service and environmental control.</p>
<p>Provide colour coded sanitary waste bins for each unit of service users and at all public places including streets, parks, markets, schools, etc. All food waste must be bagged before being deposited in the bin for organic waste.</p>	

Waste Collection, Transfer and Transport

The importance of an efficient collection system can never be overemphasised in MSW management. To a large extent, the failure or success of any MSW management system depends largely on the quality and efficacy of the collection. It is the failure of waste collection that is commonly seen and felt by the public. In order to ensure that the source separated waste from the different categories of service users and all other waste that could arise as a result of dissident behaviour, a good level of ingenuity is required in the collection of waste in Aboja. Once a deep clean of the city has been effected, the collection system proposed will ensure that most of the waste generated in the city end up where they ought to and when they ought to, and not in the streets, surroundings and drainage. It will also eradicate the need for people to burn their waste openly and thus contribute positively to public health and air quality by reducing air pollution and the associated illnesses discussed earlier.

Once collected, the inorganic waste can be separated into different categories such as paper, clothing, non-combustibles e.g. metals, etc. This can help create a hub for the activities of the current informal recyclers, itinerant waste pickers and scavengers and will provide a safer working environment. It will also help strengthen the market for

reusable materials as well as make it easy for the relevant data to be appropriately captured and recorded. Table 3 summarises the vision and action plan for waste collection, transfer and transport.

Table 3 Vision and Action Plan for Waste Collection

Action Plan	Vision
Prepare efficient schedule and agree same with stakeholders for waste collection from all service user groups, zones and public bins as well as for the cleaning of the drainage and public areas in each zone. Where there are franchisees or contractors involved, they must provide and adhere to similar schedules as part of the agreement.	Collect and keep adequate records of quantity and rates of waste generation; costs per user, types of waste, etc. Avoid huge and misplaced investments in high-tech vehicles that are mostly not suitable and ineffective
Ensure waste is collected using appropriate vehicles suitable for local conditions that protect not just the health and safety of waste workers but also the environment. This should also be regulated for each franchisee or contractor. The use of locally fabricated modified skips that can be attached to and driven by motorised carts, tri-cycles, etc. is particularly recommended.	
Once waste is collected from each zone and weighed, calculate waste generation rates; average costs for the service to ascertain how much it costs to provide the service per user and what resources are required to provide services to each zone	
Establish a team for monitoring and enforcement as well as a helpline that anyone can contact for help and information.	

Waste Treatment

Waste separation can be regarded as the first step of waste treatment as it helps achieve environmental protection which is one of the important aims of waste treatment. Once

the separated waste has been collected, it is important to treat each stream of waste accordingly to ensure the least environmental impact. For the organic stream, this study proposes composting as this can readily be achieved without huge investments. Composts or compost-like outputs (CLO) can be applied to farmlands as a soil conditioner, used in landscaping, incinerated for energy recovery or sent to landfill. Anaerobic digestion is also an option but requires huge investments though energy production is also an added benefit. For the inorganic stream, once the reusable and materials to be recycled has been removed, waste to energy (WtE) appears to be the most suitable and beneficial treatment option as electricity supply is epileptic and unreliable in the city. Where the funds are not available for a WtE plant, the residual inorganic waste can be baled and landfilled. Table 4 below is a summary table for the vision and action plan.

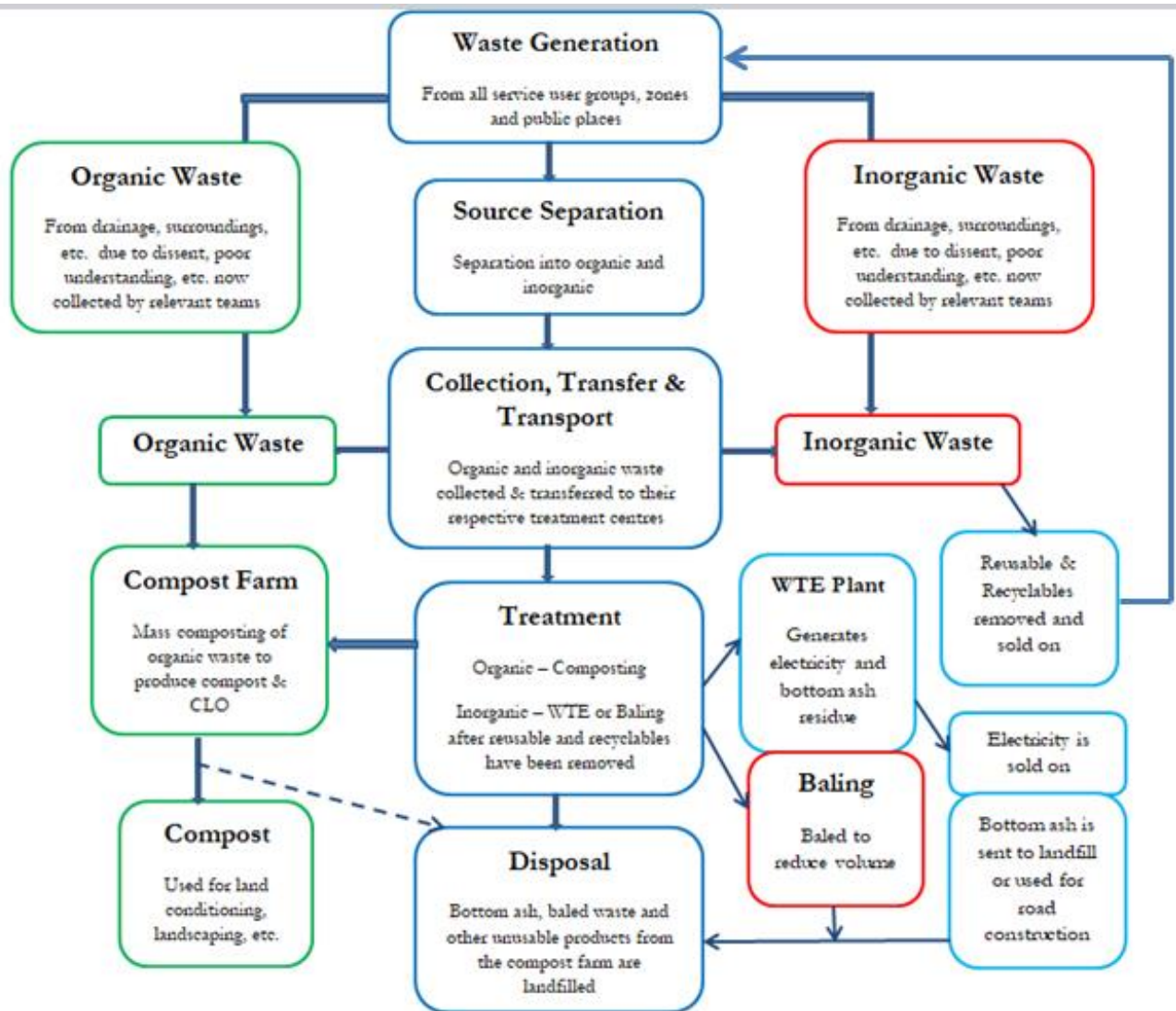
Table 4 Vision and Action Plan for Waste Treatment

Action Plan	Vision
Establish properly planned and sited treatment centres for organic and inorganic waste collected. A compost farm for organic waste and a WTE plant and or baling unit for inorganic waste.	Drastically reduce the harmful environmental impact of waste, open up new economies and create job opportunities

Waste Disposal

No matter the treatment method employed, waste management will always produce residue that has to be disposed. For this reason, a properly planned, sited and engineered sanitary landfill is an essential and desirable component of any ISWM system. Consequently, the construction of a sanitary landfill or landfills to serve the MSW management needs of the city of Aba is essential to achieve the visions proposed herein. Figure 1 below is the influence diagram of the vision and action plan in Aba. It shows the expected flow of MSW following the implementation of the proposal.

Figure 1 Material Flow Diagram of the Vision and Action Plan



[Credit: Researcher]

Governance

The proposals for the governance aspects of MSW management are arranged under the broad headings of Inclusivity, Financial sustainability and Proactive policies and institutions. It is noteworthy to mention that these governance changes are paramount to achieving the desired vision and thus it is recommendable to effect the desired governance changes before or simultaneously with the physical changes proposed above.

Inclusivity

For any meaningful progress to be made in the city in terms of MSW management, the issue of service user and provider inclusivity must be attended to. Currently, the government and its agency, ASEPA, do not have the required capacity to effectively

deliver the desired level of MSW management in the city. It is therefore necessary to involve or partner other providers such as private professionals or waste management cooperatives that can be formed through a union of existing informal waste workers. The right policy frameworks and suitable methods of monitoring and evaluation must also be established. The current secrecy that shrouds most management and financial activities of the agency must be discarded for an open transparent system that not only encourages private participation and public-private partnerships but also enhances accountability and public trust.

The current status quo does not identify the stakeholders and the agency (government) as members or parts of a system that should be working together to achieve a common goal. The agency sees the stakeholders (service users) as waste generators and very difficult people whose only desire is to make their (agency's) work more difficult while the service users see the agency as an oppressive force that collects money and does nothing. In the midst of these views, the real issues of MSW management are lost. Therefore, one of the key steps is to get both parties on the same side and for both to be co-partners in designing, implementing, monitoring and evaluating the process.

To achieve this, the agency needs to have the right leadership and the requisite knowledge to pass to key staff members. Once the message and culture flows through the agency, then they need to communicate the new essence to other would-be service providers and users. A massive, continuous and effective public awareness, sensitisation and education drive will be just as important as a markedly improved level of service that appeals to all users. Table 5 below summarises the vision and action plan for service provider and user inclusivity.

Table 5 Vision and Action Plan for Service Provider and User Inclusivity

Action Plan	Vision
Reposition the agency to understand its significant role in the MSW management. Appoint a new strong, focused and committed leadership based on knowledge and understanding of the demands and challenges. Employ professionals into key positions in the agency and	

<p>ensure all staff are adequately trained and remunerated. An efficient Ministry of Environment must assume oversight functions over the activities of the repositioned agency.</p>	
<p>Encourage and support the establishment of a cohort of private-led, community-based, cooperatives or public-private partnerships to partner with the agency as waste management service providers</p>	
<p>Establish an open transparent tendering process for waste management services contracts where service providers will bid to manage the different zones and or different aspects of the service</p>	<p>Achieve high levels of public awareness and desired behavioural changes.</p>
<p>Embark on effective mass education, sensitisation and awareness campaign combining several methods such as mass media, local systems e.g. town crier; and all other systems available especially those used by politicians during electioneering campaigns.</p>	<p>Get all stakeholders involved and ensure they all understand their roles as interdependent partners.</p>
<p>Involve all stakeholders in the design, implementation, monitoring and evaluation of the MSW management system through consultations, townhall meetings, focus groups, interviews, surveys, etc.</p>	<p>An open tendering or bidding policy will drive competition and ensure service users get optimum value for money.</p>
<p>Provide an equitable level of service that is satisfactory and affordable to service users</p>	<p>A monitoring and evaluation team drawn from different stakeholder groups will ensure contracts are adequately executed and service is delivered.</p>
<p>Establish effective and responsible monitoring and evaluation teams drawn from the different stakeholder groups to ensure equity and contract fulfilments</p>	
<p>Establish a well-trained enforcement team with clear mandates and priorities of encouraging and driving</p>	

behavioural change with punishment of offenders and penalties as last resort.	
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Financial Sustainability

MSW management costs money. The authorities in Aba are very quick to point out this well-known fact. But just how much it really costs is shrouded in top secrecy partly because they do not actually know. The combination of the prevalence of corruption and the absence of key accounting practices, such as cost accounting and budgeting, which could serve as checks and balances leaves more to be desired from a MSW management system. For the system to be sustainable a long term approach to the budgeting is necessary and the full costs of the services as well as the relative costs of the different activities within the MSW management services ought to be ascertained and budgeted. This requirement becomes even more important when other service providers are involved as partners. Without the cost accounting practices, it will be impossible to effectively cost the services and thus determine the true value of the contracts to be awarded to partner service providers.

It is expected that the implementation of the proposals in this action and vision plan will result in increases in the costs of service. Undoubtedly too, there is clear evidence of the willingness of the service users to pay higher fees to ensure a better level of service. It is thus very important to have in place, the necessary cost accounting practices and systems to determine the levels of fees that users will have to pay if all costs are to be recovered or the level of government subsidy to cover any shortfalls. Though not expected, the accounting processes will also show if there were excesses generated and how they will be invested. All of these must be available for public scrutiny. Table 6 below is a summary of the vision and action plan for financial sustainability.

Table 6 Vision and Action Plan for Financial Sustainability

Action Plan	Vision
<p>Implement cost accounting techniques and processes to ensure every aspect of the MSW management activity is properly captured and costed. This may include elucidating costs for separation, collection, transfer and transport, treatment, disposal, etc. for the different zones</p>	<p>Have adequate information on the costs involved in providing the services and how and where the funds come from.</p> <p>Make it possible to forecast and have a long term budget and plan for the MSW management system and thus ensure sustainability of the system.</p> <p>Achieve and maintain an equitable level of service that is satisfactory to the majority or all stakeholders.</p>
<p>Develop a streamlined cost-effective method of collecting service charges from users. With current technologies and evolving payment systems in mind, it is important to minimise the costs of collecting these charges and also avoid unnecessary leakages and loopholes that might be exploited by service users.</p>	
<p>Agree and effect the collection of acceptable levels of service charges that are affordable to the majority of service users. This must be backed up by the provision of the agreed levels of services.</p>	
<p>Over time, use the data to prepare forecasts and budgets for the MSW management system. This will provide a clear focus and plan and ensure the system runs smoothly and sustainably. It will also make it easy to attract investment in the sector as the figures which will be available in the public domain will answer any questions an intending investor may have.</p>	
<p>Continue to monitor and evaluate the systems and adjust and adapt accordingly to reflect emerging scenarios and conditions.</p>	

Proactive Policies and sound institutions

The national environmental sanitation policy contains a few strategies to drive improvements in MSW management but it is open to interpretation and the onus of implementation is left to states and local government councils. Thus, to achieve any desired objectives of the policy document, there is need to have trained professionals who understand the provisions of the document and committed to its implementation at the state and local government levels. A survey of the different cities in Nigeria will suggest that there is either a dearth of these trained professionals at the required levels or they are simply not effective. As stated earlier, public services in Nigeria is in shambles and MSW management is not spared. This study found that a combination of poor policies, lack of adequately trained manpower, neglect, lack of sound institutions and heightened levels of corruption and nepotism are a few factors militating against improvements in MSW management in Nigeria.

Consequently, to reverse this trend, this study recommends the development of a clear and concise MSW management policy that focuses on the local issues and the revitalisation of the institutions that historically played important roles in maintaining good levels of MSW management and environmental protection in the past such as the EHD, Local Government Authorities, Law Enforcements, schools, etc. Others include traditional institutions such as the families, communities and churches. Table 7 below shows details of the vision and action plan for proactive policies and sound institutions.

Table 7 Vision and Action Plan for Proactive Policies and Sound Institutions

Action Plan	Vision
The policy or policies must be clear on waste generation including strategies to minimise it; waste collection including frequency and mode of collection; waste treatment including separation and conversion; as well as acceptable methods of disposal e.g. sanitary landfilling of inert residues. Local policies must outlaw indiscriminate dumping and littering of public and private places. Penalties for dissident behaviour and	Have a clear system where everyone understands their roles and responsibilities

noncompliance must be very clear and properly communicated	and are committed to achieving them for the good of all.
The policy or policies must establish achievable targets for reduction in waste generation, collection coverage, reuse and recycling rates, etc.	Eliminate the current rancour that exists between the different government parastatals involved in MSW management and the disaffection between them and the public.
Establish a clear delineation of duties and responsibilities of agencies and or departments involved in MSW such as ASEPA, EHD, MOE, etc. and encourage synergy between them	Promote public wellbeing and environmental protection as standards of MSW management in the city.
As well as emphasise the roles of institutions such as families, communities, churches, law enforcement, etc. on ensuring all stakeholders fulfil their roles, local advocacy and support groups must be established and encouraged to help especially the less privileged. MSW management should be taught in schools from early years to ensure kids pick up the practice and understand their responsibilities from early stages in life.	
Continuously review the policies in line with achievements and developments to ensure growth and sustainability	

Conclusion

Previous studies have shown that it is unrealistic for a city to move from indiscriminate dumping of refuse to a state of the art model system of MSW management in one great leap. The vision and action plan outlined here does not intend to achieve that either. However, the expectation is that if the changes proposed are implemented, sustained and reviewed and adapted over time, it will gradually and steadily help the city transform its perilous state of MSW management to one where MSW does not pose a threat to lives and the environment.

In practice, this can be implemented by developing a measurable and achievable short (1 to 5 years) and long (10 to 20 years) term goals and objectives. In the short term, the goals and objectives could include staff recruitment and training, human resource development, partitioning of city into waste zones, waste generation and collection rates, collection of relevant social data and development of a management system of such data, development of cooperatives and waste advocacies, public education and enlightenment, policy developments, development of service standards, institutional developments, etc. while in the long term, the goals and objectives could include rate of materials recovery rates, compliance, climate change impacts and carbon footprint of MSW management processes, economic contribution etc.

Clearly, the vision and action plan cannot guarantee the elimination of corruption from the MSW management system or indeed the society. However, in section 4.1, the study reported the importance and usefulness of a strong committed leadership. Consequently, it is important to reemphasise the need for strong and committed leadership of the MSW management agency; employment and use of adequately trained and well remunerated workforce; policy and institutional structural changes e.g. reinstating the oversight functions of a well-staffed MOE; and a clear delineation of duties between parastatals and departments involved in MSW management; so as to reduce the negative impacts of corruption.

The approach of the vision and action plan is the ISWM model. The proposal takes a holistic view of MSW, recognising it as a system of interconnected parts. From waste generation to final disposal, the entire system is influenced by factors such as human, social, economic, technological, environmental, etc. collectively considered as governance issues. Local approaches are an important feature and recommendation of the ISWM framework and success stories such as those from Ghorahi, Nepal (Chapter 2) have proven that local approaches do work. Thus the proposal is not an attempt to mitigate a particular factor but rather a generic plan drawn mainly from stakeholder suggestions, researcher observations and knowledge of the local systems. Table 5.8 below show the different possible solutions suggested by stakeholders.

APPENDICES

Appendix 1 - Four Quantitative Indicators for the Physical Components of a MSW management system

Physical Component	Indicator name and definition	Low	Low/ Medium	Medium	Medium /High	High
Public Health – Waste Collection	Waste Collection Coverage: % households who have access to a reliable waste collection service	0-49%	50-69%	70-89%	90-98%	99-100%
	Waste captured by the solid waste management and recycling system: % of waste generated that is collected and delivered to an official facility	0-49%	50-69%	70-89%	90-98%	99-100%
Environmental control – disposal	Controlled treatment or disposal: % of the total MSW destined for treatment or disposal which goes to either a state-of-the-art, engineered or 'controlled' treatment/disposal site	0-49%	50-74%	75-84%	85-94%	95-100%
Resource value – '3Rs' – Reduce, reuse, recycle	Recycling rate: % of total MSW generated that is recycled. Includes materials recycling and organics valorisation (composting, animal feed, anaerobic digestion).	0-9%	10-24%	25-44%	45-64%	65% and over

Appendix 2 - Criteria for assessing the quality of waste collection and street cleaning services

Criterion	Description
Appearance of waste collection points	Presence of accumulated waste around collection points/containers
Effectiveness of street cleaning	Presence of litter and of overflowing litter bins
Effectiveness of collection in low income districts	Presence of accumulated waste/illegal dumps/open burning
Efficiency and effectiveness of transport	Appropriate public health and environmental controls of waste transport
Appropriateness of service planning and monitoring	Appropriate service implementation, management and supervision in place
Health and safety of collection workers	Use of appropriate personal protection equipment and supporting procedures

Appendix 3 - Criteria for assessing degree of environmental protection in waste treatment and disposal

Criterion	Description
Degree of control over waste reception and general site management	This criterion should be applied to all treatment and disposal sites, whatever the specific process being used
Degree of control over waste treatment and disposal	The focus here is on the waste treatment or disposal process in use at each site and over any potential emissions. This covers both the presence of the necessary technologies, and the operating procedures for their proper use
Degree of monitoring and verification of environmental controls	Includes the existence and regular implementation of: robust environmental permitting/licensing procedures; regular record keeping, monitoring and verification carried out by the facility itself; AND monitoring, inspection and verification by an independent regulatory body
Efficiency of energy generation and use (used for energy recovery facilities only)	Assesses the energy efficiency of those facilities for which a major purpose is (or could be) energy recovery
Degree of technical competence in the planning, management and operation of treatment and disposal	An assessment of the level of technical competence at three points in the system: (i) the authority responsible for service provision; (ii) the management of the treatment and disposal facilities; and (iii) the frontline operational staff
Occupational health and safety	Use of appropriate personal protection equipment and supporting procedures

**Appendix 4 - Criteria for assessing the quality of provision of the 3Rs –
reduce, reuse and recycle**

Criterion	Description
Source separation of 'dry recyclables'	Assessed on the basis of the proportion of the total quantity of materials collected for recycling that are collected as clean, source separated materials The focus here is on the relative % of clean, source-separated materials that are recycled, as opposed to materials that are sorted out from 'mixed' wastes – where there will inevitably be much higher levels of contamination.
Quality of recycled organic materials	A qualitative assessment of the likely quality of the recycled product (i.e. animal feed, compost, and the organic product (digestate) from anaerobic digestion) – assessment guidance based on both separation at source and quality control
Focus on the top levels of the waste hierarchy	An assessment of the degree of both policy and practical focus on promoting reduction and reuse in 'higher waste generating cities'; and on the '3Rs' – reduction, reuse, recycling – in 'lower waste generating cities'
Integration of community and/or informal recycling sector with the formal SWM system	An assessment of how far and how successfully efforts have been made to include the informal recycling sector (in low and middle-income countries) and the community reuse and recycling sector (in higher income countries) into the formal solid waste management system
Environmental protection in recycling	Environmental impacts of the recycling chain, from collection through to the separation and processing of the separated materials.

Occupational health and safety	Use of appropriate personal protection equipment and supporting procedures
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Appendix 5 - Criteria used to assess the degree of user inclusivity

Criterion	Description
Equity of service provision	Extent to which all citizens (users and potential users) irrespective of income level, receive a good solid waste management (SWM) service- i.e. a service which they can afford, which meets their expressed needs, and which protects public health and environmental quality
The right to be heard	Do authorities have a legal obligation to consult with and involve citizens in decisions that directly affect them?
Level of public involvement	Evidence of public involvement at appropriate stages of the solid waste management decision-making, planning and implementation process
Public feedback mechanisms	Existence and use of public feedback mechanisms on solid waste management services
Public education and awareness	Implementation of comprehensive, culturally appropriate public education, and/or awareness raising programmes – focus here on the level of activity
Effectiveness in achieving behaviour change	Change in habits and behaviours of both the public and businesses regarding their waste management/handling practices – focus here on the effectiveness of education and awareness programmes

Appendix 6 - Criteria for assessing the degree of provider inclusivity

Criterion	Description
Legal framework	Degree to which laws and/or other legal instruments are in place and implemented at national or local level, which enables both the public and private sectors to deliver solid waste management services on a stable basis
Representation of the private sector	Organisations or structures in place which represent the private waste sector and actively participate within solid waste management planning forums, task forces, committees and/or steering-groups
Role of the 'informal' and community sector	Evidence of acknowledgement and recognition of the role of the organised 'informal' and community sectors within the formal solid waste management system
The balance of public vs. private sector interests in delivering services	Degree to which appropriate checks and balances are in place locally, so that waste services are being delivered by either the public or private sector, in a manner that is mutually beneficial and does not substantially disadvantage either party
Bid processes	Degree of openness, transparency and accountability of bid processes

Appendix 7 - Criteria used to assess the degree of financial sustainability

Criterion	Description
Cost accounting	Extent to which the solid waste management accounts reflect accurately the full costs of providing the service and the relative costs of the different activities within solid waste management; and whether the accounts are open to public scrutiny
Coverage of the available budget	Is the annual budget adequate to cover the full costs of providing the service?
Local cost recovery – from households	Percentage of the total number of households both using and paying for primary waste collection services The focus here is on the number of households, NOT on the percentage of the total costs which they pay
Affordability of user charges	Are practices or procedures in place to support charges for those who can least afford to pay?
Pricing of disposal	Degree to which all the wastes coming to the final (treatment or) disposal site(s) are charged at a rate that covers (at least) the operating costs of (treatment or) disposal
Access to capital for investment	Has adequate provision been made for necessary capital investments, both to extend collection coverage to any un-served areas; to upgrade standards of waste disposal; and to replace existing vehicles, equipment and sites at the end of their life?

Appendix 8 - Criteria used in assessing the adequacy of the national framework for MSW management

Criterion	Description
Legislation and regulations	Is there a comprehensive national law(s) in place to address solid waste management requirements? Does the legislation require regulation in order to bring it to force and have these regulations been put in place
Strategy/policy	Is there an approved and recent national strategy for solid waste management; and are there clear policies in place and implemented?
Guidelines and implementation procedures	Are there clear guidelines for local authorities on how to implement the laws and strategy? Are there effective mechanisms in place for facility siting?
National institution responsible for implementing SWM policy	Is there a single institution at the national level which is charged with the responsibility of implementing, or coordinating the implementation of, solid waste management strategy/policy?
Regulatory control / enforcement	Is there a well organised and adequately resourced environmental regulatory agency? Does it enforce the legislation so as to ensure a 'level playing field' for all?
Extended producer responsibility (EPR) or Product Stewardship (PS)	Has engagement been made with national and international companies who produce the packaging, electronic goods and other products that end up as MSW? Do they share at least some of the costs of the solid waste management service and/or recycling?

Appendix 9 - Criteria for assessing the degree of local institutional coherence

Criterion	Description
Organisational structure/ coherence	The degree to which all MSW management responsibilities are concentrated into a single organisation or department, that can be held accountable for performance, or if multiple organisations, the presence of a significant concentration of responsibilities in one named agency
Institutional capacity	An assessment of the organisational strength and capacity of the department(s) responsible for solid waste management
City-wide SWM strategy and plan	Is there a recent strategy or plan in place and being implemented at the city (or regional) level for solid waste management?
Availability and quality of SWM data	Is there a management information system (MIS) in place? Are data regularly measured, collected and monitored?
Management, control and supervision of service delivery	A measure of the strength of control by the city, as 'client' for solid waste management, over the on-the-ground delivery of solid waste management services. The services may actually be delivered by the private or public sector, or a combination of the two.

Inter-municipal (or regional) cooperation	Waste collection is often delivered at a local level, while treatment and disposal may require cooperation city-wide or at a regional level. Regulatory control may be organised at regional or national level. How well does such co-operation work?
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Appendix 10 – Pilot Questionnaire

Survey questionnaire for residents of Aba, Abia State, Nigeria.

Section A – Demographic Information

1. Name (Optional).....
2. Address.....
3. Ward
4. Telephone (optional)
5. Email (optional)
6. Sex Male Female
7. Age 18-24 25-45 >45
8. Level of education None Primary Secondary Vocational/Trade Tertiary
9. Occupation Farming Artisans Trading Civil Service Other Professional Unemployed/student
10. Monthly Income <N18,000 N18000-N100,000 >N100,000
11. Accommodation type Native Tenement(face-me-I-face-you) Private compound Flat Shared compound
12. Household size Single occupant 2-5 occupants 6-8 occupants more than 8 occupants
13. Number of bedrooms 1 2-4 more than 4
14. Source of drinking water private bore hole Public bore hole Sachet water Bottled water Other (specify).....
15. How do you pay for sanitation? Do not pay Per Compound Per Household Per bedroom Per person

Comments:

Section B – Drivers of MSW Management

1. Do you separate your waste? Never heard of it No Sometimes Always
2. Is there a standard waste collection service in your area? No Yes

3. How do you dispose your waste? Indiscriminate dumping Taken to dumpsite Open burning Private contractor Government collection Private dumpsite
4. How would you prefer your waste to be collected? Door-to-door Community bring bank Designated dumpsite It doesn't matter
5. How satisfied are you with your waste management service? Very Unsatisfied Unsatisfied Don't know Satisfied Very satisfied
6. What type of container do you use to store your waste before disposing? No bin Open container Closed container Standard bin
7. I will get a standard bin if: It is free I see it to buy Mandated to
8. What is the size of your waste container? None 1-50Litre >50Litre
9. How often do you empty the container Daily Twice a week Weekly Depends (specify).....
10. How much do you know about the following waste management terms
 Reduction Never heard of it Do not know what it means Basic Advanced
 Re-use Never heard of it No idea Basic knowledge Advanced knowledge
 Recycle Never heard of it No idea Basic knowledge Advanced knowledge
 Composting Never heard of it No idea Basic knowledge Advanced knowledge
 Anaerobic Digestion Never heard of it No idea Basic knowledge Advanced knowledge
 Mechanical Biological Treatment (MBT) Never heard of it No idea Basic knowledge Advanced knowledge
11. Which of the following do you currently practice? Separation Reduction Recycling Composting
12. Which of the following will you like to practice? Separation Reduction Recycling Composting
13. Is there a designated (waste) dumpsite near you Yes No I don't know
14. How is the dumpsite managed? Unmanaged I don't know Evacuated Burned Other (specify).....

Comments:

Section C – MSW management Governance

1. Who makes waste management laws in your area? I don't know No law Government Other (specify).....
2. Do you get asked for your opinion Yes No I don't care
3. Will you like to be consulted for your opinion on issues regarding waste management in your area? Yes No May be
4. If you have problems/concerns regarding waste, where do you report it? I don't know I just deal with it Government dedicated officer Other (specify).....
5. When was the last time you received any information regarding waste management Never Can't remember Recently Always

6. How did you receive the information Leaflet Town crier Radio Television Other (specify).....
7. How much do you pay for waste management? Do not pay Covered by sanitation fee <N100 Monthly >N100 monthly
8. Will you pay more for an improved waste management service? Yes No Depends (specify).....

Comments:

Appendix 12 - Information Sheet for Potential Participants

My name is Stanley Nwankpa and I am a Postgraduate student from the School of Arts, Social Sciences and Management at Queen Margaret University in Edinburgh. As part of my PhD course, I am undertaking a research project for my Doctor of Philosophy thesis. The title of my project is: A post-normal science approach to understanding the real issues, challenges and contexts of municipal solid waste (MSW) management in developing countries – A case study of Aba-urban in Abia State, Nigeria.

This study will investigate the realities and challenges of waste management in Aba and articulate a vision and action plan towards an integrated sustainable waste management system in the city.

This research is self-funded.

I am looking for volunteers to participate in the project. There are no criteria (e.g. gender, age, or health) for being included or excluded – everyone is welcome to take part.

The researcher is not aware of any risks associated with this project. You will be free to withdraw from the study at any stage and you would not have to give a reason.

If you are interested in participating in the focus group discussions, details of the venue and time will be made available to you. Light refreshments will be provided and you will have the opportunity of exchanging ideas with other participants from various stakeholder groups.

All data will be anonymised as much as possible, but you may be identifiable from audio recordings of your voice or photos taken with your permission. Your name will be replaced with a participant number, and it will not be possible for you to be identified in any reporting of the data gathered.

The results may be published in a journal or presented at a conference. It may also be used by government in decision making regarding future waste management policies.

If you would like to contact an independent person, who knows about this project but is not involved in it, you are welcome to contact Prof Emeka Oguzie. His contact details are given below.

If you have read and understood this information sheet, any questions you had have been answered, and you would like to be a participant in the study, please now see the consent form.

Contact details of the researcher:

Name of researcher: Stanley Nwankpa

Address: PhD Research Student, Sociology

School of Arts, Social Sciences and Management

Queen Margaret University, Edinburgh

Queen Margaret University Drive

Musselburgh, East Lothian

EH21 6UU

Email / Telephone: SNwankpa@qmu.ac.uk / 0131 474 0000

Contact details of the independent adviser

Name of adviser: Prof Emeka Oguzie

Address: Dean, School of Environmental Sciences

Federal University of Technology, Owerri

P.M.B 1526

Owerri, Imo State

Email / Telephone: emekaoguzie@gmail.com / 08037026581

Appendix 13 - Consent form for Participants



Queen Margaret University
EDINBURGH

Consent Form

“A post-normal science approach to understanding the real issues, challenges and contexts of municipal solid waste (MSW) management in developing countries – A case study of Aba-urban in Abia State, Nigeria”

I have read and understood the information sheet and this consent form. I have had an opportunity to ask questions about my participation.

I understand that I am under no obligation to take part in this study.

I understand that I have the right to withdraw from this study at any stage without giving any reason.

I agree to participate in this study.

Name of participant: _____

Signature of participant: _____

Signature of researcher: _____

Date: _____

Contact details of the researcher

Name of researcher: Stanley Nwankpa

Address: PhD Research Student, Sociology
School of Arts, Social Sciences and Management
Queen Margaret University, Edinburgh
Queen Margaret University Drive
Musselburgh
East Lothian EH21 6UU

Email / Telephone: SNwankpa@qmu.ac.uk / 0131 474 0000

**Appendix 14 - An example Transcription of a Short Interview
(Pseudonymised)
(LEPI 2)**

FORMAL DISCLOSURE

Researcher: In your own words sir, what is your perception of waste management in Aba?

Interviewee: The fact is that the town planning authority is not in any way involved with municipal solid waste management in Aba.

All information should be gotten from ASEPA.

(The interviewee declined speaking on the matter and asked the researcher to leave)

CLOSING REMARKS

**Appendix 15 - An example Transcription of Average Length Interview
(Pseudonymised)
(GePH 9)**

FORMAL DISCLOSURE

Interviewee: In the western world, experts are appointed irrespective of political opinion. That's the first step to succeeding.

Researcher: How long have you lived in Milverton, Aba?

Interviewee: More than 20 years

Researcher: In that time how has waste management changed? Has it gotten better or gotten worse?

Interviewee: It has gotten much worse. There was a time Milverton was being swept by road cleaners. Now from year to year, nothing. 5 years, nothing.

Researcher: Are there any obvious reasons why it is like that?

Interviewee: It is like that because this present democracy that is almost 20 years has no program, no positive and practical program. They may claim to have ASEPA and what have you, but they are all empty claims that can be likened to building a house without foundation.

Researcher: As residents here, do you pay sanitation fee?

Interviewee: We pay many things, many fees including sanitation

Researcher: How much do you pay?

Interviewee: there was a time it was about #120 every month but now we are not even sure because even after paying it they will still come again. There is multiple extortionate levies and there are no services rendered.

Researcher: You just went ahead of me there – you said no services rendered

Interviewee: Yes, no services rendered. They just use law enforcement agencies like police, bakkasi, army, etc to intimidate you.

Researcher: In terms of waste management, what do you understand as a person as your responsibility? What do you think you should be doing to manage your waste?

Interviewee: We should be hygiene conscious. We should not be littering waste here and there. The truth though is that the government has no program. For instance, during Mbakwe (governor between 79/83?), there was a program called “Keep Imo beautiful a beautiful society” which was positively pursued. This road and other roads alike were swept regularly. (Explains with a scenario how the poor leadership of government ensures the people care less too). The government is only after money, they don’t care. Other states are doing much better in terms of waste management.

Researcher: Do you think that with some evidence of service from the agency and with some manpower to enforce cleanliness and adequate sanitation, the situation will change?

Interviewee: Yes, it will change. If there is sincerity of purpose but the government has not started. They are only claiming. In reality, there is no program on ground. Government intentions must be genuine. For e.g. during the Buhari/Idiagbon regime, they had the WAIC (War Against Indiscipline & Corruption) program which they pursued religiously. People were even scared of throwing rubbish anyhow because they knew they’ll be brought to book.

Researcher: You mentioned hygiene. I take it that you have knowledge about the implications of indiscriminate dumping of refuse. Obviously, we can perceive the odour nuisance. Are you aware of other related health hazards?

Interviewee: I’m not a medical doctor but I know that the susceptibility to sickness we have now is not the same as before when we were children, when everywhere was very clean. I know when EHOs (Environmental Health Officers) were going around fumigating our surroundings. People were rarely sick then. Now sickness and death are so common. These are related to the air we breathe and the environment we live in.

(Researcher provides information about the different drivers of waste management, health implications of poor waste management).

Researcher: In this area, do people burn their waste openly?

Interviewee: Yes, they burn it every day. People burn toilet wastes, waterproofs, etc and for me it causes me instant catarrh which will linger for a very long time.

(Researcher provides further information on health implications of open waste burning)

Interviewee: I believe what you're saying because the rate at which people get sick, even the rate of cancer as if it is rainfall. Our dirty environment is causing a lot more than we realise.

Researcher: I believe that you've shown a good level of understanding and thus will benefit from having the necessary facilities for a better waste management. Do you think others or majority of the people here have the same information or will benefit from having such?

Interviewee: They don't. People are ignorant of the health implications and hazards. We need some enlightenment by the experts, but nothing is being done. It will help greatly.

Researcher: So going forward, what would you like to see?

Interviewee: We need the facilities as we had during Mbakwe's time. Dust bins placed at strategic locations so people can use instead of throwing things indiscriminately.

Enforcement is important too. People don't care these days because no one is there to enforce anything

Like the bible says, we need the renewal of our minds. Everybody should repent. Starting from the government, they should have some real programs that should be pursued vigorously. Desist from appointing political cronies and use experts to do the job.

CLOSING REMARKS

**Appendix 16 - An example Transcription of a Long Interview
(Pseudonymised)
(TGGO 2)**

(FORMAL DISCLOSURE)

We began with a strong resistance to grant interview as interviewee insists on a questionnaire type data collection. The researcher reiterates the need for the adopted methodology and the objectives of the research. A lot of phone calls ensued between the interviewee and his superior officer, and later, the interviewee agreed to proceed.

Researcher: I have been informed that ASEPA Aba Area is in charge of managing waste in Aba. Is that right?

Interviewee: Yes, that is correct.

Researcher: Could you in your own words tell me the process of how ASEPA manages the waste in Aba?

Interviewee: ASEPA Aba zone comprises the 9 local governments from Isiala Ngwa to Ukwu West and East. Aba metropolis is a flash point and thus there is concentration on the city.

ASEPA collects and evacuates waste to the dumpsite.

No waste recycling at the moment but all arrangements are in the pipeline.

Researcher: At the moment, do you collect the waste from the households?

Interviewee: That is the ideal thing but pending the convenience of such collection, we have created secondary collection points (skips/receptacles) that are convenient, where residents are required to take their waste in bags, and from which we evacuate to final dumpsite.

Researcher: Do you provide the waste bags or they can use any bag?

Interviewee: We provide the bags and they buy

Researcher: How much does it cost?

Interviewee: A unit price of #50 each

Researcher: Is there any form of treatment of the waste?

Interviewee: We seldom fumigate the secondary and final dumpsites. No other form of treatment.

(Researcher provides information on methods of waste preparation such as sorting, compaction and baling and treatment such as incineration, composting, digestion, etc. etc.)

Researcher: Do you do any of that?

Interviewee: No but all arrangements have been concluded to have waste sorted at the point of generation.

Researcher: When is that to start sir?

Interviewee: Well, any moment government is ready.

Researcher: So there will be facilities provided to support that because the current system cannot support that?

Interviewee: Yes, we'll provide different colours of bags - for degradable, non-degradable, metals, etc. etc.

Researcher: I suppose there will be an educational campaign to enlighten the people and highlight the benefits of such practice?

Interviewee: As I speak, the sensitisation and education is ongoing via our education department.

Researcher: Okay. In terms of the waste itself, how much waste is generated in Aba say daily, monthly or annually?

Interviewee: I am very sure Aba generates well over a thousand metric tonnes of waste daily.

Researcher: 1000 metric tonnes (1 million kg) a day? Is there a method used to reach this data?

Interviewee: Each of our buckets (the secondary collection point) is 30 tonnes and we evacuate 30 to 35 buckets daily

(Researcher expresses reluctance to accept this method of averaging as a reliable form of data as papers and polythene bags will not weigh the same as organic materials)

Researcher: Out of this, what quantity will you say is the percentage composition of the biodegradable by weight?

Interviewee: 60 – 70%

Researcher: That is within the widely reported composition of organic matter in MSW in developing countries. As an agency, have you undertaken any waste audit, study or report to find out the variations with season or population? It is important to keep track

Interviewee: We have not carried out any such study. There is no official data for daily collection either, at the moment.

Researcher: I understand there are 3 ASEPA zones – Aba & environs, Umuahia & environs, and Abia North. Is that right?

Interviewee: No. There are only 2 zones – Aba & environs and Umuahia & environs.

[A few days after this interview, the state government created a new zone out of the Aba & environs called Osioma & environs with a new director in-charge].

Researcher: Who do the 2 zones report to?

Interviewee: Directly to the governor by law.

Researcher: In essence, the office of the governor is responsible for managing waste in the state

Interviewee: That is what it means

Researcher: In ASEPA Aba zone. The DGM is in charge. Who are the other key officers that help him run the agency? What is the structure like?

Interviewee: We have the chief of staff, the HOD Admin and the Director of Finance (3 key officers directly under the DGM). Then we have other unit heads such as the Director of Operations and HOD Education.

Researcher: When it comes to designing the system, who does what? Does the DGN decide how he wants the system to run or is it all of these heads coming together?

Interviewee: There should be a management meeting that comprises the DGM and all these heads I already mentioned.

Researcher: Do you need clarification from the governor before proceeding?

Interviewee: No, there is a board between the agency and the governor.

Researcher: Ok, the ASEP (Abia State Environmental Protection) Board? Do ASEPA need clarification from that board?

Interviewee: Once the programs are sorted out with the board, the board reports back to the governor. The board meets periodically. It is when we need funds that the DGM reports straight to the governor for approval.

Researcher: Okay. Now that you have mentioned funds, what is the budget like? I know it must cost a lot of money

Interviewee: I may not be competent to speak on that

Researcher: Ok. When these decisions are taken, are the other stakeholders consulted for inputs towards may be developing the process or the running of it?

Interviewee: Naturally, it is difficult to consult the waste generators. You take decisions, design the system and communicate the decisions to them. It is the business of the agency to design waste management strategy and tell them the strategy so designed.

If any of them has anything to add, they can come forward with such.

Researcher: A little question before we talk more on that. Do you sometimes get dissident behaviours or people resisting the process?

Interviewee: It is frequent particularly in our society here. A typical Aba man is dissident in nature.

(Researcher reiterates the reasons for adopting the chosen approach which includes sharing relevant information and results from various other previous researches)

(The interviewee found it laughable when it was explained to him that all stakeholders should be consulted in designing and running a waste management system)

Researcher: Does your field staff receive some training?

Interviewee: Yes. We have different cadre and categories of training and they all receive proper trainings.

Researcher: What kinds of training? Internal or external?

Interviewee: They only receive on-the-job- training. The agency has not engaged any professional trainers.

Researcher: I think I missed one little thing. In terms of the buckets, how many receptacle points are there in the city and how are they worked out as per where they should be?

Interviewee: We drop the buckets at 'vulnerable' places i.e. where experience has shown that waste generation is high. I am not competent to say how many points there are in total. The director of operations can provide that information.

Researcher: You mentioned the education department. In a nutshell what are their roles?

Interviewee: They educate and sensitise the public on the need to manage their waste properly, on the need to have a clean environment and the ways of doing so.

Last year, they embarked on school programs to educate school kids and to catch them young. They also did the same in markets, to reach the traders and to teach them also.

Researcher: The entire system is all about bringing your waste and we will take it away to the dump. What does the education programs teach?

Interviewee: They tell people how to use their bags and to take their rubbish bags to the designated points during the approved times.

Researcher: Okay. So it's not about the waste hierarchy, the need to minimise, reuse, recycle, energy recovery and those kinds of stuff?

Interviewee: No. we have not gotten to that but we are aware that such things are in existence

Researcher: From the description, it sounds a lot like what the environmental health department are required to do as well. Do you work in tandem or synergy with the department?

Interviewee: No, no. Theirs is a different thing all together. Our education department go to schools to teach people so that when they go home it becomes easier and they can tell their parents what they were taught in the school.

Researcher: So you don't work together then. I have seen the national policy on sanitation and the practice guide for EHOs

Interviewee: [cuts in].... Originally, ASEPA used to be under the ministry of environment until it was separated and put under the office of the governor. We no longer report to the ministry of environment.

Researcher: It seems there's a duplication of duty then

Interviewee: Yes, it's the same law we both operate

Researcher: Is there no conflict between the two units?

Interviewee: Well, conflicts to the extent that we both can abate the same nuisance. We are not looking at the conflicts for now because the law, to a great extent, defines roles for every one of us.

Researcher: We have talked about training. What about welfare, job security and protective equipment? I have observed that some of them work without PPEs.

Interviewee: Unless they don't want to use their PPEs we always give them PPEs. There is job security.

Researcher: Are they pensionable jobs?

Interviewee: There are 2 categories of staff – permanent and adhoc. The permanent staffs are pensionable but the adhoc are not yet. We are still seeking confirmation from the state government to make them permanent.

Researcher: What is the mix like? What percentage is permanent and adhoc?

Interviewee: 20% permanent, 80% adhoc.

Researcher: Do you get the same mix of staff categories across board or are adhoc staff mainly junior cadre staffs?

Interviewee: No, all levels.

Researcher: I guess they don't earn the same

Interviewee: They may not earn the same, they may earn the same.

Researcher: Does the adhoc staff you mentioned include the road sweepers?

Interviewee: Yes.

Researcher: Is there a contract stipulating the length of employment the adhoc staff?

Interviewee: They have appointment letters that details that.

Researcher: You mentioned so many things are in the pipeline. What will you say is the biggest challenge for the agency?

Interviewee: The biggest challenge is that of funding. We hardly have enough equipment to carry out the job effectively.

Researcher: What do mean by equipment? Is it manpower or buckets, trucks?

Interviewee: All of that and compactors, bulldozers, pay loaders. We make use of all these.

Researcher: If residents bring their waste to the designated points (buckets), what do you need bulldozers and compactors for?

Interviewee: You may not appreciate all that is involved. If the waste is bagged, it is easier to throw it straight into the compactor for compaction and onward disposal at the dumpsite. Also, you will notice that people dump refuse indiscriminately in the city, the compactor will go round and mop it up.

Researcher: Is it because the skip is far from the people or they don't have the right orientation?

Interviewee: They may have the right orientation but the indiscipline in them or laziness will make them not appreciate the short trek to the skip.

Researcher: I appreciate what you are saying and I agree there are dissident behaviours everywhere. But let me give you an instance, there is only one bucket at Union Bank junction serving the whole of that area up to Umuchichi and Okpu Umuobo. Is that not too large an area for one bucket to serve?

Interviewee: I appreciate it is. There are plans to roll out more buckets

Researcher: Okay. Has the agency considered running a street collection service? There is positive feedback that when that was in operation, it worked better.

Interviewee: It is also in the pipeline. Arrangements have been concluded; we will soon remove the buckets and run a street service.

*** [This response is not in agreement with the earlier statement about rolling out more buckets] ***

Researcher: Moving forward, what is the goal of the agency? What does the agency hope to achieve in the next 12 – 18 months?

Interviewee: What else except to give the city a good waste management service. Until we can recycle waste, we have not arrived yet.

Researcher: So the ultimate goal is to start recycling waste?

Interviewee: Yes, granted that waste collection and evacuation processes have been perfected. We are looking at the proposals for recycling.

(Researcher provides information on the waste hierarchy. Recycling is down there in the middle on the waste hierarchy. There is waste minimisation and reuse above it and with less perceived environmental impact. I'd love to see more emphasis on waste avoidance/minimisation and reuse)

Researcher: How do you think the recycling will work?

Interviewee: The recycling plant will be established very close to the dumpsite, it is simple. There will be workers there who will sort and the items for recycling will be taken to the factory for recycling and the perishable materials used for organic fertilizer manufacturing.

Researcher: I think there is a misconception. I do not know of any recycling plant that recycles everything, you can either recycle plastics, glass, metals, etc.

Interviewee: That is the essence of the sorting.

Researcher: That sorting cannot happen from the dump because comingled waste will be contaminated. You cannot recycle paper that has been contaminated with grease for instance. The sorting has to happen at the point of generation

Interviewee: Yes but where it cannot be sorted there, the plan is to sort it at the dump

(We have a lengthy discussion over this issue and I explained that a recycling company cannot mine waste from the dumpsite. I also explained that recycling is always subsidised but for obvious reasons. I highlighted the benefits – divert waste from landfill, job creation, resource management, etc. etc.)

Researcher: Does the agency use contractors for some of their jobs?

Interviewee: Yes, why not

Researcher: Any chance I could reach some of these contactors?

Interviewee: depending on the categories of contractors

Researcher: What categories of contractors are there?

Interviewee: We have house to house contractors who collect revenue and supervise house to house collection of waste

Researcher: But you said there are plans to begin street services and the like

Interviewee It is, but the use of contractors to use the street service will soon take off.

Researcher: So how does this house to house collection work?

Interviewee: They use tippers and the residents throw their waste in as the tipper goes through the streets.

Researcher: So they are private contractors?

Interviewee: No, government does not want us to call them contractors so we call them adhoc staff.

Researcher: So In essence there are no contractors?

Interviewee Well, yes. There are 27 zones with each person manning a zone. We have contractors as dump managers for our 2 functional dumpsites. There are others we hire equipment from.

Researcher: Do you hire only equipment or equipment and staff that operate it?

Interviewee: Their staffs operate the equipment.

Researcher: Are the revenue collections outsourced or they collect it in-house for the agency?

Interviewee: It's either way. We can agree a lump sum for the revenue collectors and they go to the field to recoup or we can agree for the revenue collector to go to the field and collect levies and remit to the agency.

Researcher: So who monitors the process?

Interviewee The agency does that.

Researcher: How does the agency know or is assured that all monies collected have been remitted?

Interviewee: It's difficult but we check the teller they use for payment

Researcher: What is the shortfall like when you compare what is collected by the various revenue collectors and remitted to the agency and what it costs the agency to carry out their duties?

Interviewee: It is very huge. The margin is huge because most people tend to dodge the payment.

Researcher: So many people I have interviewed have this mentality that they pay ASEPA but no service is provided. How do you convince these people that the agency is actually working?

Interviewee: That is their mentality. They take the waste to the secondary points and they don't see it anymore. It should be common sense to know that the agency is servicing those secondary points.

Researcher: But when you walk round the city, so many streets and gutters are filled with refuse and there is unbearable odour nuisance in some of these places. For people living in these places, nothing is being done and they don't see why they should pay. How do you convince such people that the agency is working?

Interviewee: Nothing really except by sensitising them. Let me tell you, even if you go house to house and evacuate waste from residents, the typical Aba man will refuse to pay except quite a few that will volunteer to pay.

Researcher: One last question sir. From the feedback received, over 90% of those interviewed say they are willing to pay a higher fee for a better service.

Interviewee: I agree with that

Researcher: Is that a challenge to the agency to provide a better service?

Interviewee: I won't call it a challenge because the agency is well position to provide efficient services to these people.

Researcher: But that has not happened yet

Interviewee: How else? We are doing a great job. We are providing the services; only that you might say we do not cover all the nooks and crannies of the city

Researcher: So that's a problem

Interviewee: It is but not a major problem

Researcher: It is

Interviewee: How is it?

Researcher: I've been to several other cities around here – PH, Uyo, Owerri, Calabar and IK. And if you compare Aba to these places, the difference is clear in terms of cleanliness.

Interviewee: If you know what Aba used to be, you will not be saying that.

Researcher: Actually, most people I have spoken to say it was better when the present governor was the DGM of ASEPA

Interviewee: I don't believe that. I served in this same position under then DGM who is now the governor, we have improved on his achievements.

Researcher: One last word from you sir? What is the message to the service users?

Interviewee: They should cooperate with us – bag their wastes properly, dispose their waste within the stipulated times (5pm to 9pm) and pay their statutory sanitation fees and by so doing, the agency will be encouraged to continue to provide service to them.

CLOSING REMARKS

Appendix 17 - Observation Note

Location – ASEPA Operations (From Ministry of Works through Eziukwu Rd to Asa Rd by Jubilee)

Date: 6th November, 2017

Time: 10:05am; finished 1:15pm

On this occasion, the researcher went out with the ASEPA operations staff to observe their day-to-day operations.

The following was observed:

- Staff loitering and awaiting their allocation to teams/trucks to proceed to secondary receptacles for carting away of the skips (this went on from about 10:05 am to around 11am)
- The entire vicinity of the Ministry of Works complex was dirty and unkempt. There was clear evidence of environmental damage, stagnant discoloured waters and general neglect
- The trucks looked dirty, worn out and the odour emanating from them was unbearable
- None of the staff wore full range of basic PPE (safety boots, overall, hand gloves and nose masks). Just 2 had rain boots (as safety boots), only one staff member had hand gloves, 4 others had no PPE at all.

During carting away of refuse at Asa by Jubilee:

- There was no signage to warn motorists and passers-by that work was going on
- The refuse truck, skips and ASEPA staff were effectively blocking one lane each side of the road thus causing huge traffic jam and nuisance
- Clear evidence of noise, odour and particulate matter nuisance
- All 3 skips at the receptacle point was overflowing with huge heap of refuse dump along the road demarcation
- Staff were using (previously used and unwashed or disinfected) baskets and shovels to scoop and empty refuse into the standby truck
- As the truck was on standby, thick black smoke covered the area, further contributing to poor visibility and air pollution
- On interacting with a supervisor, he informed that PPEs were provided once in a while but some of the staff countered that they have never been given any since they joined
- Once the truck was full, the driver departed with one other worker while the remaining group of staff and the supervisor sat beside the road waiting for their return from the waste dumpsite

- Some of the waiting staff were seen throwing empty water sachets they had just finished drinking from indiscriminately on to the street
- When the researcher approached them and reminded them on the need to lead by showing good example, they countered that the area and city was already dirty
- Once the truck returned, the process of scooping into the basket and emptying into the truck was repeated until the evacuation was complete
- The researcher suggested to the officer in-charge (who had now arrived at the location to check on the progress of work and the researcher's observations) that the team could be better off doing the job of carting refuse at night as it will cause less traffic hazard and less general disturbance to the people. He informed the researcher that they were doing that before and that it worked better but because they do not have sufficient trucks, it was more difficult to accomplish tasks
- It was now 1:15pm and the researcher retired from the location

Appendix 18 - Observation Note

Location – Secondary Receptacle at Union Bank Junction (Aba Owerri Road, Aba)

Date: 7th November, 2017

Time: 5:45pm; finished 9:05pm

The following was observed:

- At all times of the observation, a man (I had been informed during interviews that there was always a bucket minder at the receptacle during the designated times for waste disposal) was standing beside the waste skip
- 15 adults (ages ranging from 18 to 50, 12 female and 3 male) came with their waste in a bucket and emptied it into the ASEPA skip, and left with the buckets
- A lady came with her waste in a bag and emptied the bag into the skip and left with the bag
- Someone came with a bag full of waste and threw the bag into the skip and left
- Some children (numbering about 7) came with their waste in buckets and made their way onto the waste skip to empty their buckets. They left with the buckets
- Another group of kids (numbering about 8 – 10), they climbed onto the skip to empty their waste and were ordered by the bucket minder to jump and mash on the waste, presumably to compress it.
- A man carrying a wheelbarrow full of waste bags came and gradually emptied his bags into the waste skip. Afterwards, he went over the bucket minder and gave him some money and left.
- Someone drove by and flung his waste bag in the direction of the waste skip and sped off
- A man came with his bag full of waste and flung it on the ground. The bucket minder went over and cautioned him and then swept the waste that had fallen on the ground around the skip together and packed same onto the skip
- A man came with a wheelbarrow full of waste bags. After emptying same into the skip, he brought out his broom and swept around the skip and packed the dirt onto the skip. He then went over to the bucket minder, paid him some money and left.
- A lady drove to the skip with her waste bags in the car boot. She emptied them onto the skip and left
- The waste skip was now full and the refuse was falling on the ground uncontrollably
- Suddenly the entire place was deserted
- The time now was 9:05 pm and the researcher retired

Appendix 19 - Observation Note

Location – Near Umungasi Market

Date: 2nd November, 2017

Time: 9am; finished 10.25pm

The following was observed: The focus was on the activities of a vegetable street vendor

- Trader had her stock in a basket on a bicycle
- Buyers separated the leaves from the vegetable stem and dropped the stems on the street
- There were several openings on the drains that posed great risk as people could easily fall inside the gutter through them
- Suddenly a task force appears to confiscate the trader’s goods. The trader and the buyers ran away
- A member of the task force was heard yelling instructions at the trader to stay inside the market and not on the street
- The trader soon returned to gather the refuse from her earlier activities together but she did not pack the refuse away. The refuse remained on the street
- The trader finished selling her vegetables and left without evacuating the refuse she had earlier gathered together

Across the street:

- A road sweeper was causing so much discomfort to passers-by as her sweeping was generating plenty of dust
- There were potholes on the side of the road she was sweeping
- The sweeper was sweeping the sand into the potholes together with the debris
- Some passers-by could be heard shouting abuses on the sweeper and almost everyone had their hand across their nostrils.

Appendix 20 - Ethical Approval form

For Office Use Only

Ref. Number	
Assigned Reviewers	
Recommendation	
Outcome	



Queen Margaret University
EDINBURGH

**APPLICATION FOR ETHICAL APPROVAL
FOR A RESEARCH PROJECT 2011/12**

This is an application form for ethical approval to undertake a piece of research. Ethical approval must be gained for any piece of research to be undertaken by any student or member of staff of QMU. Approval must also be gained by any external researcher who wishes to use Queen Margaret students or staff as participants in their research.

Please note, before any requests for volunteers can be distributed, through the moderator service, or externally, this form **MUST** be submitted (completed, with signatures) to the Secretary to the Research Ethics Panel.

You should read QMU’s chapter on “Research Ethics: Regulations, Procedures, and Guidelines” before completing the form. This is available at:

<http://www.qmu.ac.uk/quality/rs/default.htm>

Hard copies are available from the Secretary to the Research Ethics Panel.

The person who completes this form (the applicant) will normally be the Principal Investigator (in the case of staff research) or the student (in the case of student research). In other cases of collaborative research, e.g. an undergraduate group project, one member should be given responsibility for applying for ethical approval. For class exercises involving research, the module coordinator should complete the application and secure approval.

The completed form should be typed rather than handwritten. Electronic signatures should be used and the form should be submitted electronically wherever possible.

Applicant details

1. Researcher’s name: Stanley Nwankpa
2. Researcher’s contact email address: SNwankpa@qmu.ac.uk
3. Category of researcher (please tick and enter title of programme of study as appropriate):

QMU undergraduate student	
Title of programme:	
QMU postgraduate student – taught degree	
Title of programme:	
QMU postgraduate student – research degree	

QMU staff member – research degree	x
QMU staff member – other research	
Other (please specify)	

4. School: Arts, Social Science and Management
5. Subject Area: Sociology (Sustainability – Waste Management)
6. Name of Supervisor or Director of Studies (if applicable): Dr Eurig Scandrett
7. Names and affiliations of all other researcher who will be working on the project: Dr Claire Seaman, Dr Karina Kielmann

Research details

8. Title of study: A complex adaptive system approach in search of a local integrated sustainable system that works – A case study of municipal solid waste (MSW) management in Aba, Nigeria.
9. Expected start date: July 2015
10. Expected end date: June 2016
11. Details of any financial support for the project from outside QMU: Self-funded
12. Please detail the aims and objectives of this study (max. 400 words)

The main aim of this research is to articulate a vision and action plan towards integrated sustainable waste management in the city of Aba, Abia State, Nigeria. To achieve this, the study will adopt a complex adaptive system approach (AMESH methodology) and will focus on 3 key objectives: To analyse the current realities and challenges of waste collection, disposal and treatment in Aba; To evaluate the history and contexts of waste management from the perspectives of the different stakeholders in the city; and To identify potential areas of conflict between stakeholders’.

Methodology

13. Research procedures to be used: *please tick all that apply.*

	Tick if applicable
Questionnaires (<i>please attach copies of all questionnaires to be used</i>)	
Interviews (<i>please attach summary of topics to be explored</i>)	x

Focus groups (<i>please attach summary of topics to be explored / copies of materials to be used</i>)	x
Experimental / Laboratory techniques (<i>please include full details under question 14</i>)	
Use of email / internet as a means of data collection (<i>please include full details under question 14</i>)	
Use of questionnaires / other materials that are subject to copyright (<i>please include full details under question 14 and confirm that the materials have been / will be purchased for your use</i>)	
Use of biomedical procedures to obtain blood or tissue samples (<i>please include full details under question 14 and include subject area risk assessment forms, where appropriate</i>)	
Other technique / procedure (<i>please include full details under question 14</i>)	

14. Briefly outline the nature of the research and the methods and procedures to be used (max. 400 words).

This research is post-normal science in nature i.e. involves the inclusion of a wide range of stakeholders in the research process and recognises the value of history. Therefore, a wholly qualitative approach has been adopted to ensure the perspectives of these stakeholders are adequately captured and represented in the research process. Though the qualitative methodologies are more time consuming and expensive, the use of unstructured interviews, informal chats and researcher observations ensures that participants are at liberty to express their views and tell their stories which in turn enhances the quality and variety of the data collected. These data will be collated and analysed to create qualitative narratives of the current situations and how the current situation came to be. Issues and influences analyses of the needs, activities and concerns of the stakeholders will be used to identify possible conflict areas between stakeholders. Trade-offs will be debated in focus groups with representatives from the different stakeholder groups.

15. Does your research include the use of people as participants? *Please delete as appropriate.* **Yes**

16. Does your research include the experimental use of live animals? *Please delete as appropriate.* **No**

17. Does your research involve experimenting on plant or animal matter, or inorganic matter? *Please delete as appropriate.* **No**

18. Does your research include the analysis of documents, or of material in non-print media, other than those which are freely available for public access? *Please delete as appropriate.* **Yes**

19. If you answered 'Yes' to question 18, give a description of the material you intend to use. Describe its ownership, your rights of access to it, the permissions required to access it and any ways in which personal identities might be revealed or personal information might be disclosed. Describe any measures you will take to safeguard the anonymity of sources, where this is relevant:

I intend to access and analyse historic waste data collected over the years by the waste management agency of the state (ASEPA). These data do not include any kinds of personal information and are not deemed to be sensitive in any form. However, they are not readily available in the public domain.

20. Will any restriction be placed on the publication of results? *Please delete as appropriate.* **No**

21. If you answered 'Yes' to question 20, give details and provide a reasoned justification for the restrictions. (See Research Ethics Guidelines Section 2, paragraph 7)

This text box will expand as required.

22. Will anyone except the named researchers have access to the data collected? *Please delete as appropriate.* **No**

23. Please give details of how and where data will be stored, and how long it will be retained for before being destroyed. (See Research Ethics Guidelines Section 1, paragraph 2.4.1)

All relevant data will be stored in accordance with QMU recommendations for data storage as stipulated in the Research Ethics Guideline Section 1, paragraph 2.4.2.

24. Please highlight what you see as the most important ethical issues this study raises (eg. adverse physical or psychological reactions; addressing a sensitive topic area; risk of loss of confidentiality; other ethical issue. If you do not think this study raises any ethical issues, please explain why).

I do not think the study raises any ethical issues as it is a non-invasive procedure and there are no sensitive data sought. Participation is voluntary with no harm intended. Participants may benefit from learning as part of the research process and by making their opinions count in the decision making process.

25. If you have identified any ethical issues associated with this study, please explain how the potential benefits of the research outweigh any potential harms (eg. by benefiting participants; by improving research skills; other potential benefit).

This text box will expand as required.

Protection for the Researcher

26. Will the researcher be at risk of sustaining either physical or psychological harm as a result of the research? *Please delete as appropriate.* **No**

27. If you answered ‘Yes’ to question 26, please give details of potential risks and the precautions which will be taken to protect the researcher.

This text box will expand as required.

Research Involving Human Participants

You should only complete this section if you have indicated above that your research will involve human participants.

28. Please indicate the total number of participants you intend to recruit for this study from each participant group:

Participant Group	Please state total number
QMU students	
QMU staff	
Members of the public from outside QMU	
NHS patients	
NHS employees	
Children (under 18 years of age)	
People in custody	
People with communication or learning difficulties	
People with mental health issues	
People engaged in illegal activities (eg. illegal drug use)	
Other (please specify):	All participants in this study will be residents of the city of Aba, Abia State, Nigeria, and or government

	officials with responsibilities in waste management.
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** Please declare in section 32 where the participant group may necessitate the need for standard or enhanced disclosure check*

29. Please state any inclusion or exclusion criteria to be used. (See Research Ethics Guidelines Section 1, paragraph 2.4)

All participants must be resident in Abo or connected to waste management policy making in the state

30. Please give details of how participants will be recruited:

Participation will be promoted by local representatives elected by the community but recruitment will be strictly voluntary.

31. Please describe how informed consent will be obtained from participants. (See Research Ethics Guidelines Section 1, paragraphs 2.1.2 – 2.1.5)

Participants, if necessary, will be required to sign consent form but not until all relevant information as contained on the research information sheet has been provided and sufficiently explained to them.

32. Ethical Principles incorporated into the study (*please tick as applicable*):

	<i>Tick as applicable</i>
Will participants be offered a written explanation of the research?	x
Will participants be offered an oral explanation of the research?	x
Will participants sign a consent form?	x
Will oral consent be obtained from participants?	x
Will participants be offered the opportunity to decline to take part?	x
Will participants be informed that participation is voluntary?	x
Will participants be offered the opportunity to withdraw at any stage without giving a reason?	x
Will independent expert advice be available if required?	x

Will participants be informed that there may be no benefit to them in taking part?	x
Will participants be guaranteed confidentiality?	x
Will participants be guaranteed anonymity?	
Will the participant group necessitate a standard or enhanced disclosure check?	
Will the provisions of the Data Protection Act be met?	x
Has safe data storage been secured?	
Will the researcher(s) be free to publish the findings of the research?	x
If the research involves deception, will an explanation be offered following participation?	
If the research involves questionnaires, will the participants be informed that they may omit items they do not wish to answer?	x
If the research involves interviews, will the participants be informed that they do not have to answer questions, and do not have to give an explanation for this?	x
Will participants be offered any payment or reward, beyond reimbursement of out-of-pocket expenses?	

33. Risk Assessment



Reference:	1
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School / Dept:	Arts, Social Sciences and Management	Location:	Aba, Nigeria	Date	16/02/2015
Assessed by:	Stanley Nwankpa	Job Title:	Researcher	Signature	
Activity / Task:	Interviews, Chats, Observations	Total Number exposed to risk	200	Review Date	

Ref no.	Hazards	People at risk					Likelihood				Severity				Total risk	Existing control measures	Adequate controls?
		Employees and	Members of public/visit	Contractors	Young neone	Mothers: new or	Improbable	Remote	Possible	Probable	No injury	Minor	Major	Fatal			
1.	Trips and Falls	x	x				x				x	x			2	PPE	Yes
2.	Fire	x	x					x			x				1	Fire extinguishers	Yes
3.																	
4.																	
5.																	
Risk value (RV)							1	2	3	4	1	2	3	4	3		

Total risk = Likelihood (RV) x Severity (RV) Total risk of 1 – 4 = 'L', low risk Total risk of 6 – 9 = 'M', medium risk Total risk of 12 – 16 = 'H', high risk



Reference:	2
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Remedial action required

Ref no.	Action required	Target date	Action by:	Date completed
1.	Researcher will carry out a risk assessment for each individual neighbourhoods, and venues used for focus group discussions, townhall meetings, interviews, etc. and where there are significant risks, such neighbourhoods and venues will be avoided.	July 2015	Stanley Nwankpa	16/02/2015
2.				
3.				
4.				
5.				

Declarations

34. Having completed all the relevant items of this form and, if appropriate, having attached the Information Sheet and Consent Form plus any other relevant documentation as indicated below, complete the statement below.

- I have read Queen Margaret University's document on "Research Ethics: Regulations, Procedures, and Guidelines".
- *In my view* this research is:

<i>See Research Ethics Guidelines Section 6</i>	<i>Please tick</i>
Non-invasive	x
Minor invasive using an established procedure at QMU	
Minor invasive using a NEW procedure at QMU	
Major invasive	

- I request Ethical Approval for the research described in this application.

Name *(if you have an electronic signature please include it here)*



_____ Date 16/02/2015

Documents enclosed with application:

Document	Enclosed (please tick)	Not applicable (please tick)
Copy of consent form(s)	x	
Copy of information sheet(s)	x	
Sample questionnaire		x
Example interview questions	x	
Copy of proposed recruitment advert(s)		x
Letters of support from any external organisations involved in the research		
Evidence of disclosure check		x
Subject area risk assessment documentation		
Any other documentation (please detail below)		
Risk Assessment	x	