RELATIONSHIPS BETWEEN RESIDENTS ATTITUDE, LOCAL AUTHORITY GOVERNANCE AND SOLID WASTE COLLECTION AT JIGAWA STATE, NIGERIA

By

MANSUR AMINU

Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in Fulfilment of the Requirements for the Degree of Doctor of Philosophy

June 2023

FPAS 2023 9

Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the degree of Doctor of Philosophy

RELATIONSHIPS BETWEEN RESIDENTS ATTITUDE, LOCAL AUTHORITY GOVERNANCE AND SOLID WASTE COLLECTION AT JIGAWA STATE, NIGERIA

By

MANSUR AMINU

June 2023

Chairman : Professor Latifah binti Abd Manaf, PhD
Faculty : Forestry and Environment

The relationships between residents' attitude, local authority governance and solid waste collection in Jigawa State are related to the wider issue of the failure of governance. Deficiencies in the delivery of solid waste collection services in the region are often symbolic of its form of governance. Poor governance has hampered the solid waste management sector for many years (Ezeah and Roberts 2014). Effective provision of solid waste collection services in an indicator of good urban governance (Nzeadibe and Anyadike 2012), which is far from reality in Jigawa state. In order to achieve viable solid waste management, good governance plays a critical role (Onibokun 1999). Solid waste collection become a major issue of concern for most cities of Jigawa State. Efficient delivery of solid waste collection services remains a distant hope, mainly because local authorities could not provide the services. That is why the community needs to manage their waste, the region has 27 Local Authority areas each with no defined solid waste collection services except one in Dutse (Capital). This study's objective is to evaluate the relationships between residents' attitudes, Local authority governance and solid waste collection in Jigawa state, Nigeria. The quantitative technique was used in data collection; convenient sampling was used to select the respondents from Nine (9) non-service areas selected from three senatorial districts. Multi-stage sampling technique was used to administer the questionnaire to the respondents.The data was analysed using descriptive statistics with frequency and percentage. A Pearson correlation was used to determine the relationships between variables. The outcome of the study revealed that the fundamental problem that emerged was that solid waste was not governed in an integrated manner, and Local authorities failed to meet the growing demand for service delivery. The study concludes that poor governance has encumbered the waste management sector and therefore, fundamental changes are essential if a viable solid waste management system is to be established.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Doktor Falsafah

HUBUNGAN ANTARA SIKAP PENDUDUK, TADBIR URUS PIHAK BERKUASA TEMPATAN DAN KUTIPAN SISA PEPEJAL DI JIGAWA, NIGERIA

Oleh

MANSUR AMINU

Jun 2023

Pengerusi : Profesor Latifah binti Abd Manaf,, PhD
Fakulti : Perhutanan dan Alam Sekitar

Hubungan antara sikap penduduk, Pihak Berkuasa Tempatan, dan kutipan sisa pepejal di Negeri Jigawa berkait rapat dengan isu kegagalan tadbir urus oleh pihak kerajaan. Kekurangan dalam penyampaian perkhidmatan kutipan sisa pepejal di negeri ini sering menjadi simbolik kepada kelemahan sistem tadbir urusnya. Tadbir urus yang lemah telah menyukarkan sektor pengurusan sisa pepejal selama bertahun-tahun (Ezeah dan Roberts 2014). Penyediaan perkhidmatan pengumpulan sisa pepejal yang berkesan adalah petunjuk pentadbiran bandar yang baik (Nzeadibe dan Anyadike 2012), yang jauh daripada realiti di Negeri Jigawa. Untuk mencapai pengurusan sisa pepejal yang berdaya maju, tadbir urus yang baik memainkan peranan yang kritikal (Onibokun 1999). Pengumpulan sisa pepejal menjadi isu utama yang membimbangkan bagi kebanyakan bandar di Negeri Jigawa. Penyampaian perkhidmatan kutipan sisa pepejal yang cekap masih menjadi tumpuan kerana pihak berkuasa tempatan tidak dapat menyediakan perkhidmatan tersebut ke kawasan itu. Oleh itu, masyarakat perlu menguruskan sisa pepejal mereka sendiri, negeri tersebut mempunyai 27 kawasan tanpa perkhidmatan pengumpulan sisa pepejal yang ditakrifkan dibawah Pihak Berkuasa Tempatan masing-masing kecuali hanya satu di Dutse (Ibu negeri). Objektif kajian ini adalah untuk menilai hubungan antara sikap penduduk, tadbir urus pihak berkuasa tempatan dan kutipan sisa pepejal di Negeri Jigawa, Nigeria. Teknik kuantitatif digunakan dalam pengumpulan data; pemilihan secara mudah digunakan untuk memilih responden dari Sembilan (9) kawasan bukan perkhidmatan yang dipilih daripada tiga daerah senatorial. Teknik persampelan pelbagai peringkat digunakan untuk mentadbir soal selidik kepada responden. Data dianalisis menggunakan statistik deskriptif dengan kekerapan dan peratusan. Korelasi Pearson digunakan untuk menentukan hubungan antara pembolehubah. Hasil kajian menunjukkan bahawa masalah utama yang timbul adalah bahawa sisa pepejal tidak diperintah secara bersepadu, dan pihak berkuasa tempatan gagal memenuhi permintaan yang semakin meningkat dalam penyediaan perkhidmatan. Kajian ini menyimpulkan bahawa tadbir urus yang lemah telah membebankan sektor

pengurusan sisa pepejal dan oleh itu, perubahan asas adalah penting jika sistem pengurusan sisa pepejal yang berdaya maju ingin diwujudkan.

ACKNOWLEDGEMENTS

In memory of my late parents for instilling the values in life, prayer and encouragement until their sudden and tragic demise. May their gentle soul rest in perfect peace, amen.

I,m indebted to my supervisor Prof. Dr. Latifah Abd Manaf who tirelessly spare her time to go through the thesis and provide useful advise despite her tight schedule. As a mentor, and expert while working under her effective tutelage not only made the task of my academic career more bearable, but also help to keep in focus my objective and determination to make a firm positive change. I most forever remain indebted. Above all, we pray and ask the lord to comfort and grant his love to you, to give you peace of heart, answer all your prayers and hopes and similarly be with you today.

I,m grateful to the committee members, Dr. Amir Hamzah Sharaai, and Dr. Nazatul Sydia Zainodin who continuously shown understanding of, encouragement, my ambition and goal in life. Both of them; assisted, counsel advice, directed and encourage me. Their efforts are equally worthy.

Finally, to my colleagues who together we have been scouting and canvassing all the times in a bid achieve a specific objective. I remain grateful to you all

This thesis was submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the degree of Doctor of Philosophy. The members of the Supervisory Committee were as follows:

Latifah binti Abd Manaf, PhD
Professor
Faculty of Forestry and Environment
Universiti Putra Malaysia
(Chairman)

Amir Hamzah binti Sharaai, PhD
Senior Lecturer
Faculty of Forestry and Environment
Universiti Putra Malaysia
(Member)

Nazatul Syadia binti Zainordin, PhD
Senior Lecturer
Faculty of Forestry and Environment
Universiti Putra Malaysia
(Member)

ZALILAH MOHD SHARIFF, PhD
Professor and Dean
School of Graduate Studies
Universiti Putra Malaysia

Date: 8 February 2024

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

CHAPTER 1

INTRODUCTION

1.1 Background to the Study

The world has over the years, witnessed a rapid increase in population. The overall population of the world is about 4.028 billion, which significantly increases at the rate of 2.035% annually. This huge increase in population has resulted in economic growth, urbanization and prompt industrialization are no doubt the leading factors that led to the sharp increase in solid waste generation (Khandellwal *et al.,* 2019: Huichan 2016).

The current annual total solid waste production is about 17 billion tons globally. This figure is probably to stretch to 27 billion by 2050, making waste collection a serious problem. Therefore, there is a necessity for an efficient method to increase proficiency in solid waste collection and logistics (Shao *et al.,* 2020). As society has identified the importance of the resources confined within solid waste and technology has facilitated the recovery of such value, a collection system has evolved. Whether collection occurs in diverse systems, officially or informally, the method and rate of the collection are determined by statutory, environmental or economic reasons. For example, the Environmental Act of 1990 indicated that a solid waste collection authority in England must organize the collection of no less than two recyclable materials; either mixed or separated (Stuart 2019). Solid waste collection is a fundamental process in the overall waste management strategy and one of the biggest problems threatening many urban authorities and solid waste managers all over the world (Hanna *et al.,* 2018). Furthermore, regardless of the approach and method of solid waste management employed, the collection system ought to adapt and satisfy the objective of the target waste management processing technique, such as landfilling or resource recovery (Odonkor *et al.,* 2020).

The most common system of solid waste collection is by road from different houses or specific collection points (Hidalgo *et al.,* 2018), vehicles start from the depot and travel along the road to collect waste by visiting all places resulting in a huge amount of financial plan (Hanna *et al.,* 2018). In developing countries, solid waste collection is carried out by manually dropping the waste in bins followed by transportation using vehicles for disposal, while in developed nations, the waste collection system has advanced techniques of collection through many waste flows (Mwanza *et al.,* 2018; Rodriques *et al.,* 2016). Among all the stages of solid waste management, solid waste collection from the generation area to the collection route is a vital issue. If there is no proper collection, then a nuisance may arise in the solid waste production area (Hanna *et al.,* 2018).

The collection is the most significant and exorbitant part due to manual labour strength and the considerable use of trucks in the collection process (Hidalgo *et al.,* 2018). In some municipalities of developed countries, approximately 46-85% of the overall solid waste management expenditure is used for collection and transportation (Vu *et al.,*

2018). For example, in Sweden, collection lies between 50-75% of the total solid waste management cost. Meanwhile, in developing countries, for example, India 70-85% of the total expenditure is spent on waste collection (Yadav and Karmakar 2020). Many urban authorities in developing nations are faced with serious resource limitations and thus services are not provided (Rai *et al.*, 2019). For example, solid waste collection in Liberia is only concentrated in urban areas, particularly the capital Monrovia (Almazan *et al.*, 2019). However, in Nigeria, inadequate solid waste collection systems encourage the public to develop a waste-littering habit, which poses a serious risk to the environment. In Ilorin, Kwara State (Nigeria) for example, only 43% of the collection facilities were provided, showing that the solid waste collection system lacks sufficient equipment and thereby necessitated insufficient collection (Ibinkunle 2019).

Globally, solid waste collection is employed mainly for maintaining the environment and human health to recover materials to be re-used, recycled or recovered (Rodriques *et al.*, 2016). The success of solid waste collection, the efficiency of other related services, for example, street cleaning and the justification of huge costs assumed by an authority depend on the level of services provided to customers as well as the public attitude towards waste collection (Calabro and Komilis 2019).

The condition of solid waste collection workers in many African countries revealed that most of the workers survive in precarious situations since they are vulnerable to infection arising from these activities. Previous studies from Egypt, Ghana, Cameroon, Ethiopia, Nigeria, Zimbabwe and South Africa suggested the use of special defensive equipment to control work-related exposure; Nigeria also suggested compliance with safety regulations to regulate musculoskeletal respiratory, digestive and nervous problems. However, studies in South Africa suggested education and awareness campaigns among waste collectors on the necessity for using protective apparatus and cleanliness (Emmatty and Panicker 2019).

A viable environmental management requires a governance system in which policy, institutional and legal requirements of environmental management are regarded as the joint responsibility of not only the shareholders but also of numerous stakeholders (Ogunkai 2022). In developing countries, solid waste is the main public health and environmental concern, in Africa for example, in Kenya the situation is particularly severe, especially in big metropolis. The public sector is unable to provide waste service efficiently, regulation of the private sector is limited and therefore illegal dumping of industrial and household waste is very common. However, the provision of waste management services has remained a challenge to waste management agencies to play their role. Small and medium enterprises account for a large share of environmental problems particularly concerning waste management (Mungai *et al.*, 2020).

South Africa, one of the emerging economies, faces massive environmental challenges one of which is the handling and disposal of waste. Presently, the country is grappling with serious waste problems in terms of generation and management strategies and this is probably to increase at an alarming rate shortly (Andeobu *et al.*,2021). In most developing economies, solid waste policies were designed to deal with environmental problems but failed to integrate health and economic perspectives. Companies take this

guideline as costly and in turn view waste as a problem and not a recyclable resource (Mungai *et al.,* 2020).

In Nigeria, over the years, environmental management has remained consistently bad and the problem proved very difficult to solve regardless of all the efforts of various arms of government. Consequently, the environment continues to decline while environment-associated diseases exacerbate poverty (Ayorinde *et al*., 2015). The country, which accounts for the highest population in the continent, with a large concentration of people vulnerable to many environmental hazards and thus, calling for more support and consideration of the rising ecological issues in Nigeria (Moses *et al.,*2019).

Efficient waste management in Nigeria is required to achieving better environmental management. Currently, the waste management system in the country is very poor. The agencies charged with the responsibility of waste management only collect and transport the comingled waste to open dumpsites. Therefore, there is a need for a change of direction in waste management. Improvement in green technologies, methodologies, and models is required in order to speed up the implementation of a reformative economic application, for example, waste-to-wealth and waste-to-energy (Chinenye and Uzoma 2023). The Nigerian government is yet to regard environmental management as the main concern in national development. It started with an enabling legislation and standards. Environmental organizations were established but with inadequate operating resources (Ayorinde *et al.,*2015).

Solid waste collection in Jigawa is not a developed practice. Overall, the waste management system is very poor making the region vulnerable to the challenges of solid waste and without any efforts to improve the system. However, the area will not record any improvement if the situation continues at its current face. The government should recognize the role of the residents and non-residents in waste management but left largely to operate in its existing form without special care and control. Therefore, effective management is very important to the residents, non-residents and the entire community; this will guard against the spread of diseases resulting from solid waste-related problems and improve the urban environmental quality.

The study contributes to the existing literature by providing empirical evidence from Jigawa state, a region with no waste collection services over the past decades. It offered an in-depth knowledge to the repository of literature on the relationships between residents' attitudes, local authority governance and solid waste collection in the context of Jigawa State, which is scarce in the literature. While there is an increasing volume of solid waste studies,very little is known about the Jigawa State context. Similarly, in highlighting areas of practical inadequacies and remedies, local authority can implement in ensuring the thorny issue surrounding local authority governance and solid waste collection are squarely addressed.

1.2 Problem Statement

Relationships between residents' attitudes, Local authority governance and solid waste collection is an issue of concern in Jigawa state. The status of solid waste management worsened by the absence of waste collection services is a representative of its form of governance. Poor waste governance is manifested in terms of deficiency in service delivery and lack of transparency in the region, provision of solid waste collection services is habitually ineffective and non-transparent (Bjerkli 2013). This has reached an alarming rate over the dismal failure of the local authority to provide waste collection service. Low-income residential areas are the worst affected by the absence and irregular solid waste collection services (Rodney and Sydney 2012; Senekane *et al.,* 2021; Cetrulo *et al.,* 2018). Low collection rates and inefficient collection services are very common, poor governance is the bane of the aforementioned problems.

Residents are the inhabitants of the region, while non-residents are the immigrants who came from different neighbouring towns in their struggle for survival. It has become necessary to acquire information from the residents to support the study because they are the ones considerably affected by the absence of solid waste collection services. On the other hand, the non-residents are responsible for waste collection activities in the region. It has remained a recurrent problem for the local authority to provide the service to the community due to poor funding, distance limitation, inadequate and qualified waste workers, inadequate vehicles and lack of effective working tools. Rectifying this requires a change in attitude regarding local authority governance and solid waste.

Over the past decades, the absence of solid waste collection services has been a growing problem in the area and the non-service areas are the worst affected by the poor solid waste collection services causing significant problems to the dwellings, with uncollected piles of waste and the prevalent of open dumpsites pollute atmospheric air, land and soil. The open dumpsites served as a habitat to many vectors of diseases and high concentrations of leachate contaminate drinking water sources. This consequently led to the spread of diseases such as myiasis, diarrhoea, cholera, typhoid fever, and mosquito-borne diseases for example, malaria and dengue among others (Adogu *et al*.,2015; Naibi and Umar 2017), resulting in health and environmental problems.

The local authorities at the time of the study were aware of the absence of waste collection and its aftermath, but no meaningful measure was taken to arrest the situation. The community tabled these grievances to the local authority several times, but unfortunately, could not tackle the problem. That is why the community need to manage their waste using non-residents. The region has 27 local authority areas, each with no define waste collection system, except one in a Dutse area, where the Environmental Protection Agency (JISEPA) is solely and legally responsible for solid waste management in Jigawa State. The rest of the local authorities are without collection services. Collection service is lacking, frustrated and habitually abandoned with the full capacity of (JISEPA) and unable to deliver satisfactory service to the areas. This led to the evolution and integration of non-residents in waste collection activities; all these are associated with the failure of the local authority to see waste as a serious problem in urban governance.

The region is at risk of uncontrolled waste disposal due to the lack of waste collection services, which consequently resulted in blocking drainage channels and eventually flooding. The absence of solid waste collection services was attributed to poor local authority governance, and the outcome of inappropriate solid waste collection services is widely known but poorly understood (Kaoje *et al.*,2017; Chengula *et al.*,2015;). Due to a lack of awareness among the community aggravated by poor local authority governance, the comingled waste collected is disposed of in open dumpsites without treatment. The local community are not aware of solid waste-related problems, accentuated by the lack of proper understanding of issues concerning its adverse consequences. Poor governance has produced a negative impact on solid waste collection in Jigawa without any strategy or policy initiative to enhance the system. Therefore, fundamental changes in waste governance are imperative if sustainable solid waste management is to be achieved.

The undesirable attitude and inadequacies of local authority governance towards solid waste collection is a very serious issue. Waste management is accorded low priority; resulting in poor collection and inefficient collection coverage. Financial constraints and worsened by the shortage of trained waste management workers is identified as the major problem. The collection rate in Jigawa State is less than 10% and in other cities in Nigeria for example; Ibadan ranged from 10%, Kano 30%, and Kaduna 10% (Olukanni *et al.*, 2016; Salami *et al.*,2018; Hameed *et al.*, 2016), where the gross inefficiencies have been reported. This complicated the problem in slum areas that require a more regular collection and is further heightened by the shortage of human and technical resources of the Local Authorities as well as the lack of a formal collection system.

The waste collection practices are widely known in the region, but how the process operates in practice is poorly understood, a move towards sound waste collection practices requires a behaviour change, and negative public perception of poor practices remains a problem. However, the local authority's ability to recognize the major problem associated with such practices is an issue.

The community were not satisfied with the absence of solid waste collection services. The dominance of illegal disposal and open dumps and the replication of pollution and diseases communicated by solid waste make the inhabitants pay more attention to this problem and plan its management using non-residents. Poor collection services and irregular collection frequency resulting from bad local authority governance is an issue. This raised dissatisfaction and poor environmental outcomes among the communities, many local authorities in the region are faced with serious resource limitations and thus, solid waste collection services are not obtainable.

There is no structured waste collection system in the area, and local authorities were not willing to pay the private sector to provide the services due to corrupt governance. Therefore, residents' willingness to pay (WTP) was initiated by the local community though unofficial; this is to keep a sanitary environment. In addition, (WTP) is the means through which the local community agrees to solve the problem of waste collection among themselves by paying for the service without the involvement of the local authority. However, the non-residents' willingness to accept (WTA) collection fees

became necessary based on negotiation regarding the permanent collection schedule, since there is no formal collection system. Hence, non-resident WTA collection fees are one of the obvious factors in sustaining the practice. This will provide the impetus for enhancing solid waste collection services, thereby ensuring efficient service delivery to the region.

Environmental responsible behaviour theory suggests that an individual must have knowledge of environmental issues and have to be aware of the environmental harms, sources and consequences (Mei *et al.*, 2017). The prediction of environmentally responsible behaviour involves attitude, locus of control and individual concern, knowledge of issues, knowledge of activities, skills, plans and action (Tclens 2016).

The novelty of the study is the evolution and integration of non-residents in waste collection, which is not known about the Jigawa State context. Very little research was carried out in the area. The rarity of research slows down environmental evolution in the region thus deteriorating the area to propel forward on the wheel of global environmental sustainability.

1.3 Objectives of the Study

The general objective of this study is to evaluate the relationships between residents' attitudes, Local Authority governance and solid waste collection in Jigawa State. However, to achieve the general objective of this study, there are specific objectives:

1. To determine the awareness of the residents and non-residents towards households' solid waste collection, and to determine if there is any relationship between residents' awareness, attitude and practice.
2. To determine the attitude and practice of the residents and non-residents about solid waste collection, and to determine if there is any relationship between residents' attitude and non-residents towards solid waste collection, and to determine if there is any relationship between socio-demographic characteristics of the residents and attitude.
3. To evaluate the satisfaction among the residents and the non-residents towards household solid waste collection.
4. To identify willingness to pay (WTP) among the residents for solid waste collection service and willingness to accept collection fees among the non-residents.

1.4 Research Questions

1. What is the level of residents' and non-residents' awareness towards solid waste collection in Jigawa state? Are there any relationship between resident's awareness, attitude and practice?
2. What is the attitude and practice of the residents and non-residents about solid waste collection? Are there any relationship between residents' and non-residents' attitudes? Are there any relationship between socio-demographic characteristics of the residents and attitude?
3. What is the level of satisfaction among the residents and non-residents regarding waste collection?
4. How much would the residents be willing to pay for solid waste collection service and what would be the willingness of the non-residents to accept collection fees?

The major research question this study attempt to answer was: What is the attitude of the residents and non-residents regarding waste collection? Are there any relatioship between the attitude of the residents and non-residents about waste collection? Are there any relationship between socio-demographic characteristics of the residents and attitude?

Research Hypothesis

H_{01}: There is no statistically significant relationship between the awareness, attitude and practice of residents and non-residents towards solid waste collection.

H_{02}: There is no statistically significant relationship between the attitude of residents and non-residents about solid waste collection.

H_{03}: There is no statistically significant relationship between socio-demographic characteristics and residents attitude.

1.5 Scope and Delimitation of the Study

This study examines the relationships between residents' attitudes, Local Authority governance and solid waste collection in Jigawa State, Nigeria. The study is within the scope of the following areas:

The awareness of residents and non-residents towards solid waste, the attitude and practice of the residents and non-residents about solid waste collection. Satisfaction among the residents and non-residents regarding solid waste collection, as well as the willingness to pay among the residents and willingness to accept solid waste collection fees among the non-residents in non-service areas.

However, the delimitation of the study was confined to **Birnin Kudu, Gwaram, Jahun, Ringim, Kazaure, Babura, Hadejia, Kafin Hausa and Malam Madori** and may not be generalized to other local authority areas**;** this study also had financial and time limitation. The findings and recommendations from this study will have a significant basis for application in the rest of the non-service areas of Jigawa State where there are no solid waste collection services.

During the period of the study, the following challenges were prominent:

(i) The emergence of COVID-19 and its aftermath hindered the researcher's efforts to administer the instruments on time, due to the lockdown and other strict measures brought about by COVID-19.

(ii) Some of the respondents could not respond to the questions in the instruments on time thinking that the local authority will drive the non-residents away thereby neglecting the region from waste collection services.

1.6 Significance of the Study

This study covers the current knowledge based on the relationships between residents' attitudes, local authority governance and solid waste collection. It will contribute to the existing literature by providing empirical evidence from the non-service areas of Jigawa State, a region with no waste collection service over the past decades. Contributing to the realm of knowledge and creating awareness on solid waste collection systems in Jigawa state and Nigeria as a whole.

The findings of the study would aid the planning authority, environmental protection agencies and concerned stakeholders in developing public arrangements in solid waste management, through environmental awareness campaigns to create awareness among the community on the need and importance of an effective waste collection system, which is required to make the environment hygienic and sustainable. This would nurture awareness that could improve the ingenuity to minimize the menace of inappropriate collection systems.

The government has a negative attitude towards waste collection, as waste management is accorded low priority. The findings will assist the local authority and community to understand the implications of poor waste management and develop proper techniques to enhance the waste collection system and provide regular and effective collection services coverage. This will positively contribute to shaping the attitude of the government about waste management and global environmental sustainability.

The results of the study will help policymakers implement policies aimed at improving waste collection services and overall waste management so that service delivery standards can match the community's expectations in terms of waste collection satisfaction. Therefore, the local community can pay for waste collection services with satisfaction.

Therefore, by envisaging the problems and challenges of household solid waste collection from many perspectives. The study can also serve as a guide to any study on WTP/WTA in Jigawa State and other parts of Nigeria.

1.7 Justification of the Study

Until now, the study on the relationships between residents' attitudes, Local Authority Governance and solid waste collection in Jigawa state was not explored. Therefore, a deeper understanding of this study is essential to allow policymakers, waste management agencies and other stakeholders to make decisions to enhancing waste collection system. Many studies in Nigeria have focused on MSW management due to its impact on the environment and human health (Oguntoyinbo 2012; Maiyaki *et al.*,2018; Sridhar *et al.*, 2017; Solomon 2009; Salami *et al.*, 2018; Adeniran *et al.*,2017; Coker *et al.*, 2016; Ogwueleka 2013). However, very few studies have analysed waste collection in Nigeria (Olukanni *et al.*,2016; Olawale *et al.*,2020; Aliu *et al.*,2016). As a result, the environmental repercussion of inappropriate solid waste collection is poorly understood in Jigawa and Nigeria in general. Accordingly, very few studies have relatively investigated waste governance in Nigeria (Ezeah and Robert 2014; Adama 2012) but failed to consider the relationships between resident attitude, Local authority governance and solid waste collection in Jigawa. Hence, this study is very vital.

Therefore, for a viable solution to solid waste collection in Jigawa, suitable strategies for governance are necessary. This will lead to the implementation of solid waste collection techniques, policies and plan strategies to pre-empt the threat associated with inappropriate solid waste collection services. Thus, the need for research on the relationships between residents' attitudes, local authority governance and solid waste collection in Jigawa, which is the focus of the study, is very important.

1.8 Thesis Organization

The thesis is categorized into 5 chapters. A brief highlight of each chapter is as follows.

Chapter 2 Present the literature review, Environmental management, Waste management, MSW management in Nigeria, household solid waste, MSW policy, legislations and institutional framework, MSW in developed and developing countries, MSW generation, MSW composition, MSW treatment, recycling, biological treatment, composting, Anaerobic digestion, chemical treatment, incineration, pyrolysis, solid waste disposal, MSW collection system in Nigeria. MSW collection practice in the service area, MSW collection in non-service areas, challenges of MSW collection in Nigeria. MSW management practice in Jigawa, MSW collection practice in non-service areas, community role in MSW management in Jigawa. In addition, the role and participation of residents, role and participation of non-residents was also presented, theoretical framework, theory, theory of environmentally responsible behaviour, Attitude behaviour paradigm and the theory of Planned behaviour, Norm activation theory, Value-Belief norm theory, Behavioural change theory, expectancy disconfirmation theory, and conceptual framework.

Chapter 3: describes the methodology adopted for the study, methodological framework; Research paradigm, description of the study area, Residents and Non-residents, inclusion/exclusion criteria, data collection process, primary data, secondary data, questionnaire survey, quantitative method instrumentation, ethical consideration, data analysis, sample size selection, sampling technique, sample size, validity, validation of instruments and a pilot study, descriptive statistics, inferential statistics was presented in this chapter.

Chapter 4: Present the results of the study. This includes awareness of residents and non-residents towards solid waste, comparison of the relationship between awareness, attitude and practice, the attitude of the residents and non-residents about solid waste collection, comparison of the relationship between residents and non-residents attitude, comparison of the relationship between socio-demographic characteristics and residents attitude, residents' and non-residents' practices about solid waste collection. It also comprises the residents and non-residents' level of satisfaction towards the solid waste collection, residents' willingness to pay for solid waste collection and non-resident's willingness to accept solid waste collection fees, Discussion and summary of findings.

Chapter 5: Conclusion and recommendation. It also highlights the importance of the study and encapsulates the major findings with discussion and relevant policy recommendations. In addition, recommendations for future research were included.

1.9 Operational Definition of Terms

Residents: The residents are the dwellers who choose to live together and share common ideas, values, and culture prevailing in a particular area.

Non-Residents: The non-residents are not the original inhabitants of a particular household they hail from different remote locations in the struggle for survival, educationally backward with low social status. Their involvement in solid waste collection is mainly due to poverty accentuated by their dismal failure to find an alternative job.

Non-service area: This is the region where waste collection services are not provided by the local authority. The local community manage their waste with the help of non-residents.

REFERENCES

Abas., M, A, Hassin., N.H Hambali., K, A, Karim., M, F, A Hussin., HIsmail., L, & Fitrian. N, (2021). Public satisfaction and willingness to pay (WTP) for better solid waste management services in rural area of Kelantan, Malaysia. IOP Conference Series: *Earth and Environmental Science*, 756, 012083.

Abdel-shafy, H, I., & Mansour, M, S., M. (2018). 'Solid waste issue : Sources , composition , disposal , recycling , and valorization', *Egyptian Journal of Petroleum*. 27(4), 1275–1290.

Abdulrehman, A., & Alharthi, K. (2016). An introduction to research paradigms. *International Journal of Educational Investigations*, 3(8), 51-59.

Abila, B. & Kantola, J. (2013). Evolving Knowledge Management Solution in Nigeria. 7(6), 303–308.

Abubakar, S., Dominic, O. & Ibrahim, A. (2019). A critical appraisal of the National Emergency Management Agency Act', *International Journal of Disaster Risk Reduction*. 253–265.

Ach, H, A., Adeofun, C, O., Gbadebo, A, M., Ufoegbume, G, C., & Oyedepo, J., A. (2012). An assessment of solid waste management practices in Abeokuta, southwest, Nigeria. *Journal of Biological and Chemical Research*, 29(2), 176-188.

Adama, O.,(2012). Urban governance and spatial inequality in service delivery: A case study of solid waste management in Abuja, Nigeria. *Waste Management, And Research*, 30(9),991-998.

Addai, K., N. & Abbeam, G., D. (2014). Determinants of Willingness to Pay for Improved Solid Waste Management in Dunkwa-on-Offin , Ghana', *Journal of Agriculture And Environmental Science*, 3(1), 1–9.

Addo, H. O., Dun-dery, E. J., Afoakwa, E., Elizabeth, A., Ellen, A., & Rebecca, M. (2017). Correlates of domestic waste management and related health outcomes in Sunyani , Ghana : a protocol towards enhancing policy. *BMC Public Health*, 1–10.

Adebayo, F,O., & Obiekezie, S., O. (2018). Microorganisms in waste management. *Research Journal of Science and Technology*, 10(1), 28-39.

Adekanmbi, A., O. Oluwaseyi, T, A., &Oyelade, A., A. (2021). Dumpsite leachate as a hotspot of multi drug resistant entero bacteriaceae harbouring extended spectrum and AMPCB-Lactamase genes: A case study of Awotan municipal solid waste dumpsite in southwest Nigeria. *Meta Gene*, 28, 100853.

Adekunle, M, M., Sangodoyin, A., Y. & Wahab., B. (2020). Status of solid waste composition and quantity among varying households in Ibadan metropolis, Nigeria. *International Journal of Education and Research*, 8(9), 133-156.

Adeniran, A. E., Nubi, A. T., & Adelopo, A. O. (2017). Solid waste generation and characterization in the University of Lagos for a sustainable waste management. *Waste Management*, 67, 3–10.

Adewumi, J. R., Ejeh, O, J., Lasisi, K, H., & Ajibade, F,. O. (2019). A GIS-AHP-based approach in siting municipal solid waste landfill in Lokoja, Nigeria. *Earth and Environmental Science*, 1, 1528.

Adeyi. A, A., & Adeyemi, A., M. (2019). Potential occupational health effects of municipal solid waste management in Nigeria. The case of Lagos and Ibadan. *Ife Journal of Science*, 21(2), 417-430

Afroz, R. & Masud, M., M. (2011). 'Using a contingent valuation approach for improved solid waste management facility : Evidence from Kuala Lumpur , Malaysia', *Waste Management*. 31(4), 800–808.

Afuno, S. A. & Rabiu, S. (2017). 'Characterization and composition analysis of municipal solid waste. 10 (1), 493–497.

Aghedo, I. & Eke, S. J. (2013). 'From Alms to Arms : The Almajiri Phenomenon and Internal Security in Northern Nigeria', *The Korean Journal of Policy Studies*, 28(3), 97–123.

Agovino, M. & Musella, G. (2020). 'Land Use Policy Separate waste collection in mountain municipalities . A case study in Campania', *Land Use Policy*, 91,104408.

Aigbokhan, B. E. & Ailemen, M. I. (2018). Environmental Issues in Nigeria Commercialisation and Privatisation Policy.

Ajani, A., & Fakunle, S., O. (2021). Community participation: The cornerstone for the efficiency of institutional frameworks for household solid waste management in low-income residential areas in Nigeria. *American International Journal of Supply Chain Management*, 2(1): 37-44

Ajibade, F, O., Olajire, O,O., Ajibade, T, F., Nwogwu, N, A.,Lasisi, K, H., Alao, A, B., Owulabi, T, A., & Adewomi, J, R., (2019). Combining multicriteria decision analysis with GIS for suitably siting landfills in a Nigerian state. *Indicators*, 3(4),100010.

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50, 179-211.

Akaateba, M., A. & Yakubu, I. (2013). Householders satisfaction towards solid waste collection services of Zoom Lion, Ghana limited in WA, Ghana. *European Scientific Journal*, 9(32), 198-213.

Akbar, A., Alavi, N., Goudarzi, G., & Teymouri, P. (2015). Household recycling knowledge , attitudes and practices towards solid waste management.*"Resources, Conservation & Recycling,"* 102, 94–100.

Akhtar, S. Ahmad, A, S., Qureshi, M, I., & Shahraz , S. (2017). 'Households willingness to pay for improved solid waste management', *Global Journal of Environmental Science Management*, 3(2), 143–152.

Akimana, B., & Letema, S. (2022). Assessment of quality of household solid waste collection by private service providers in Bujumbura city. *Ghana Journal of Geography*, 14(1), 65-82.

Akintunde, E., A. (2017). Theories and concepts for human behaviour in Environmental preservation. *Journal of Environmental Science and Public Health*, 1(2), 120-133.

Alam, O. & Qiao, X. (2020). 'An in-depth review on municipal solid waste management , treatment and disposal in Bangladesh', *Sustainable Cities and Society*. 52, 101775.

Aleluia, J. & Ferrão, P. (2017). Assessing the costs of municipal solid waste treatment technologies in developing Asian countries. *Waste Management.*

Alhassan, H., Donkoh, S., A, & Vivian, F. B. (2017). 'Households' willingness to pay for improved solid waste management in Tamale metropolitant area, Northern Ghana', *International Journal of Development*, 3(2), 70–84.

Aliu, I. R., Adeyemi, O. E. & Adebayo, A. (2014). Municipal household solid waste collection strategies in an African megacity : Analysis of public private partnership performance in Lagos'.

Aliyu, A., A, Bello, M., J. Kazim, R., & Martin, D. (2014). Positivist and Non-positivist paradigm in social science research. Conflicting paradigms or perfect partners. *Journal Of Management And Sustainability*, 4(3).

Al-khateeb, A. J. & Al-sari, M. I. (2017). 'Factors affecting the sustainability of solid waste management system — the case of Palestine', *Journal of Environmental Monitoring And Assessment*. 189(93), 1–12.

Almamun, A., Hayat, N., Mohiuddin, M., Salamen, A., A, Ali, M., H. & Zainol, N., R. (2022). Modelling the significance of value-belief norm theory in predicting work place, Energy Conservation Behaviour. *Frontiers in Energy Research*, 10,

Almasi, A., Mohammadi, M., Azizi, A., Berizi, Z., Shamsi, K., Shahbazi, A., & Mosavi, S. A. (2019). Assessing the knowledge, attitude and practice of the kermanshahi women towards reducing, recycling and reusing of municipal solid waste. *Resources, Conservation and Recycling*, 141, 329–338.

Almazán-casali, S., Alfaro, J. F. & Sikra, S. (2019). 'Exploring household willingness to participate in solid waste collection services in Liberia', *Habitat International*. 84, 57–64.

Alobaid, F. Al-Maliki, W, A., K, Lanz, T., Haaf, M., Brachthauser, A., Epple, B., & Zorbach, I. (2018). 'Dynamic simulation of a municipal solid waste incinerator', *Energy*, 149, 230–249.

Al-Salem, S, M., Antelava, A., Constantinou, A., Manos, G., & Dutta, A., (2017). A review on thermal and catalytic pyrolysis of plastic solid waste. *Journal of Environmental Management,* 197(15), 177-198.

Al-Salem, S, M., Lettieri, P., & Bayens, J. (2010). The valorization of plastic solid waste (PSW) by primary to quaternary routes: From re-use to energy and chemicals. *Progress in Energy and Conbustion Science,* 36(1), 103-129.

Aluko, O, O., & Sridhar, M, K., C. (2005). Application of constructed wetlands to the treatment of leachates from a municipal solid waste landfill in Ibadan, Nigeria. *International Perspective,* 67(10),58-62.

Aluko, O, O., Obafemi, T, H., Obiajuwa, P, O., Obiajunwa, C, J., Obisanya, O, A., Odanye, O, H., & Odeleye, A., O. (2021). Solid waste management and health hazards associated with residents around open dumpsites in heterogenous urban settlement in South waste Nigeria. *International Journal of Environmental Health Research,* 1-16.

Amasuomo, E. & Baird, J. (2016). 'Solid Waste Management Trends in Nigeria', 6(4),35–44.

Andrianisa, H. A., Brou, Y. O. K. & Alphonse, S. (2016). 'Role and importance of informal collectors in the municipal waste Cote d ' Ivoire pre-collection system in Abidjan , 53.

Anyawu, N., C, & Adefila, J., O. (2014). Nature and management of solid waste in Karu Nasarawa state, Nigeria. *American International Journal of Contemporary Research,* 4 (11), 149-159.

Apuke, O., D. (2017). Quantitative research methods: A synopsis approach. *Arabian Journal Of Business And Management Review (Kuwait Chapter).* 6(10),40.

Arafat, H, A., Jijakli, K., & Ahsan, A. (2013). Environmental performance and energy recovery potential of five processes for municipal solid waste treatment. *Journal of Cleaner Production,* 1-8.

Areola, R, I., & Ipindola, O., O. (2021). Design of a community-Based Anaerobic digester for sustainable solid waste management in Ile-oluji, Ondo state, Nigeria. *Journal of Engineering Research and Reports,* 20(9),80-90.

Asase, M., Yanful, E., K, Mensah, M., Stanford, J., & Amposah, S., (2009). Comparison of municipal solid waste management systems in Canada and Ghana: A case study of the cities of London, Ontario, and Kumasi, Ghana. *Waste Management,* 29(10), 2779-2786.

Audu, H, A., P. Aigwi, I, E., & Enaboifo, M., A. (2015). Solid waste composition analysis for the development of a suitable waste disposal system in Port Harcourt Local government of Rivers state, Nigeria. *African Journal,* 6(2).

Awopetu, M., S, Ronke G. Awopetu, R., G, Sample, E., D, Coker, A., O, Awokola, O., S, Fullen, M, A., Booth, C, A., & Hammond, F., N. (2014).

Municipal solid waste management and the role of waste pickers in Nigeria. *International Journal of Education and Research,* 2(3), 1-12.

Ayeleru, O. O., Okonta, F. N., & Ntuli, F. (2018). Municipal solid waste generation and characterization in the City of Johannesburg : A pathway for the implementation of zero waste. *Waste Management*, 79, 87–97.

Ayodeji, Peter., I. (2020). Households Attitudes And Willingness To Pay For Solid Waste Management In Two Southwest States, Nigeria. *Journal Of African Social Studies,* 1, (2), 123-132.

Ayodele, T, R., Alao, M, A., & Ogunjigbe, A, S., O. (2018). Recyclables resources from municipal solid waste: Assesment of it energy, economic and environmental benefits in Nigeria. *Resources, Conservation and Recycling,* 134, 165-173.

Ayodele, T. R., Ogunjuyigbe, A. S. O., & Alao, M. A. (2017). Life cycle assessment of waste-to-energy (WtE) technologies for electricity generation using municipal solid waste in Nigeria. *Applied Energy*, 201, 200– 218.

Ayooluwa, A. (2020). 'Environmental Literacy levels on Waste Management in Ibadan, Nigeria', *International Journal of science and Business*, 4(1), 37–47.

Ayotunde Dawodu, Jumoke Oladejo, Zayyad Tsiga, Tatenda Kanengoni &Ali Cheshmehzangi (2021): Underutilization of waste as a resource: bottom-up approach to waste management and its energy implications in Lagos, Nigeria. *Intelligent Buildings International,* 10, 1-23.

Babaei, A, K,. Alavi, N., Goudarzi, G., Teymouri, P., & Ahmadi, K., (2015). Household recycling, knowledge, attitude and practices towards solid waste management. *Resources, Conservation and Recycling,* 102, 94-100.

Babbie, E. and Mouton, J. (2001). The practice of social research. Cape Town: Oxford University Press.

Babatunde, B, B., Vincent- Akpu, I, F., Atarhirya, W, G., N, Aharanwa, E, Aharanwa, V, C., Gree, A, F., & Isaac, J., O. (2013). Comparative analysis of municipal solid waste composition in three local government areas in Rivers state, Nigeria. *African Journal of Environmental Science and Technology*, 7(9), 874-881.

Babayemi, J, O. & Dauda, K, T. (2009). Evaluation of solid waste generation categories and disposal options in developing countries: A case study of Nigeria. *Journal of Environmental Management,* 13(3),83-88.

Babayemi, J. O. & Ogundiran, M. B. (2017).'Overview of Environmental Hazards and Health Effects of Pollution in Developing Countries : A Case Study of Nigeria' 51–71.

Babs-shomoye, F. & Kabir, R. (2016). 'Health Effects of Solid Waste Disposal at a Dumpsite on the Surrounding Human Settlements', 2(3), 268–275.

Badrum, S. Y. & Tahir, M. (2020). 'Village-Level Knowledge , Attitude , and Practice (KAP) on Solid Waste Management in Penampang , Sabah', 1(1), 148–160.

Bai, R., & Sutanto, M. (2002). The practice and challenges of solid waste management in Singapore. *Waste Management,* 22: 557–567.

Banzhaf, S., Ma, L. & Timmins, C. (2019). 'Environmental Justice: The Economics of Race, Place, and Pollution', *journal of economic perspectives*, 33(1), 185–208.

Bashir, M, J., K, Tao, G, H., Abu Amir, S, S., & Tan, K., W, (2018). Public concern and behaviour towards solid waste minimization using composting in Kampar district, Malaysia. *Global Nest Journal,* 20 (20), 316-323.

Barrow, C., J. (2006). Environmental management for sustainable development, 2nd: Published in Taylor and Francis E-Library.

Bryant, R, L., and Wilson, G., A. (1998). Rethinking Environmental management. *Progress in human geography,* 22(3), 321-343.

Batool, S, A., & Chauadhry, M., N. (2009). The impact of municipal solid waste treatment method on Green House Gas emissions in Lahore, Pakistan. *Waste Management,* 29, 63-69.

Batu, M. M., Admasu, E., &Tolosa, F, (2016). 'Determinants of Households ' Willingness t o Pay for Improved Solid Waste Management in Ethiopia : The Case Study of Jimma', *Journal of Environment And Earth Sicience*, 6(7), 64–77.

Bautista, P., R. (2019). Level of awareness and practices on solid waste management (SWM) among college students', *Journal of Biodiversity and Environmental sciences,* 14(1), 131–138.

Bees, A. D., & Williams, I.D. (2017). Explaining the differences in household food waste collection and treatment provisions between local authorities in England and Wales. *Waste Management.*

Bello T.B, Kolawole T.D., Jesuleye F.A., Ogunola E.O, Oyebode M.O., Abraham O. D., Olaniyi R. & Bamigbayan I. (2021). Municipal solid waste management practices in inner cities of Osogbo, Osun State and its implications on health. *Research Journal of Health Sciences,*10(1),16-26.

Bensusan, N, R., Wilson, D, C., Smith, S., R, (2018). Uncontrolled burning of solid waste by households in Mexico is a significant contributor to climate change in the country. *Environmental Research*, 163, 280-288.

Bergum, R. A., Siwar, C., Pereira, J. & Jafar, A, H. (2009). Attitude and behavioural factors in waste management in the construction industry of Malaysia. *Resources Conservation and Recycling,* 53,321-328.

Bertanza, G., Ziliani, E. & Menoni, L. (2018). 'Techno-economic performance indicators of municipal solid waste collection strategies', *Waste Management*, 1–12.

Bhat, R, A., Singh, D, V., Qadri, H., Dar, G, H., Dervash, M., Bhat, S, A., &Yousaf, B. (2022). 'Chemosphere Vulnerability of municipal solid waste : An emerging threat to aquatic ecosystems', *Chemosphere*. 287(3), 132223.

Billingham, S, A., M, Whitehead, A, L., & Julious, S., A. (2013). An audit of sample sizes for pilot and feasibility trials being undertaken in the United Kingdom, registered in the United Kingdom clinical research network database. *BMC. MED RES Methodology,* 13 (104).

Biswas, A. & De, A. K. (2016). 'A Fuzzy Goal Programming Approach for Solid Waste Management Under Multiple Uncertainties', *Procedia Environmental Sciences*. 35, 245–256.

Blamey, R. (1998a). Contingent valuation and the activation of environmental norm *Ecological Economics,* 24, 47-72.

Bleck, D. & Wettberg, W. (2017). 'Waste collection in developing countries – Tackling occupational safety and health hazards at their source', *Waste Management*. 32(11).

Boateng, K, S., Baffour, P, A., Boateng, D., Rockson, G, N., Mensah, K, A., & Edusei, A., K, (2019).. Household willingness to pay for improved solid waste management service in four metropolitan cities in Ghana. *Journal of Environmental and public Health,* 9, 1-10

Boateng, S. & Amoako, P. (2016). 'Household Willingness to Pay for solid Waste Disposal Services in Urban Ghana : The Kumasi Metropolis Situation', *Ghana Journal of Geography*, 8(2), 1–17.

Bolaane, B. & Isaac, E. (2015). 'Privatization of solid waste collection services : Lessons from Gaborone', 40,14–21.

Botello-Álvarez, J, E., Rivas-Garcia, P., Fausto-Castro, L., Estrada-Baltazar, A., & Gomez-Gonzalez, R. (2018). 'Informal collection, recycling and export of valuable waste as transcendent factor in the municipal solid waste management: A Latin-American reality', *Journal of Cleaner Production,* 182, 485–495.

Bovea, M. D. & Gallardo, A. (2015). 'Environmental assessment of alternative municipal solid waste management strategies . A Spanish case study', *Waste Management*. 30(11), 2383–2395.

Bujang, M. A., Omar, E. D. & Baharum, N. A. (2018). A Review on Sample Size Determination for Cronbach ' s Alpha Test : A Simple Guide for Researchers', *Malays Journal of medical science*, 25(6), 85–99.

Calabrò, P. S. & Komilis, D. (2019). 'A standardized inspection methodology to evaluate municipal solid waste collection performance', *Journal of Environmental Management*. 184–191.

Carlos, M, Gallardo, A., Edo-Alcom, N., & Abaso, J., R. (2019). 'Influence of the Municipal Solid Waste Collection System on the Time Spent at a Collection Point : A Case Study', *Sustainability*, 11(22), 1–14.

Cetrulo, T. B., Marques, R. C., Cetrulo, N. M., Pinto, F. S., Moreira, R. M., Mendizábal-Cortés, A. D., & Malheiros, T. F. (2018). Effectiveness of solid waste policies in developing countries: A case study in Brazil. *Journal of Cleaner Production*, 205.

Chalkias, C. & Lasaridi, K. (2018). 'A GIS based model for the optimisation of municipal solid waste collection : A GIS based model for the optimisation of municipal solid waste collection : the case study of Nikea , Athens , Greece', *WSEAS TRANSACTION on Environment and Development*, 5(10), 640–650.

Chaudhary, S., Nidhi, C. & Rawal, N. R. (2019). 'Emerging Technologies in Data Mining and Information Security', *Emerging Technologies In Data Mining And Information Security*. 813, 45–65.

Chen, X., Geng, Y. & Fujita, T. (2010). 'An overview of municipal solid waste management in China', *Waste Management*. 30(4), 716–724.

Chen, Y,-C. (2018). Effects of urbanization on municipal solid waste composition. *Waste Management,* 1-9.

Chengula, A. (2015). 'Assessing the Awareness , Knowledge , Attitude and Practice of the Community towards Solid Waste Disposal and Identifying the Threats and Extent of Bacteria in the Solid Waste Disposal Sites in Morogoro Municipality in Tanzania', 5(3), 54–66.

Chidi, T. & Chukwuedozie, N. (2011). 'Development impact of advocacy initiatives in solid waste management in Nigeria' 163–177.

Chidiebere, O, A., Abubakar, M., Shabako, J., G. (2018). Municipal solid waste management in African cities: A case study of Lagos state, Nigeria. *Malaysian Journal of Civil Engineering,* 30(1), 1-12.

Chinh, P, C., Hung, N, TR., Mikky, N., Thile Ai, N., & Tam, N, M. (2021). Willingness to pay for improving household solid waste management in Vietnam. *Applied Environmental Research,* 43(2), 1-14.

Christtos, C., & Katia, L., (2009). A GIS based model for the optimisation of municipal solid waste collection: the case study of Nikea, Athens, Greece. *WSEAS TransactionS on Environment and Development,* 10 (5), 640-650.

Chu, X, He, Z., Fan, X., Zhang, L., Wen, H., Huang, W., C, & Wang, T. (2020). The influencing factors of Harbin (China) residents satisfaction with municipal solid waste treatment. *Waste Management and Research,* 39 (1),83-92.

Chu, X, Zhan, J., Wang, C., Hameed, S, & Wang, X. (2020). 'Households ' Willingness to Accept Improved Ecosystem Services and Influencing Factors : Application of Contingent Valuation Method in Bashang Plateau , Hebei Province , China', *Journal of Environmental Management*. 255, 109925.

Chu, Zh., Xi, B. Song, Y., & Crampton, E., (2013). Taking out the trash: Household preferences over municipal solid waste collection in Harbin, China. *Habitat International* 40, 194-200

Chuan, C., L. (2006). 'Sample size estimation using Krejcie and Morgan and Cohen statistical power analysis: A Comparison', *Journal Penyelidikan IPBL, Jilid*, 7, 78–86.

Chung, W., & Yeung, I. M. H. (2019). Analysis of residents choice of waste charge methods and willingness to pay amount for solid waste management in Hongkong. *Waste Management*, 96, 136-148.

Clayson, P. E., Carbine, K, A., Baldwin, S, A., Olsen, J, A., & Larson, M, J., (2021). Using generalizability theory and the ERP reliability analysis (ERA) toolbox for assessing test-retest reliability of ERP scores part 1: Algorithms, framework, and implementation. *International Journal of psychophysiology*. 1-14

Cobbinah, P. B., Addaney, M., & Agyeman, K. O. (2017). Locating the role of urbanites in solid waste management in Ghana. *Environmental Development*, 24, 9–21.

Coker, A., Sangodoyin, A., Sridhar, M., Booth, C., Olomolaiye, P., & Hammond, F. (2009). Medical waste management in Ibadan , Nigeria : Obstacles and prospects, 29, 804–811.

Cressweel, J, W. (2008). Educational research: Planning, conducting quantitative and qualitative research, (3rd ed.) New Jersey: Pearson Merril Prentice Hall.

Curran, A., Williams, I. D. & Heaven, S. (2007). 'Management of household bulky waste in England', *Resource Conservation And Recycling*, 51, 78–92.

Davda, A. Hillary Kibet, H., Achieng, E. Atundo, L., & Komen, T. (2021). 'Assessing the acceptability , reliability , and validity of the EORTC Quality of Life Questionnaire (QLQ-C30) in Kenyan cancer patients : a cross-sectional study', *Journal of reported outcomes*, 1–8.

Debrah, J. K., Vidal, D, G., & Dinis, M, A, P., (2021). 'Raising Awareness on Solid Waste Management through Formal Education for Sustainability : A Developing Countries evidence review. *Recycling*, 6(6), 1–21.

Demirbas, A. (2011). 'Waste management , waste resource facilities and waste conversion processes', *Energy Conversion and Management*. 52(2), 1280–1287.

Dika, G., Nemie, A., & Birhane, E. (2019). Household willingness to pay for improve solid waste management in Gulelle sub-city, Addis Ababa. *Energy And Environmental Engineering*, 6(1),1-7.

Dilixiati, D., Suzuki, S., Yoshida, H., & Takahashi, F., (2023). A case study of willingness towards PE-T Bottle recycling behaviours- a new contingent valuation approach which request only simple comparison of perceptive stimuli. *Resource, Conservation And Recycling*, 189, 106746.

Dilsath, A. & Prasada, D. V. P. (2021). 'Assessing the Potential for an Improved Solid Waste Collection in Kalmunai , Sri Lanka : An Analysis of Willingness to Pay', *Tropical Agricultural Research*, 32(4),434–444.

Dumbili, E. & Henderson (2020). The challenge of plastic pollution in Nigeria. *Plastic Waste and Recycling, 569-58.*

Dura, C., Driga, I., & Nita, D., (2010). Statistical landmarks and practical issues regarding the use of simple random sampling in market research. *Annals of the University of Petrosani, Economics,* 10(2),111-124.

Durrheim, K. , & Painter, D. (2006). Collecting qualitative data: Sampling and measuring. In. Terre Blanche, M., Durrheim, K., & Painter, D., (Eds). Research in Practice: applied methods for social sciences. 2nd revised ed. Cape Town: University of Cape Town.

Edalatpour, M. A., Al-e-hashem, S. M. J. M., Karimi, B., & Bahli, B. (2017). Investigation on a Novel Sustainable Model for Waste Management in Megacities : A Case Study in Tehran Municipality. *Sustainable Cities and Society*.

Elemile, O. O., Author, C., Sridhar, M. K. C., Coker, A. O., Alhassan, E. A., Aran, O. (2019). Determination of carbon emission potentials in solid waste management facility in Akure, Nigeria. *International Journal of Civil Engineering and Technology,* 10(2), 2184–2196.

El-Hamouz, A. M. (2008). Logistical management and private sector involvement in reducing the cost of municipal solid waste collection service in the Tubas are of the west Bank. Waste Management, 28, 260-271. *Environmental Science And Technology,* 11(2), 94–102.

Emelumadu, O., F. Azubike, O., C. Nnebue, C., C. Azubike, N., F, & Sidney-Nnebue, Q., N. (2016). Practice, pattern and challenges of solid waste management in Onitsha metropolis, Nigeria. *American Journal of Public Health Research,* 4 (1), 16-22.

Emmatty, F. J., & Panicker, V., V, (2019). Ergonomic interventions among waste collection workers: A systematic review. *International Journal of Industrial Ergonomics,* 72, 158-172.

Erasu, D., Feye, T., Kiros, A., & Balew, A. (2018). Municipal solid waste generation and disposal in Robe town, Ethopia. *Journal of the Air And Waste Management Association,* 2247, 1-7.

Ertz, M., Karakas, F. & Sarigöllü, E. (2016). 'Exploring pro-environmental behaviors of consumers : An analysis of contextual factors , attitude , and behaviors', *Journal of Business Research.* 69(10),3971–3980.

Esae, O. E., Sarah, J. & Mofe, A. (2020). 'A critical analysis of the role of energy generation from municipal solid waste (MSW)', *AIMS Environmental science*, 7(5), 387–405.

Ezeah, C. & Roberts, C. (2012). Analysis of Barriers and success factors affecting the adoption of sustainable management of municipal solid waste in Nigeria. *Journal of Environmental Management*, 103, 9–14.

Ezeah, C. & Roberts, C. L. (2014). 'Waste governance agenda in Nigerian cities : A comparative analysis, 41.

Ezeah, C., Osuagwu, J., C. & Adesiyan, I. (2023). Chapter 7-Design principles of sustainable composting and recovery of value from compost. *Current Development in Biotechnology and Bioengineering*, 143-168.

Ezechi, E, H., Nwabuko, C, G., Enyinnaya, O, C., & Babington, C., J. (2017). Municipal solid waste management in Aba, Nigeria: Challenges and prospects. *Engineering Resources*, 22 (3),231-236.

Ezenta, O., N, & Osagie, L., U. (2021). Service quality and customer satisfaction in resort hotels in Nigeria. *Saudi Journal of Business and Management Studies*, 6(11), 415-426.

Ezugwu, L. A., Ozor, P, A., & Nwanya, S, C., (2019). 'Municipal Solid Waste Collection and Disposal Approaches : *A Review',* 1893–1903.

Faccio, M., Persona, A. & Zanin, G. (2011). 'Waste collection multi objective model with real time traceability data, 31, 2391–2405.

Fang, W. Huang, Y., Ding, Y., Qi, G., Liu, Y. & Bi, J. (2022). Health risks of odorous compounds during the whole process of municipal solid waste collection and treatment in China. *Environmental International*, 158,106951.

Farzadkia, M., Jorfi, S., Akbari, H., & Ghasemi, M. (2012). Evaluation of dry solid waste recycling from municipal solid waste: Case of Mashhad city, Iran. *Waste Management and Research*, 30(1), 106–112.

Fernando, R. L. S. (2019). 'Solid waste management of local governments in the Western Province of Sri Lanka : An implementation analysis', *Waste Management*. 84, 194–203.

Ferreira, S. & Marques, R. C. (2015). Contingent valuation method applied to waste management', *'Resources, Conservation & Recycling,* 99, 111–117.

Ferronato, N., Preziosi, G., Antonio, M., Portillo, G., Gabriela, E., Lizarazu, G., & Torretta, V. (2020). Assessment of municipal solid waste selective collection scenarios with geographic information systems in Bolivia. *Waste Management*, 102, 919–931.

Fidelis, R. Ferriera, A, M., Antunes, L, C., & Komatsu, A, K., (2020). Socio-productive inclusion of scavengers in municipal solid waste management in Brazil : Practices, paradigms and future prospects', *Resources, Conservation & Recycling*, 154, 104594.

Filho, W., L, Brandli, L. Moora, H., Kruopien, J., & Stenmarck, A. (2016). Benchmarking approaches and methods in the field of urban waste management. *Journal of Cleaner Production* 112, 4377-4386.

Gaglias, A., Mirasgedis, S., Tourkolias, C., & Georgopoulou, E. (2016). Implementing the Contingent Valuation Method for supporting decision making in the waste management sector. *Waste Management*, 1–8.

Gambella, C., Maggioni, F. & Vigo, D. (2018). 'A stochastic programming model for a tactical solid waste management problem', *European Journal of Operational Research*, 273(2), 684–694.

Gan, M, Wong, G., Fan, X., Ji, Z., Ye, H., Zhou, Z, & Wang, Z., (2021). 'Enhancing the degradation of dioxins during the process of iron ore sintering co-disposing municipal solid waste incineration fl y ash', *Journal of Cleaner Production*, 125286.

Gana, B, A., Babanyara, Y, Y., & Abdulkadir, A. (2022). Prospect of the involvement of stakeholders in solid waste processing in developing nation. *Journal of Environmental treatment and Technology*, 10(1),81-91.

García, M, G., López, L, M., & Palmero, J, R. (2020). Social Networks Use Patterns among UniversityYouth: The Validity and Reliability of an UpdatedMeasurement Instrument. *Sustainability*, 12, 3503.

Gemma, P, L., Jose, L., Zafara, G., (2018). Temporal scale efficiency in DEA Panel data estimation. An application to the solid waste disposal service in Spain, *OMEGA*, 76, 18-27.

Genati, G. Ahmednur, M., Berihun, G., & Teym, A. (2021). Assessment of Household Solid Waste Management Practice and Associated Factors in Debre Berhan Town, Amhara Regional State. International Journal of Waste Resources, Ethiopia, 11(6), 1-12.

Ghazali, A, Tjiakaatmadja, J, H., & Pratiwi, S, E., Y. (2020). Residents-based learning model for sustainable residents participation in municipal solid waste management programme. *Global Journal of Environmental Science and Management*, 7(4), 599-624.

Gilbert, G, E., & Susan, P. (2016). Making sense of methods and measurements: Lawshe's content validity index. *Clinical Simulation In Nursing*, 12, 530-531.

Gidarakos, E., Havas, G. & Ntzamilis, P. (2006). Municipal solid waste composition determination supporting the integrated solid waste management system in the island of Crete. *Waste Management*, 26, 668-679.

Givano, G. & Ismail, Y. (2020). 'Housewives Environmental Awareness in Household Solid Waste Management', *Journal Of Environmental Engineering And waste Management*, 5(1), 54–71.

Goodluck, C. (2019). Sustainability of social enterpprises involved in waste collection and recycling activities: Lesson from Tanzania. *Journal of Social entrepreneurship*, 1, 19.

Grant & Osanloo (2014). Understanding, selecting, and integrating a theoretical framework in dissertation research: Creating a blue print for your house. *Administrative Issue Journal,* 4(2),1-26.

Gravetter, F, J,. & Forzano, L, A., B. (2009). Research methods for the behavioural sciences. 3rd ed. Belmo: Wadsworth Cengage Learning.

Greco, G., Cenciarelli, V. G. & Allegrini, M. (2018). 'Tourism ' s impacts on the costs of municipal solid waste collection : Evidence from Italy', *Journal of Cleaner Production*. 177, 62–68.

Greener, J, C., Kreider, H. & Mayer, E. (2005). Combining qualitative and quantitative methods in social inquiry. In: Somekh, B. & Lewin, C. (Eds). Research methods in the social sciences. London: Sage.

Guagnano, G., A. (2001). Altruism and market-like behavior: An analysis of willingness to pay for recycled paper products. *Population and Environment,* 22, 425-438.

Guagnano, G. A., Dietz, T., & Stern, P. C. (1994). Willingness to pay for public goods: A test of the contribution model. *Psychological Science,* 5, 411-415.

Guerrero, L, A., Maas, G. & Hogland, W. (2013). Solid waste management challenges for cities in developing countries. *Waste Management,* 33, 220-232.

Gupta, N., Yadav, K., K. & Kumar, V. (2015). 'A review on current status of municipal solid waste management in India', *Journal of Environmental Science*. 1–13.

Hagger, M., S. (2015). Retired or not, the theory of planned behaviour will always be with us. *Health Psychology Review,* 1-10.

Hagus, D., Mekonnen, A., & Gebreegziabher, Z. (2013). Household willingness to pay for improved urban solid waste management: The case of Mekelle city, Ethiopia. *Ethiopian Journal of Economics,* 1, 107-138.

Hakeem, I, G., Aberuagba, F., & Musa, U. (2018). Catalytic pyrolysis of waste poly propylene using Ahoko Kaolin from Nigeria. *Applied Petrochemical Research,* 203-210.

Hameed, T., (2016). Validity and reliability of the research instrument: How to test the validation of the questionnaire/survey in research. *International Journal Of Academic Research In Management,* 5 (3), 28-36.

Hameed, T, B., Sridhar, M, K., C, & Wahab, B. (2016). Enhancing solid waaste collection and transportation for sustainable development in the Ibadan metropolis, Nigeria. *European Journal of Research in Social Science,* 4(7),23-32

Hameed, Z, Muhammad, A., Zakir, K., Khuram, M., Atabani, A, E., Manuddin, G., Khurram, M., S, Muhammad, R., & Sattar, N., A. (2021). 'Gasification of municipal solid waste blends with biomass for energy production and resources recovery : Current status , hybrid technologies and innovative prospects', *Renewable and Sustainable Energy Reviews*, 136, 110375.

Han, Z., Liu, Y., Zhong, M., Shi, G., Li, Q., Zeng, D., Xie, Y. (2018). Influencing factors of domestic waste characteristics in rural areas of developing countries. *Waste Management,* 72, 45–54.

Hannan, M. A., Akhtar, M., Begum, R. A., Basri, H., Hussain, A., & Scavino, E. (2018). Capacitated vehicle-routing problem model for scheduled solid waste collection and route optimization using PSO algorithm. *Waste Management*, 71, 31–41.

Harir, A, I., Kasim, R., & Ishiyaku, B., (2015). Exploring the resource recovery potentialss of municipal solid waste: A review of solid waste composting in developing countries. *International Journal of Scientific and Research Publications,* 5(4),1-9.

Hasan, M, M., Rasul, M,G., Khan, M, M., K, Ashwatth, N., & Tahirul, M, I., (2021). 'Energy recovery from municipal solid waste using pyrolysis technology : A review on current status and developments', *Renewable and Sustainable Energy Reviews*. 145, 111073.

Heale, R., & Twycross, A. (2015). Validity and Reliability in Quantitative studies. *Evidence Based Nursing,* 18(3), 66-7.

Heale, R., (2019). Integration of a theoretical framework in to your research study. *Evidence Based Nursing,* 22(2),36-37.

Heidari, R., Yazdanparast, R., & Jabbarzadeh, A. (2019). 'Sustainable design of a municipal solid waste management system considering waste separators : A real-world application', *Sustainable Cities and Society,* 47,101457.

Herberlein, S., Chan, W. P., Veksha, A., Giannis, A., Hupa, L., & Liska, G. (2022). High temperature slagging gasification of municipal solid waste with Biomas charcoal as a greener auxilliary fuel. *Journal of Hazardous Materials,* 423, 127057.

Hertzog, M., A. (2008). Considerations in determining sample size for pilot studies. *Research In Nursing and Health,* 31(2), 180-191.

Herva, M., & Roca, E. (2013). Ranking municipal solid waste treatment alternative based on ecological foot-print and multi criteria analysis. *Ecological Indicators*, 25, 77-84.

Hidalgo, D., Martín-marroquín, J. M., Corona, F., & Juaristi, J. L. (2018). Sustainable vacuum waste collection systems in areas of difficult access. *Tunnelling and Underground Space Technology*, 81, 221–227.

Hox, J., J & Boeiji, H., R. (2005). Data collection, Primary VS. Secondary. *Encyclopedia Of Social Measurement,* 1, 593-599.

Hongkrou, J., Tseng, H,. H, Rao, P., S, & Wey, M., Y. (2008). The prospect and development of incinerators for municipal solid waste treatment and characteristics of their pollutants in Taiwan. *Applied Thermal Engineering,* 28, 2305-2314.

Huang, P., Zhang, X., & Deng, X., (2006). Survey and analysis of public environmental awareness and performance in Ningbo, China: A case study on household electrical and electronic equipment. *Journal of Cleaner Production*, 14(18), 1635-1643.

Huichan , J, K. (2016). The ethics of working with wicked urban waste problems: The case of Singapore Semakau landfill. *Landscape and Urban Planning*, 154, 123-131

Ibikunle, R, A., Lukman, A, F., Titiladunayo, I, F., & Hadi, A. (2022). Modelling energy content of municipal solid waste based on proximate analysis: R-K. Class estimator approach, *Cogent Energy*, (9), 1-20.

Ibikunle, R. A., Titiladunayo, I. F., Akinnuli, B. O., Dahunsi, S. O., & Olayanju, T. M. A. (2019). Estimation of power generation from municipal solid wastes : A case Study of Ilorin metropolis , Nigeria. *Energy Reports*, 5, 126–135.

Ibor, O, R., Andem, A, B., Enih, G., Arong, G, A., Adeougun, A, O., & Arukwe, A. (2020). Contaminants levels and endocrine disruptive effects in clarias gariepinus exposed to stimulated leachate from a solid waste dumpsites in Calabar, Nigeria. *Aquatic toxicology*, 219, 105375.

Ibtissem, M., H. (2010). Application of value-beliefs norm theory to the energy conservation behaviour. *Journal of Sustainable Development*, 3(2), 129-139.

Ifegbesan, A. P. (2020). 'Households attitudes and willingness to pay for solid waste management in two southwest states, nigeria', *Journal of African social studies*, 1(2), 1–11.

Igoni, A, H. Ayotamuno, M, J. Ogaji, S, O, T. & Robert, S, D. (2007). Municipal solid waste in Portharcourt, Nigeria. *Applied Energy*, 84, 664-670.

Ike, C. C., Ezeibe, C. C., Anijiofor, S. C., & Daud, N. N. N. (2018). Solid waste management in Nigeria : Problems , Prospect and Policies, 163–173.

Ikpeze, N. (2014). Safe disposal of municipal solid waste in Nigeria: Perspectives on a right based approach. *Journal of Sustainable Development Law and Policy*, 3(1), 72-86.

Imam, A., Mohammed, B., Wilson, D. C., & Cheeseman, C. R. (2008). Solid waste management in Abuja , Nigeria, 28, 468–472.

Inyang, M., P. (2007). ' Health and safety risk of the municipal solid waste collectors In Port harcourt metropolis of the Niger Delta region of Nigeria, 57.

Iorhemen, O, T., Alfa, M, I., & Onoja, S, B., (2016). The review of municipal solid waste management in Nigeria: The current trends. *Advances In Environmental Research*, 5 (4),237-249.

Isreal, G,, D. (2012). Determining sample size: The UF I University of Florida, 1-5.

Iyamu, H. O., Anda, M. & Ho, G. (2020). A review of municipal solid waste management in the BRIC and high-income countries : A thematic framework for low-income countries', *Habitat International*, 95, 1–15.

James, M., & Nabavubya, N., F. (2017). Assessment of willingness to pay for solid waste collection services in Uganda: Acase study of Kawempe division, 1-7

Jatau, A. A. (2013). 'Knowledge , Attitudes and Practices Associated with Waste Management in Jos South Metropolis , Plateau State', *Mediterranean Journal of Social Sciences*, 4(5), 119–128.

Jenn, C., Ng. (2006). Common ethical issues in Research and publication. *Malaysfan Physian*, 1(2-3),74-79.

Jimoh, R., Chuma, V., Moradeyo, A., Olubukola, O., Sedara, S, O., Yusuf, A., & Jimoh, A., A. (2019). GIS Based appraisal of waste disposal for environmental assessment and management in Mainland Area of Lagos state, Nigeria. *International Journal of Environment and Geoinformatics* 6(1), 76-82.

Jiya, M, S., Mohammed, S., & Hassan, M., I. (2016). Challenges of solid waste management in Minna and environs. *International Journal of Environmental Science*, 1, 1-7.

Johnson, G, A., & Brooks, G., P. (2009). Initial scale development: Sample size for pilot studies. *Educational and Psychological measurement*, 70(3), 394-400.

Joseph, K. (2006). Stakeholders participation for sustainable waste management. *Habitat International*, 30, 863-871.

Kaboub, F., (2008). Positivist paradigm, Leong (Enancy) 2(3), 343.

Kanhai, G., Agyei-mensah, S. & Mudu, P. (2019) 'Population awareness and attitudes toward waste- related health risks in Accra , Ghana', *International Journal of Environmental Health Research*. 1–17.

Kaoje, A. U., Sabir, A. A., Yusuf, S., Jimoh, A. O., & Raji, M. O. (2017). Residents ' perception

Karout, N. & Altuwaijri, S. (2012). 'Impact of health education on community knowledge , attitudes and behaviour towards solid waste management in Al Ghobeiry , Beirut', *Eastern Mediterranean Health Journal*, 18(7), 777–785.

Kasim, S. M., & Ali, M. (2006). Solid waste collection by the private sector: Households perspective-- Findings from a study in Dares-Salem city, Tanzania. *Habitat International* 30, 769-780.

Kassie, K., E. (2016). The problem of solid waste management and people awareness on appropriate solid waste disposal in Bahir Darcity: Amhara region, Ethiopia. *ISABB Journal of Health and Environmental Science*, 3(1), 1-8.

Katusiimeh, M, W. Mol,. A. P. J., & Burger, K. (2012). The operation and effectiveness of public and private provision of solid waste collection service in Kampala. *Habitat International*, 36(2), 247-252

Kazaure, M. B. (2016). 'Survey on municipal solid waste for Sustainable Development and Public Health in Dutse Metropolis , Jigawa State , Nigeria', in *Procedia Environmental Sciences*, 57–64.

Khandelwal, H., Thalla, A. K., & Kumar, S. (2019). Life cycle assessment of municipal solid waste management options for India', *Bioresource Technology*, 121515.

Klasssen, R, D., & Mclaughlin, C., R. (1996). The impact of Environmental management on firm performance. *Management Science*, 42(8), 1199-1214.

Kingsley, E. N., Paschal, I. O. & Jude, E. O. (2016). 'Assessment of landfill sites for management in Delta state , Nigeria solid waste', 3(1), 116–122.

Kofoworola, O, F. (2016). Comparative assessment of the environmental implication of management options for municipal solid waste in Nigeria. *International Journal of Waste Resources*, 7(1),2252-5211.

Kofoworola, O. F. (2007). 'Recovery & recycling practices in municipal solid waste management in Lagos , Nigeria', 27, 1139–1143.

Kolekar, K. A., Hazra, T. & Chakrabarty, S. N. (2016). 'A Review on Prediction of Municipal Solid Waste Generation Models', *Procedia Environmental Sciences. 35, 238–244.*

Korai, M. S., Mahar, R. B. & Uqaili, M. A. (2017). 'The feasibility of municipal solid waste for energy generation and its existing management practices in Pakistan', *Renewable and Sustainable Energy Reviews*, 338–353.

Krejcie, R. V., & Morgan, D., W. (1970). 'Determining sample size for research activities', *Educational and Psychological Measurement*, 607–610.

Kulkarni, B. N. & Anantharama, V. (2020). Repercussions of COVID-19 pandemic on municipal solid waste management : Challenges and opportunities', *Science of the Total Environment*, 743, 140693.

Kumar, A. & Samadder, S. R. (2020). 'Performance evaluation of anaerobic digestion technology for energy recovery from organic fraction of municipal solid waste : A review', *Energy*, 197, 117253.

Kyere ,R, M., Addaney, & JA Akudugu (2019). Decentralization and solid waste management in urbanizing Ghana: Moving beyond the statuquo. Municipal solid waste Book.

Lalitha, R. & Fernando, S. (2019). Solid waste management of Local government in the western province of Srilanka: An implementation analysis. *Waste Management*, 84, 194-203.

Lopez, V., & Whitehead, D. (2012). Sampling data and data collection in qualitative research. *Nursing and Midwifery Research,* 123-139.

Lavee, D. & Nardiya, S. (2013). 'A cost evaluation method for transferring municipalities to solid waste source-separated system', *Waste Management*, 33(5), 1064–1072.

Lawinska, O. Korombel, A., & Zajemska, M. (2022). Pyrolysis-base municipal solid waste management in Poland- SWOT Analysis, Energies, 15(510).

Liebe, U., Preisendorfer, P., & Meyerhoff, J. (2011). To pay or not to Pay: Competing theories to explain individual Willingness to Pay for public environmental goods. *Environmental Behaviour,* 43(1), 106-130.

Liikanen, M, Havukainen, J., Viana, E., & Horttanainen, M, (2018). 'Steps towards more environmentally sustainable municipal solid ~ o Paulo , Brazil waste management : A life cycle assessment, *Journal of Cleaner Production*, 196, 150–162.

Lim, W. J., Chin, N. L., Yusof, A. Y., Yahya, A., & Tee, T. P. (2016). Food waste handling in Malaysia and comparison with other Asian countries. *International Food Research Journal*, 23, S1–S6.

Lin, N. & Roberts, K. R. (2020) 'The normative beliefs that form individual food safety behavioral intention : A qualitative explanatory study', *Food Control*. *106966.*

Lind, H, B., Nordfjaern, T., Jorgen, S, H., & Rundmo, T. (2015). The value-belief-norm theory, Personal norm and sustainable travel mode choice in urban areas. *Journal of Environmental Psychology,* 44, 119-125.

Linzner, R. & Salhofer, S. (2014). 'Municipal solid waste recycling and the significance of informal sector in urban China', *Waste Management & Research*, 32(9), 896–907.

Lisah, S, Y., Ayanore, M, A., Krugu, J, K., Ako, M, A., & Ruiter, R, A. C., (2020). Managing urban solid waste in Ghana: Perspectives and experience of municipal waste company managers and supervisors in an urban municipality. *PLOSE ONE,* 1-8.

Lissah, S, Y., Ayanore, M, A., Krugu, J., Aberese-Areko, M., & Ruiter, R, A., C, (2021). 'Managing urban solid waste in Ghana : Perspectives and experiences of municipal waste company managers and supervisors in an urban municipality, 16(3), 1–18.

Liu, J., Snow, J. & Che, T. (2019). 'Understanding perceived environment quality in affecting tourists ' environmentally responsible behaviours : A broken windows theory perspective', *Tourism Management Perspectives*, 31, 236–244.

Longe, E., O, Longe, O., O, & Ukpebor, E., F. (2009). People perception on household solid waste management in Ojo local government area in Nigeria. *Iran Journal of Environmental Health Science. Eng.* 6(3), 209-216.

Loukil, F. & Rovached , L. (2020). Waste collection criticality index in African cities. *Waste Management,* 103, 187-197.

Ma, J., & Hipel, K. W. (2016). Exploring social dimensions of municipal solid waste management around the globe – A systematic literature review. *Waste Management*, 56, 3–12.

Macovei, O., I. (2015). Determinant of consumer Pro-environmental Behaviour towards an integrated model. *Journal of Danubian Studies and Research,* 5(2),261-275.

Magazzino, C., Mele, M., & Schneider, N. (2020). The relationship between municipal solid waste and greenhouse gas emissions : Evidence from Switzerland', *Waste Management*, 1–13.

Mairvrova, A., Kurniawan, T., A, Kutiskova, M., Bykovskaia, Othman, M., H, D, & Huanggoh, H., (2022). Promoting digital transformation in waste collection service and waste recycling in Moscow (Russia): Applying circular economy paradigm to mitigate climate change impacts on the environment. *Journal of Cleaner Production,* 354, 131604.

Maiyaki, M., A. (2018). A review of rational of community participation in urban solid waste management in Nigeria. Journal of Engineering , Management , & Applied Sciences & Technologies, 9(3), 185–196.

Makarenko, N. & Budak, O. (2017). 'Waste management in Ukraine: Municipal solid waste landfills and their impact on rural areas', *Annals of Agrarian Science*, 15(1), 80–87.

Malav, L, C., Yadav, K, K., Gupta, N., Kumar, S., Sharma, G, K., Krihnan, S., Rezania, S., Kamyab, H., Pham, Q, B., Yadav, S., Bhattacharyya, S, Yadav, V, K., & Bach, Q, V. (2020). 'A review on municipal solid waste as a renewable source for waste-to- energy project in India : Current practices , challenges , and future opportunities', *Journal of Cleaner Production*. 277, 123227.

Maleka, T., G, Nyirenda, G., & Fakoya, M., B. (2017). The relationship between waste management expenditure and waste reduction targets on selected JSE companies. *Sustainability*, 9(9), 1528.

Mamady, K. (2016). 'Factors Influencing Attitude , Safety Behavior , and Knowledge regarding Household Waste Management in Guinea : A Cross-Sectional Study', *Journal of Environmental and Public Health*, 1–10.

Manga, V. E., Oru, O. T. & Ngwabie, M. N. (2019). 'Household perception and willingness to pay for improved waste management service in Mamfe , Cameroon', *Journal of Environmental Science and Toxicology*, 13, 354–364.

Mansur, A. & Muhammad, M., U. (2016). Land use change in a developing urban area of Jigawa state, Nigeria. *Annals of Agriculture and Environmental Science 1 (1),*

Mansur, A. (2015). 'An Analysis of Solid Waste Generation and Disposal in Dutse Sahelian Zone of Jigawa State , Nigeria', *International Journal of Agriculture and Crop Science*, 8(2), 81–85.

Mansur, A., Manaf, L., A, Sharaai, A., H, &Zionordin, N., S. (2021). Municipal solid waste management issues, policies and plan strategies in Nigeria. *Journal of Agricultural Mechanization in Asia*, 51(03),1525-1544.

Marino, A. L., Chaves, G. de L. D. & Santos Junior, J. L. (2018) 'Do Brazilian municipalities have the technical capacity to implement solid waste management at the local level?', *Journal of Cleaner Production*, 188, 378–386.

Mashi, S., A. Oghenejabor, O, D. & Inkani, A, I. (2019). Disaster risks and management policies and practices in Nigeria: A critical appraisal of the national emergency management agency Act. International Journal of Disaster Risk Reduction, 33, 253-265.

Maskey, B. & Singh, M. (2017). 'Households ' Willingness to Pay for Improved Waste Collection Service in Gorkha Municipality of Nepal', *Environment*, 1–15.

Matinez, P, A., Moreno, A, J., P, Jimenez, M, P., M, Macias, M, D., R, Palgtiari, C., & Abellan, M., V. (2015). Social media. Thin-ideal, Body dissatisfaction and disorder eating attitudes: An exploratory analysis. *International Journal of Environmental Research*, 16(21).

Mazha, S., A. Anjum, R., Anwar, A., I. & Khan, A., A. (2021). Method of data collection: A fundamental tool of research. *Journal of Integrated Community Health*, 10(1), 6-10.

Meena, M. D., Yadav, R, K., Narjary, B, Yadav, G., Jat, H, S., Sheoran, P., Meena, M, K., Antil, R, S., Meena, B, L., Singh, H, V., Meena V, S., Rai, P, K., Ghnor, A., & Moharana, P., C. (2019). 'Municipal solid waste: Strategies to improve salt affected soil sustainability : A review', *Waste Management*. 84, 38–53.

Mehta, R., Rice, S., Winter, S. R., Anania, E. C., Baugh, B. S., & Milner, M. N. (2020). Determining the predictors for ease of sleep while on aircraft : Regression and qualitative analyses', *Journal of Air Transport Management*. 83, 101756.

Mei, N, S.,Wai, C, W., Ahamad, R., & Safitri Zen, I. (2017). Review of socio-Psychological determinants in public environmental behaviour. *International Journal of Real Estate Studies*, 11(1), 1-6.

Miezah, K., Danso, K,O., Kádár, Z, Baffoe, B, F., & Mensah, M, Y., (2015). Municipal solid waste characterization and quantification as a measure towards effective waste management in Ghana. *Waste Management*. 46, 15–27.

Mihai, F. & Grozavu, A. (2019). 'Role of Waste Collection E fficiency in Providing a Cleaner Rural Environment', *Sustainability*; 11, 1–22.

Minh-Triha (2022). Data collection using online Questionnaires in Marketing. *Sage Research Method.* 1-12.

Mir, I, S. Cheema, P. P., S. & Sing, S,, P. (2021). Implementation analysis of solid waste management in Ludhiana city of Punjab. *Environmental Challenges,* 2, 100023.

Moghadam, M. R. A., Mokhtarani, N. & Mokhtarani, B. (2009). 'Municipal solid waste management in Rasht City , Iran', *Waste Management,* 29(1),485–489.

Moh, Y., C. & Manaf, L., A. (2017). Solid waste management transformation and future challenges of source separation and recycling practice in Malaysia. *Resources, Conservation And Recycling,* 116, 1-14.

Mohajan, H., K. (2020). Quantitative Research: A successful investigation in Natural and social science. *Journal Of Economic Development, Environment And People, 9 (4), 52-79.*

Mohd, R., Faizal, Y. Ă., Nur, A., Che, R., & Ahmad, A. (2015). Validity and Reliability Learning Transfer Item Using Rasch Measurement Model. *Procedia - Social and Behavioral Sciences*, 204, 212–217.

Mohsenizadeh, M, Tural, M, K., & Kentel, E. (2020). Municipal solid waste management with cost minimization and emission control objectives: A case study of Ankara, *Sustainable Cities And Society,* 52, 10807.

Momoh, J., J. & Oladebeye, D. H. (2010). 'Assessment of Awareness , attitude and willingness of people to paticipate in household solid waste recycling programme, *Journal of Applied Sciences and Environmental Sanitation*, 5(1), 93–105.

Moses, O., Micheal, E., E. & Moses, J, N., D. (2019). A review of environmental management and reporting regulations in Nigeria. *Advance in Environmental Accounting And Management,* 8, 159-182.

Mugenda, O, M., & Mugenda, A., G, (2003). Research methods: Qualitative and quantitative approaches, Nairobi: African Centre for Technology studies.

Mungai, E, M., Ndiritu, S., W. & Rajwani, T., (2020) Do voluntary environmental management system improve environmental performance? Evidence from waste management by Kenyan firms. *Journal Of Cleaner Production,* 265, 1-12.

Muhammad, L. J., Badi, I., Haruna, A, A., & Muhammed, I., A. (2021). 'Selecting the Best Municipal Solid Waste Management Techniques in Nigeria Using Multi Criteria Decision Making Techniques', *Report in Mechanical Engineering*, 2(1), 180–189.

Muheirwa, F., Kombe, W., & Kihila, J., M. (2022). The paradox of solid waste management: A regulatory discourse from Sub-saharan Africa. *Habitat International,* 119, 102491

Mukama, T., Ndejjo, R., Musoke, D., Musinguzi, G., Halage, A, A., Capenter, D, O. & Ssempebwa, J. C. (2016). Practice concern and willingness to participate in solid waste management in two urban slums in central Uganda. *Journal of Environmental and Public Health, 1-8.*

Mulat, S., Worku, W., & Minyihim, A. (2019). Willingness to pay for improve solid waste management and associated factors among households in Injibara town, Northwest Ethiopia, BMC, *12(402), 1-6.*

Munir, M. T., Mohaddespour, A., Nasar, A, T., & Carter, S. (2021). 'Municipal solid waste-to-energy processing for a circular economy in New Zealand', *Renewable and Sustainable Energy Reviews*, 145, 111080.

Munnich, K., Mahler, C, F., & Fricke, K. (2006). Pilot project of mechanical-biological treatment of waste in Brazil. *Waste Management*, 26, 150-157

Musa, A, A., Labo, A, S., Lamido, S, M,. Salisu, S, A., Ibrahim, M, B,. & Bello, N. (2016). Characterization of municipal solid waste in Kazaure Local government Area of Jigawa State, Nigeria. *International Journal of Eng ineering Science And Research Technology*, 5(7), 292-296.

Mwanza, B. G., Mbohwa, C., & Telukdarie, A. (2018).The Influence of Waste Collection Systems on Resource Recovery : Costing models for capacity optimization in Industry 4 . 0 : Trade-off between used capacity and operational efficiency. In *Procedia Manufacturing*, 21, 846–853.

Mwanza, M. S. (2013). 'Design of a waste management model using integrated solid waste management : A case of Bulawayo City Council', *International Journal water resources and environmental Engineering*, 5, 110–118.

Nabegu, A. B. & Metropolis, K. (2017). 'An Analysis of Municipal Solid Waste in Kano *9274.*

Nabegu, A. B. & Mustapha, A. (2015). 'Institutional constraints to municipal solid waste management in Kano metropolis , Nigeria', *International of Innovative Environmental studies Research*, 3(3), 13–21.

Nabegu, A. B., K. (2010). An Analysis of municipal solid waste in Kano metropolis, Nigeria. *Journal of Human Ecology*, 31(2), 111-119.

Nagpure, A. S. (2019). 'Assessment of quantity and composition of illegal dumped municipal solid waste (MSW) in Delhi', *Resources, Conservation and Recycling*, 14, 54–60.

Naibbi, A, I., & Umar, U, M. (2017). An appraisal of spatial distribution of solid waste disposal sites in Kano metropolis, Nigeria. *Journal Of Geoscience And Environment Protection*, 5, 24-36.

Namlis, K., & Komilis, D. (2019). Influence of four socioeconomic indices and the impact of economic crisis on solid waste generation in Europe. *Waste Management*, 89, 190–200.

Nanda, S. & Berruti, F. (2021). 'A technical review of bioenergy and resource recovery from municipal solid waste', *Journal of Hazardous Materials*, 403, 123970.

Narayana, T. (2009). 'Municipal solid waste management in India: From waste disposal to recovery of resources?', *Waste Management*. 29(3): 1163–1166.

Ndau, H., & Tilley, E. (2018). Willingness to Pay for Improved Household Solid Waste Collection in Blantyre, Malawi. *Economies*, 6(54), 1-21.

National Bureau of statistics (2017). Demographic statistics bulletin

Nathan, G. (1999). A review of sample attrition and representativeness in three longitudinal surveys. Government Statistical Service: Methodology series No. 13.

Nie, Y., Wu, Y., Zhao, J., Zhao, J., Chen, X., Maraseni, T., & Qian, G. (2018a). Is the finer the better for municipal solid waste (MSW) classification in view of recyclable constituents? A comprehensive social, economic and environmental analysis. *Waste Management*, 79, 472–480.

Nubi, O., Morse, S., Murphy, R., J. (2022). Prospective life cycle costing of electricity generation from municipal solid waste in Nigeria. *Sustainability*, 14, 1-24.

Nwadike, I., Ezeh, C., C. & Okonkwo, A., C. (2017). Two dimensional electrical resistivity imaging of solid waste dumpsite at Ugwuaji. Enugu state, Nigeria. *International Research Journal of Natural And Applied Science*, 4(7), 262-272

Nwofe, P., A. (2015). Management and disposal of municipal solid waste in Abakaliki metropolis, Ebonyi state, Nigeria. *International Journal of Scientific Research in Environmental Science*, 3(3),0107-0118.

Nyakuma, B, B., & Ivase, T, J., P. (2021). Emerging trends in sustainable treatment and valorisation technologies for plastic wastes in Nigeria: A concise review. *Environmental Progress and Sutainable Energy*, 40(5), 1-18.

Nzalalemba, S., K. (2020). The role of community participation in solid waste management in Sub-saharan Africa. A study of Orlando East, Johannesburg. *South Africa Geographical Journal*, 1-15.

Nzeadibe, T, C. & Ajaero, C, K. (2010). Development impact of advocacy initiatives in solid waste management in Nigeria. Environment Development And Sustainability, 13, 163-177.

Nzeadibe, T., C, & Eziuzor, O., J. (2006).Waste scavenging and recycling in Onitsha urban area, Nigeria. *CIWM Scientific and Technical Review,* 26-31

Nzeadibe, T. C., Ejike-alieji, A. U. P. & Nzeadibe, T. C. (2020). 'Solid waste management during Covid-19 pandemic : policy gaps and prospects for inclusive waste governance in Nigeria', *Local Environment*, 0(0), 1–9.

Obeng, O., F. (2017). Urban governance in Africa today: Reframing, experience and lesson. *Growth And Change*, 48(1), 4-21.

Odonkor, S, I., Frimpong, K, & Kuranti, N. (2020). An assessment of household solid waste management in a large Ghananian district, 6(1),

Ogechukwu, A. (2020). 'A Review of Solid Waste Management Strategies in Nigeria', *Journal of Environment And Earth Sicience*, 10(6), 132–143.

Oghenekohwo, J, E. & Akporehwa, N, J. (2015). Perspective on waste management and community health promotion in urban cities in Nigeria. *British Journal of Education,* 3(8),70-77.

Ogu, V., I. (2010). Private sector participation and municipal solid waste in Benin city. *Environments And Urbanization,* 12(2),103-117.

Ogundale, O, M., Rapheal, O., M. & Abiodun, A., M. (2018). Effects of municipal waste disposal methods on community health in Ibadan-Nigeria, *Polytechnica,* 1, 61-72.

Ogunmakinde, O. E., Sher, W. & Maund, K. (2019).'An Assessment of Material Waste Disposal Methods in the Nigerian Construction Industry'.

Oguntoyinbo, O., O. (2012). 'Informal waste management system in Nigeria and barriers to an inclusive modern waste management system : A review', *Public Health. 126(5), 441–447.*

Ogunjuyigbe, A, S., O. Ayodele, T, R., & Alao, M., A. (2017). Electricity generation from municipal solid waste in some selected cities of Nigeria: An assessment of feasibility potential and technologies. *Renewable And Sustainable Energy Review,* 80, 149-162

Ogwueleka, T, C., & Naveen, B, P., (2021). Activities of informal recycling sector in North-Central Nigeria. *Energy Nexus,* 1, 100003.

Ogwueleka, T., C. (2009). Muicipal solid waste characteristics and management in Nigeria, 6(3), 173–180.

Ogwueleka, T., C. (2013). Survey of household waste composition and quantities in Abuja, Nigeria. *Resources Conservation And Recycling* 77(3), 52–60.

Ojo, A, O., Olurin, O, T., Ganiyu, S., A. Badmus, B., S. &Idowu, O., A. (2022). Electrical imaging characterization of a dumpsite on an abandoned quarry site in Abeokuta, south west, Nigeria. *Scientific African,* 17, e01330.

Okafor, C, C., Ibikwe, J, C., Nzekwe, C., A, Ajaero, C., C, & Ikeotuanye, C., M. (2022). Estimating emissions from open-burning of uncollected municipal solid waste in Nigeria. *AIMS Journal of Environmental Science,* 9(2), 124-144.

Okey, E, N., Umana, E, J., Markson, A., A. & Okey, P., A. (2013). Municipal solid waste characterization and management in Uyo, AkwaIbom state, Nigeria. *Sustainable Development,* 173, 640-647.

Oladeji, O, A., & Otene, I, J., J. (2018). Environmental hazards of dumpsites in Ibadan, Nigeria: *International Journal Of Health Safety And Environment,* 4(03),257-268.

Olalekan, I., O. (2017). Identifying the barriers to environmental management accounting practices: Acomparative study of Nigeria and sub-saharan Africa. *The Business And Management Review,* 9(1), 168-179.

Olanrewaju, O., O. & Illemobade, A., A. (2009). Waste to wealth: A case study of the Ondo state Integrated wastes recycling and treatment project, Nigeria. *European Journal of Social Science*, 8(1), 1-10.

Olorunfemi, A, O., Alao- Daniel, A, B., Adesiyan, T, A., & Onah, C, E., (2020). Geochemical assessment of heavy metals impact on soil around Ewu-Elepe dumpsite, Lagos, Nigeria. *Ife Journal Of Science*, 22(3), 119-138.

Olapejua, O., O, Mohammad Rafee Majid, M., R, & Nyakuma, B., B. (2019). Cultural and Perception Dimensions of Faecal Waste Applications for Sustainable Reuse in Ogun State, Nigeria. *Chemical Engineering Transaction.* 72, 193-198.

Olukanni, D., O. & Nwafor, C., O. (2019). 'Public-Private Sector Involvement in Providing Effi cient Solid Waste Management Services in Nigeria'.

Olusola, O., & Adewale, A., J. (2017). Solid waste attitude in Sango, Ota, Ogun state: Implication for sustainable city development in Nigeria. *Journal of Environmental and Waste Management*, 4, 253-260.

Omotayo, A. O., Omotoso, A. B. & Daud, A. S. (2020). 'What Drives Households ' Payment for Waste Disposal and Recycling Behaviours ? Empirical Evidence from South Africa ' s General Household Survey', *International Journal of Environmental Reseach and public Health*, 17, 1–22.

Oelefse, S., H, H. & Godfrey, L., (2008). Towards improved waste management services by local government- A governance perspective, 1-9.

Onu, B., Price, T., Surendran, S., S. & Ebie, S., (2012). Solid waste management: A critique of Nigeria waste management policy. *International Journal of Knowledge, Culture And Change Management*

Onibokun, A., G. (1999). Managing the monster: Urban waste governance in Africa. *International Development Research Centre, Ottawa*

Onwughara, N, I., Nnorom, I, C., Kamo, O, C., & Chukwuma, R., C. (2010). Disposal methods and heavy metals release from certain electrical and electronics equipment wastes in Nigeria: Adoption of environmental sound recycling system. *International Journal of Environmental Sciences and Development*, 1(4),290-297.

Onyelowe, K. C. (2019). Review on the role of solid waste materials in soft soils reengineering. *Materials Science for Energy Technologies*, 2(1), 46–51

Ooi, J, K., Woon, K, S., & Hashim, H. (2021). A multi-objective model to optimize country-scale municipal solid waste management with economic and environmental objectives: A case study in Malaysia. *Journal of Cleaner Production*, 316, 128366.

Opoku, A, P., & Oluwayo, A., A. (2016). Private sector participation in domestic waste management in informal settlements in Lagos, Nigeria. *Waste Management And Research*, 34(12), 1217-1223.

Orgar, E., C, V, Ogar, E., J,E Njoka, V., N, & Moses, A., (2017). Attitude towards waste management and disposal methods and Health stattus of Cross Rivers state, Nigeria. *SCREA Journal of Agriculture,* 1(2), 231-247.

Oribe-Garcia, I. *et al.* (2015). 'Identification of influencing municipal characteristics regarding household waste generation and their forecasting ability in Biscay', *Waste Management*, 39, 26–34.

Oteng-Ababio, M. (2010). Solid waste management in Ghana: Willingness to pay for improve services. *Ghana Journal of Geography, 2, 86-106.*

Otitoju, T. A. (2014). 'Individual Attitude toward Recycling of Municipal Solid Waste in', *American of Engineering research, 3(07), 78–88*.

Owusu, V., Addo, E., A, &Sundberge, C., (2013). Do economic incentives affect attitudes to solid waste source separation? Evidence from Ghana. *Resources Conservation And Recycling,* 78, 115-123.

Oyedotun, T, D., T. Moonsammy, S., Oyedotun, T, D. Nedd, G, A., & Lawrence, R., N. (2021). Evaluation of waste dynamics at the local level: The search for a new paradigm in National waste management. *Environmental Challenge,* 4.

Oyelola, O., Ajiboshin, I. & Okewole, J. (2017). 'Effective solid waste management in the circular economy : The case study of Lagos State , NIGERIA, 4, 143–148.

Padilla, A., J. & Trujillo, J., C. (2018). Waste disposal and households' heterogeneity. Identifying factors shaping attitudes towards source-separated recycling in Bogotá, Colombia. *Waste Management,* 74, 16-33.

Patton, M, Q. (2002). Qualitative research and evaluation methods (3rdEd). Thousand Oaks: Sage.

Pakpour, A, H., Zeidi. I, M., Emamjomeh, M, M., Asefzadeh, S.,& Pearson, H. (2013). Household waste behaviours among a community sample in Iran: An application of the theory of planned behaviour. *Waste Management,*

Parajuly, K., Fitzpatrick, C., Muldoon, O., & Kuehr, R. (2020). Behavioral change for the circular economy : A review with focus on electronic waste management in the EU. *Resources, Conservation & Recycling:* 5, 6,1-9.

Paritosh, K., Yadav, M., Mathur, S., Balan, V., Lao, W., Pareek, N., & Vivekanaw, V. (2018). Organic fraction of municipal solid waste: Overview of treatment methodologies to enhance Anaerobic biodegrability. *Frontiers in Energy Research.*

Patrick, I. V., Okon, U. E. & Solomon, U. U. (2017). 'Households ' Willingness to Pay for Improved Solid Waste Management in Uyo Metropolis, Akwa Ibom State, Nigeria', *American Journal of Environmental protection*, 5(3), 68–72.

Pattnaik, S. & Reddy, M. V. (2010). Assessment of Municipal Solid Waste management in Puducherry (Pondicherry), India', *Resources, Conservation And Recycling*, 54, 512–520.

Penteado, C, S., G, & Castro, M, A, S., D. (2021). Covid-19 effects on municipal solid waste management : What can effectively be done in the Brazilian scenario ?', *Resources, Conservation & Recycling*, 164, 105152.

PinLee, C., Huang, M, J., & Chen, D., Y. (2022). Factors affecting citizen satisfaction: Examining from the perspective of the expectancy disconfirmation theory and individual differences. *Asian Journal of Political Science*, 33(1),35-60.

Pohjola, V, J., & Pongracz, E. (2002). An approach to the formal theory of waste management. *Resources, Conservation and Recycling*, 35(1-2), 17-29.

Polit, D, F., & Beck, C., T. (2006). The content validity index: Are you sure you know what is being reported? Critique and recommendations. *Research In Nursing And Health*, 29, 489-497.

Põldnurk, J. (2015). Optimisation of the economic, environmental and administrative efficiency of the municipal waste management model in rural areas', *'Resources, Conservation and Recycling*, 97, 55–65.

Pratiwi, R., Kaneko, S. & Kawata, K. (2019). 'Impacts of pecuniary and non-pecuniary information on pro- environmental behavior : A household waste collection and disposal program in Surabaya city', *Waste Management, 89, 322–335.*

Purcell, M. & Magette, W. L. (2010). 'Attitudes and behaviour towards waste management in the Dublin , Ireland region', *Waste Management*, 30(10), 1997–2006.

Quadri, P., (2021). Ranking 36 states in Nigeria by Land area.

Rada E.C., Ragazzi M., Ionescu, G., Merler G. Moedinger F., Raboni, M.,& Torretta, V. (2014). Municipal Solid Waste treatment by integrated solutions: Energy and environmental balances. *Energy Procedia* 50: 1037 – 1044.

Raghu, S, J., & Rodriques, L, L., R. (2020). Behavioural aspect of solid waste management: A systematic Review. *Journal of The Air and Waste Management Association*, 70 (12),1268-1302.

Rahji, M. A., Y. & Oloruntoba, E. O. (2009). 'Determinants of households ' willingness-to-pay for private solid waste management services in Ibadan , Nigeria, *961–965*.

Rahi, S., (2017). Research design and Methods: A systematic review of research paradigms, sampling issues and instruments development. *International Journal of Economics And Management Science,* 6(2).

Rai, R, K. Bhattarai, D. & Neupanes, S. (2019). Designing solid waste collection strategy in small municipalities of developing countries using choice experiment. *Journal of Urban Management,* 8, 386-395.

Ramachandra, T., V, Bharath, H. A., Kulkarni, G., & Sheng, S. (2018). 'Municipal solid waste : Generation , composition and GHG emissions in Bangalore , India', *Renewable and Sustainable Energy Reviews*. 82, 1122–1136.

Rana, J., Dilshad, S., & Ahsan, Md., A. (2022). Ethical issues in Research. *Global Encyclopedia Of Public Administration, Public Policy And Governance,* 1-8.

Razack, N. T. A. A., Medayese, S. O., Shaibu, S. I., & Adeleye, B., (2016). 'Habits and Benefits of Recycling Solid Waste among Households in Kaduna , North West Nigeria', *Sustainable Cities and Society*.

Rigasa, Y., A, Badamasi, A., G. Galadima, N., & Abubakar, G., U. (2017). Community based solid waste management strategy: A case study of Kaduna state metropolis. *Sustainable Development And Planning, 210, 762-772.*

Rislan, K. Good, A. Adams, C. & Scott, P. (2016). The role of ICT education and training in poverty reduction and economic empowerment: A case study of Jigawa ICT4D intervention. Proceeding of 16 European conference on ECEG.

Rodi, L. & Wilson, D. C. (2017). 'Resolving Governance Issues to Achieve Priority Sustainable Development Goals Related to Solid Waste Management in Developing Countries', *Journal of Sustainability*, 9(404), 1–18.

Rodrigues, A. P., Fernandes, M. L., Rodrigues, M. F. F., Bortoluzzi, S. C., Costa, S. G. Da, & Lima, E. P. De. (2018). Developing criteria for performance assessment in municipal solid waste management. *Journal of Cleaner Production*, 186, 748–757.

Rogge, N., & Jaeger, S., D. (2013). Measuring and explaining the cost efficiency of municipal of solid waste collection and processing services. *Omega,* 41, 653-664.

Sam, L., I. (2013). Data collection techniques as a guide for researchers in humanities and education. *International Research Journal Of Computer Science And Information System,* 2(3), 40-44.

Salami, H. A., Adegite, J. O., Bademosi, T. T., Lawal, S. O., & Olutayo, O. O. (2019). A Review on the Current Status of Municipal Solid Waste Management in Nigeria : Problems and Solutions. *Journal of Engineering Research, 3(4), 1–16*.

Salle, N, A., Shafiei, M, W., M. Anwar, A., Zulhumadi, F., & Hubaidillah, S., K. (2022). Sustainning the environment: Critical success factors and barriers of solid waste management through composting practices by rural communities in Malaysia. *Sustainability*,14, 1-20.

Sandhu, K., Burton, P. & Dedekorkut-howes, A. (2016). 'Between hype and veracity ; privatization of municipal solid waste management and its impacts on the informal waste sector', *Waste Management.*

Saunders, M. Lewis, P. &Thornhill, A. (2016). Research methods for Business students. Pearson Education limited, Edinburg Gate Harlow Essex CM202JE, England.

Sawitri, D. R., Hadiyanto, H. & Hadi, S. P. (2015). 'Pro-Environmental Behavior from a SocialCognitive Theory Perspective', *Procedia Environmental Sciences, 23 27–33*.

Sayed, M., N. & Jutta, G. (2018). lively hoods and health status of informal recyclers in Mongolia. *Resource, Conservation and Recycling. 134, 1-9.*

Seah, S. & Addo-fordwuor, D. (2021). 'Roles and Strategies of the Local Government in Municipal Solid Waste Management in Ghana : Implications for Environmental Sustainability', *World Environment*, 11(1), 26–39.

Seh, K., Cobbina, S., J. Asare, W., & Duwiejuah, A., B. (2014). Household demand and willingness to pay for solid waste management service in Tuobodom in the Techiman- North District, Ghana. *American Journal of Environmental Protection,* 2 (4),74-78.

Selvan, C., & Balasundram (2021). Data analysis in context based statistical modeling in predictive analysis. Hand book of Research on Engineering, Business and Health care, Applications of data science and analysis. Pg: 19.

Sembring, E. & Nitivattannon, V. (2010). Sustainable solid waste management towards an inclusive society: Integration of the informal sector. *Conservation and Recycling*, 54, 802-809.

Senekane, M. F., Makhene, A. & Oelofse, S. (2021). Methodology to Investigate Indigenous Solid Waste Systems and Practices in the Rural Areas Surrounding Maseru (Kingdom of Lesotho)', *International of Environmental Research and Public Health, (18), 5355.*

Seng, B., Fujiwara, T., & Spoann, V. (2018). Households' knowledge, attitudes, and practices toward solid waste management in suburbs of Phnom Penh, Cambodia. *Waste Management & Research*, 36(10), 993–1000.

Setya, N, W.,N. Gunawan, I. Kusumaningrum, D. E., Sumarsono, R, B., Ahmad Nurabadi, A, Hui, L, K., Pratiwi, F, D., & Firman Budi Santoso, F, B. (2020). Development of Student Leadership Variables Instruments: Validity and Reliability Analysis. *Advances in Social Science, Education and Humanities Research, volume 508, 1st International Conference On Information Technology And Education (ICITE 2020.)*

Stratton, S., J. (2021). Population research: Convenience sampling strategies. Pre-hospital and Disaster Medicine, 36 (4), 373-374

Sha'Ato, R., Aboho, S, Y., Oketunde, F, O., Eneji, I, S., Unazi, G., & Agwa, S. (2007). Survey of solid waste generation and composition in a rapidly growing urban area in central Nigeria. *Waste Management, 27,352-358.*

Shao, S. Xu, S, X. & Huang, G, Q. (2020). Variable neighborhood search and Tabu search for aution-based waste collection synchronization. *Transportation Research, Part B, 133, 1-20.*

Sharholy, M. & Ahmad, K. (2008). 'Municipal solid waste management in Indian cities – A review', *Waste Management, 28, 459–467.*

Sharma, B. K. & Chandel, M. K. (2021). Life cycle cost analysis of municipal solid waste management scenarios for Mumbai , India', *Waste Management, 124, 293–302*.

Shrotryia, V, K., &Dhanda, U. (2019). Content validity of assessment instrument for employee engagement. *Sage Open, 9 (1), 1-7*.

Sheppard, M. (2004). Appraising and using social research in the human services: An introduction for social work and health professionals. London: Jessica Kingsley Publishers.

Simatele, D. M., Dlamini, S., & Kubanza, N. S. (2017). From informality to formality: Perspectives on the challenges of integrating solid waste management into the urban development and planning policy in Johannesburg, South Africa. *Habitat International*, 63, 122–130

Singh, A. (2019). 'Managing the uncertainty problems of municipal solid waste disposal', *Journal of Environmental Management, 259–265*.

Singh, A. S. (2017). 'Common procedure fro development, Validity and reliability of a questionnaire', *International of Economics, commerce and Management*, V(5), 790–801.

Singh, G. K., Gupta, K. & Chaudhary, S. (2014). 'Solid Waste Management : Its Sources, Collection, Transportation and Recycling', *International Journal of Environmental Science and Development, 5(4), 347–351*.

Sinha, P. (2014). 'A case study on the estimation of willingness to pay', *Journal of International Academic Research for Multidisciplnary*, 2(7), 331–344.

Sinthumule, N, I., & Mkubuzi, S., H. (2019). Participation in community based solid waste management in Nkulumane suburb, Bulawayo, Zimbabwe. *Resources, 8 (30), 1-16*.

Smith, J. R. & Terry, D. J. (2003). 'Attitude-behaviour consistency : the role of group norms , attitude accessibility , and mode of behavioural decision-making', *European Journal of Social psychology*, 33, 591–608.

Solomon, U. U. (2009). The state of solid waste management in Nigeria Generation of e-waste in public universities : The need for sound environmental management of obsolete computers in Kenya. *Waste Management*, 29(10), 2787–2788.

Somiah, M, K., Aidoo, I. & Braimah, A. (2017). An empirical enquiry in to the attribute of residential satisfaction that predict students satisfaction in public halls of residents in technical universities in Ghana. *International Journal African and Asia Studies,* 39, 54-61.

Somorin, T. O., Adesola, S. & Kolawole, A. (2017). 'State-level assessment of the waste-to-energy potential (via incineration) of municipal solid wastes in Nigeria', *Journal of Cleaner Production*, 164, 804–815.

Soni, A., Patil, D. & Argade, K. (2016). 'Municipal Solid Waste Management', *Procedia Environmental Sciences*, 35, 119–126.

Sotamenou, J., Jaeger, S. De & Rousseau, S. (2019). 'Drivers of legal and illegal solid waste disposal in the Global South - The case of households in Yaoundé (Cameroon)', *Journal of Environmental Management*, 240, 321–330.

Souza, A., C, D. Alexandre, N, M., C. Guirardello, E., B. (2017). Psychometric properties in instruments evaluation of reliability and validity, *Epidemiol. Serv. Saude, Brasília,* 26(3).

Sridhar, M, K, C. Oluborode, J, A. & Zacchaeus, U. (2017). Waste management policy and implementation in Nigeria. *National Journal of Advance Research,* 3(3),23-35.

Storto, C. (2019). 'Data on urban waste collection : The case of the Apulia region in It.aly', *Data in Brief.*, 25, 104380.

Suberu, M. Y., Bashir, N. & Mustafa, M. W. (2013). 'Biogenic waste methane emissions and methane optimization for bioelectricity in Nigeria', *Renewable and Sustainable Energy Reviews*, 25, 643–654.

Subhan, M., Abdul Ghani, A., B. & Raihan Joarder, M, H., (2014). Urban Community Willingness to Pay for Improved Solid Waste Management in Malaysian Municipality: A Choice Modeling Approach. Asian Social Science; 10, (18), 1-15.

Suleman, A., Miezah, K., Donkor, E., A, Boateng, K., S, Rockson, G., N, Turkson, E., O, Akuffo, F., O, & Darko, R., (2018). Customer satisfaction of solid waste collection services: A measure towards effective waste management. *Journal of solid waste technology and Management*, 251.

Suleman, D., Simon, M., & Richard, A., (2015). Residents perceptions and attitudes towards urban solid waste management in the Berekum municipality, Ghana. *Oguaa Journal of Social Science*, 7(2), 25-37.

Sutampong, C. & Louangrath, P., I. (2015). Descriptive and inferential statistics. *International Journal of Research Methodology in Social Science,* 1(1), 22-35.

Suthar, S. & Singh, P. (2015). 'Household solid waste generation and composition in different family size and socio-economic groups: A case study', *Sustainable Cities and Society*, 14(1), 56–63.

Taber, K., S. (2018). 'The Use of Cronbach ' s Alpha When Developing and Reporting Research Instruments in Science Education', *Reseach science Education*. Research in Science Education, 48, 1273–1296.

Taghirpour, H., Aslani, Z., A. Armafer, F. & Dehganzadeh, R. (2015). Characterization and quantifying solid waste of rural communities. *Material Cycle and Waste Management*, 18(4),790-797.

Taherdoost, H., Business, H., Sdn, S., Group, C. & Lumpur, K. (2016). 'Sampling Methods in Research Methodology ; How to Choose a Sampling Technique', *International Journal of Academic Research in Management*, 5(2), 18–27.

Tanrivermis, H. (1998). Willingness to pay (WTP) and willingness to accept (WTA) measures in Turkey: May WTP and WTA be indicators to share the environmental damage burdens: A case study, Journal of economic cooperation among islamic countries, 19(3), 67-93.

Tayeh, R. A., Alsayed, M. F. & Saleh, Y. A. (2021). 'The potential of sustainable municipal solid waste-to-energy management in the Palestinian Territories', *Journal of Cleaner Production*, 279, 123753.

Teym, A. (2021). 'Assessment of Household Solid Waste Management Practice and Associated Factors in Debre Berhan Town , Amhara Regional State , Ethiopia', *International Journal of Waste resources*, 1 – 11.

TFKhanom, T., Farjana, A. A., Mamun, A. H. & Ma, B. (2015). Household satisfaction on solid waste collection services conducted by NGOS in Mymensingh municipality, Bangladesh. *International Journal of Natural and Social Science*, 2(4), 14-22.

Thaddeus, C, N., & Adaeze, U, P. Ejike-Alieji (2020). Solid waste management during the COVID19 pandemic: Policy gaps and prospects for inclusive waste governance in Nigeria. *International Journal of Justice and Sustainability*, 25(7), 527-535.

Tian, Xi., Wu, Y., Qu, S., Liang, S., Xu, M., & Zuo, T. (2016). The disposal and willingness to pay for residents scrap fluorescent lamps in China: A case study of Beijin. *Resources Conservation and Recycling*, 114, 103-11.

Triguero, A., Alvarez- Aledo, C., & Cuerva, M., C. (2016). Factors influencing willingness to accept different waste management policies: Empirical evidence from the European union. *Journal of Cleaner Production*, 138, 38-46.

Tsai, F, M., Bui, T, D., Tseng, M, L., Lim, M. K. & Hu, J. (2020). 'Municipal solid waste management in a circular economy : A data- driven bibliometric analysis', *Journal of Cleaner Production*, 275,124132.

Tuoamin, L, Leinor-Kilpil, H. & Mertota, R. (2019). Expectation of patients with colorectal cancer towards nursing care- A thematic analysis. *European Journal of oncology nursing.*

Ugwu, C., O, Ozoegwu, C, G., Ozor, P, A., Agwun, N. & Mbohwa, C. (2021). Waste reduction and utilization strategies to improve municipal solid waste management on Nigerian Campuses. *Fuel Communication*, 9, 100025.

Ukpong, E, C., Udo, E.,D. & Umoh, I., C. (2015). Characterization of materials from Aba waste dumpsites. *International Journal of Engineering And Applied Science*, 6(3).

Uwadiegwu, B., O. & Chukwu, K., E. (2013). Strategies for effective urban solid waste management in Nigeria. *European Scientific Journal*, 9(8), 296-314.

UNEP (2015). Global waste outlook. International Solid waste Association.

Van Ryzin, G., G. (2005). Testing the expectancy Disconfirmation model of citizen satisfaction with local government. *Journal of Public Administration Research and Theory,* 16(4), 599-611.

Viechtbaver, W., Smith, L., Kotz, D., Bude, L., Spigt, M., Serroyen, J. & Crutzen, R. (2015). A simple formula for the calculation of sample size in pilot studies. *Journal of Clinical Epidemiology,* 68 (11), 1375-1379.

Vitor, D., A, Ishak, S., & Jasaw, G., S. (2013). Urban household willingness to pay for improve solid waste disposal services in Kumasi metropolis, Ghana. *Urban Studies Research,*

Volsuuri, E., Sekyere, E, O. & Imoro, A. Z. (2023). Quality analysis of solid waste management services in Ghana: A gap score approach, *Cleaner Waste System*, 4, 1-10.

Vu, H. L., Ng, K. T. W. & Bolingbroke, D. (2018). Parameter interrelationships in a dual phase GIS-based municipal solid waste collection model. *Waste Management*, 78, 258–270.

Wang, A., Chen, X., Wang, X., Wei, J. & Song, L. (2022). Determinants of satisfaction with solid waste management service: A central local comparison in China. *International Journal of Environmental Resource in Public Health*, 19 (8),4610.

Wang, Fang, Peng, X., Wei, R., Qin, Y. & Zhu, X. (2019). Environmental behavior research in resources conservation and management : A case study. *Resources, Conservation & Recycling*, 141, 431–440.

Wang, Feng, Cheng, Z., Reisner, A., & Liu, Y. (2018). Compliance with household solid waste management in rural villages in developing countries. *Journal of Cleaner Production*, *202*, 293–298.

Wang, P. & Fan, F. (2022). Examining and expanding the expectancy disconfirmation model: Evidence from rural china. *Discret Dynamics in Nature and Society,* 2022-1-11.

Wang, W. Tian, Y., Zhu, Q. & Zhong, Y., (2017). 'Barriers for household e-waste collection in China : Perspectives from formal collecting enterprises in Liaoning Province', *Journal of Cleaner Production*, 153, 299–308.

Wassenaar, D, R., (2006). Ethical issues in social science research. In: Terre Blanche, M., K, Durrheim and D. Painter. (eds). Research in practice: Applied methods for the social sciences 2nd ed. Cape town: University of Cape Town.

Wen, Z., Wang, Y.,& De Clercq, D. (2015). Performance evaluation model of a pilot food waste collection system in Suzhou City, China. *Journal of Environmental Management* 154, 201-207.

Williams, R., L (1998). Economic theory and contracting out for residential waste collection: How "satisfying" is it?. *Public Productivity and Management Review,* 21 (3), 259-271.

Woretaw, E., Asmare, W., Development, E., & Ababa, A. (2017). Households ' Preferences and Willingness to Pay for Improved Solid Waste Management Interventions Using Choice Experiment Approach : Debre Tabor Town , Northwest Ethiopia. *Journal of Economics and Sustainable Development,* 8(7), 16–32.

Yadav, V. & Karmakar, S. (2020). 'Sustainable collection and transportation of municipal solid waste in urban centers', *Sustainable Cities and Society*, 53, 101937.

Yasin, R., M. Yunusa, F, A., N. Rusc, R., C. Azmi Ahmadd, A. & Rahimb, M., B. (2015). Validity and Reliability Learning Transfer Item Using Rasch measurement model. *Procedia - Social and Behavioral Sciences.* 204. 212 – 217.

Yoonsoo, P., Lais, K., & Anthony, A, R., J. (2020). The positivism paradigm of research. *Academic Medicine,* 95(5),690-694.

Yousefloo, A. & Babazadeh, R. (2019). 'Designing an integrated municipal solid waste management network: A case study', *Journal of Cleaner Production.* 1–38.

Yusoff, S. (2018). 'Toward integrated and sustainable waste management system in University of Malaya : UM zero waste campaign', in *Web of conferences,* 1–6.

Yusuf, R, O., Adeniran, J, A., Mustapha, S, I., & Sonibare, J., A. (2019). Energy recovery from municipal solid waste in Nigeria and its Economic and environmental implications. *Environment Quality Management,* 1-11.

Zhang, D,. Q. Tan, S, K., & Gersberg, R. M,. (2010). Municipal solid waste management in China: Status, Problems and challenges. *Journal of E.nvironmental Management,* 91, 1623-1633.

Zhang, J., Chen, W., Petrousky, N., & Walker, R., M. (2022). The expectancy-Disconfirmation model and citizen satisfaction with public services: A meta-analysis and an agenda for best practice. *Public Administration Review, 82 (1),* 147-159.

Zhang, X., Geng, G. & Sun, P. (2017) 'Determinants and implications of citizens ' environmental complaint in China : Integrating theory of planned behavior and norm activation model', *Journal of Cleaner Production,* 166, 148–156.

Zhang, Y, Wang, L., Chen, L., Ma, B., Zhang, Y., Ni, W., & Tsang, D, C., W. (2021). 'Treatment of municipal solid waste incineration fly ash : State-of-the-art technologies and future perspectives', *Journal of Hazardous Materials. 411, 125132.*

Zhang, Z. & Zhao, L. (2019). Monitoring of household in waste disposal: Application of the institutional analysis and development framework. *Resources Conservation And Recycling,* 143, 145-59.

Zint, M. (2002). Comparing three attitude-behaviour for predicting science teachers intentions. *Journal of Research in Science Teaching,* 39 (9),819-844.

Zolnikov, T, R., Silva, R, C., Antonia Angulo Tuesta, A, A., Carla Pintas Marques, C, P., Cruivinel, V, R., N. (2018). Ineffective waste site closures in Brazil: A systematic review oncontinuing health conditions and occupational hazards of waste collectors. *Waste Management* 80. 26–39.