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**THE PROSPECTS OF WASTE MANAGEMENT
PRINCIPLES TO ENHANCE SUSTAINABLE
DEVELOPMENT IN NIGERIA**

Examiners: Professor, Mika Horttanainen
Associate Professor, Jouni Havukainen

ABSTRACT

Lappeenranta University of Technology
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Nigeria is presently enmeshed in two related, but different problems; performing its constitutional responsibility of waste management and struggling to achieve the sustainability development as enshrine in the 2030 agenda, which Nigeria is also a signatory. To further understand how complicated the two issues are, practical examples are given from different part of the world.

The thesis therefore aims to establish the strong relationship between waste recycling and reuse, and sustainability development and to further proof that an effective waste recycling and waste reuse, most especially the exploitation of informal waste sector can help Nigeria achieve some of the sustainability development goals it has been struggling to achieve.

Since the possibility of achieving some of the goals of sustainability development lies in effective waste recycling and reuse. Focus was on the critical analysis of the current waste management as practiced in Nigeria was done, with the aim of identifying how to right the wrong.

It is necessary to integrate the informal waste sector into the mainstream of waste practices, because the informal waste sector has performed well, where the formal waste sector failed. Also, the waste management practices must mirror the waste management practices in European Countries, because most of these countries have achieved substantial successes in relation to waste management and sustainable development.

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“And thy Lord is the Most Generous Who taught by the pen, taught man that which he knew not.” (Quran, 96:1-5).” Are those who have knowledge and those who have no knowledge alike? Only the men of understanding are mindful” (Quran, 39:9).

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In Lappeenranta 17 June 2019

Lateef Omosanya

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1 INTRODUCTION

1.1 Background

According to Heraclitus of Ephesus, Change is the only constant thing in life. The ability of man to constantly change has led to serious environmental destructions, economic crises and social challenges (Omid et al.2012). The changes in human population (population growth) and consumption pattern or taste have further worsen the problems of natural resources depletion, societal issues and economic problem. (Omid et al.2012). The world is presently facing numerous environmental challenges, the challenges if not checked, might lead to huge and unbearable catastrophes, that might make the world unbearable place to live.

The quest to solve the triple problems of environmental destructions, economic crises and social challenges has forced people and nations of the world to come together and come out with the concept of sustainability development. Sustainability development has been interpreted to mean different thing to different people, the interpretation is based on individual knowledge, background, value etc.

In order to solve these problems, the concept of sustainable development was developed in 1987 in the Brundtland Report. As at the time sustainable development was meant to create a balance between the two monsters (economy development and environmental stability) that are source of the past and present environmental challenges. (Dorin,2008).

United Nations General Assembly in 1987 define sustainable development as development that meets the needs of the present without compromising the ability of future generations to meet their own needs. From the above definition it can be infer that sustainability development focus on two major issues, which are needs and restrictions (United Nations,1987).One of the implications of the above definition of sustainability is the need to efficiently use the limited resources at our disposal, so that the future generations will not be bereft of the resources that will be needed to live a quality life. Although, the idea of resources conservation is not new, some one thousand years ago, people had been instructed on the need to avoid been excessive, evidence to this can be found in the holy book of the

Muslims, the Quran. In Suratul Araf Quran Chapter 7, verse 31 “O children of Adam, take your adornment at every masjid, and eat and drink, but be not excessive. Indeed, He likes not those who commit excess”.

Sustainability development is aimed at creating a balance between a healthy environment, economic growth and social development. Sustainability development helps in solving environmental and societal issues like; good health and well-being, affordable and clean energy, sustainable cities and communities, climate action, responsible production etc. (Omid et al.2012). It is almost impossible to achieve sustainable development without a functional waste recycling and reuse system.

The common feature of countries, who are unable to meet the sustainable development goals, is their negligence of waste management. Waste management and Sustainability development are strongly related because public health concerns, resources management and environmental issues are the driving forces behind both waste management and sustainability development(Ljljana and David,2017,2).In essence, some of the objectives of Waste management and Sustainability development is to ensure excellent public health, ensure resources are effectively utilized and make sure the environment is safe to live.

The partial commitment to waste management in Nigeria, led to indiscriminate discharged of 80 million liters of oil from different industrial activities across the country, the oil(waste)penetrates the ground surfaces and drains, thereby causing a threat to human health. Also, in some areas in Lagos, municipal wastes litter the environment leading to environmental degradation and threat to human health. (Shridhar et al,2017,1). People living close to dumping sites in Lagos and other dumping sites locations in Nigeria experience different health issues like frequent fever, general body weakness etc. These health issues are related to health implication associated with improper waste management in Nigeria. The above examples indicate that improper waste management is related to sustainable development goals 3 and 6, i.e. Good health and well-being, and Clean water and sanitation. Successive governments in Nigeria have not given waste recycling and reuse the attention it deserves (Adeniran et al, 2017). In addition, the country has not been able to effectively manage and utilize her limited resources. (Robin, 2007). According to the present finance

minister of Nigeria, Kemi Adeosun (2017) Nigeria as a country has been extremely wastefulness an average, that wasteful “culture” is bad and adversely affecting not only the environment, but also all aspect of life. The wasteful culture and limited concern to waste recycling and reuse are one of the reasons why the country is enmeshed in different environmental issues, and as a result find it difficult to achieve sustainable development.

1.2 Goals and delimitations

It is looking impossible for Nigeria to meet the targets of achieving the sustainable development goals by 2030. The thesis therefore is aimed at suggesting how effective solid waste management, with focus on waste recycling and reuse, can be used to achieve some of the UN Sustainable Development Goals (SDGs) in Nigeria.

The thesis will also examine the weaknesses and factors inhibiting waste recycling and reuse towards sustainable development in Nigeria. The other goals of the thesis are;

- To suggest areas where waste legislations needed to be review and strengthen towards sustainable development.
- To propose inter-relationship between different governmental and private waste agencies towards effective waste recycling and reuse in Nigeria.
- To suggest a better waste organizing to improve waste recycling and reuse towards sustainable development in Nigeria.

- The main work for the thesis is to focus towards the geographical boundary of the country, Nigeria. Few references and lessons will be made to one or two EU countries.
- What are the main challenges inhibiting sustainable waste recycling and reuse policies and practices in Nigeria?

2 MECHANISM FOR SUSTAINABILITY DEVELOPMENT

After many years of consultations and deliberations, 193 members of the United Nations met in New York on the 25th of September, 2015 and agreed on global Agenda for Sustainable Development. (Alan, 2016, 11)

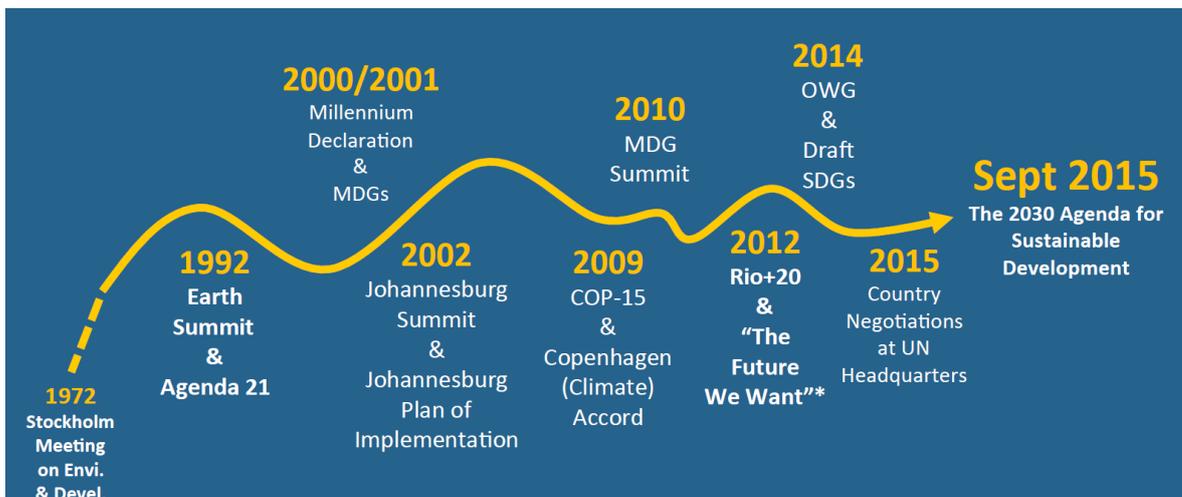


Figure 1 History of Sustainable Development (Alan, 2016, 16)

The agenda focuses more on comprehensive sustainable development policy. (Mayada, 2018). The agenda involves a set of sustainability development goals aim at putting an end to poverty, mitigate climate change, fight inequality and injustice etc. throughout the world by 2030. The sustainability development goals replace the old millennium development goals, it also creates a balance and addresses likely problems between the three core elements of sustainable development (environment, social and economic). For the first time, international agreement for peace and justice for all was reached. (European Commission, 2016, 3).

Agenda 2030 states that:

“Targets are defined as aspirational and global, with each government setting its own national targets guided by the global level of ambition but taking into account national circumstances. Each government will also decide how these aspirational and global targets

should be incorporated in national planning processes, policies and strategies”. (European Commission,2016,3).

The implication of the above quote is that sustainable development goal is a global agenda, but it is the discretion of different national government to set its targets while considering national situation. It is also within the right of the national government to integrate the targets into planning processes and strategies. (Nina et al,2015,4). As a result of this, different national governments and regional authorities adopts different policies and mechanisms in achieving different goals within a specified period.

The national sustainable development policy provides a frame work for governments, policy and decision makers on the policies that will facilitates achieving the objectives of Sustainability development goals.

2.1 Strategic Public Management Model for Approaches To Sustainability Development Mechanism

According to the fundamental principle of strategic management, leadership, planning, implementation, monitoring are the main mechanisms or instruments that authorities should consider implementing for achieving sustainability development goals (Darren et al.,2004,5).

Figure 5 below, shows the diagrammatic description of elements of the national sustainable development policy and how they are related.

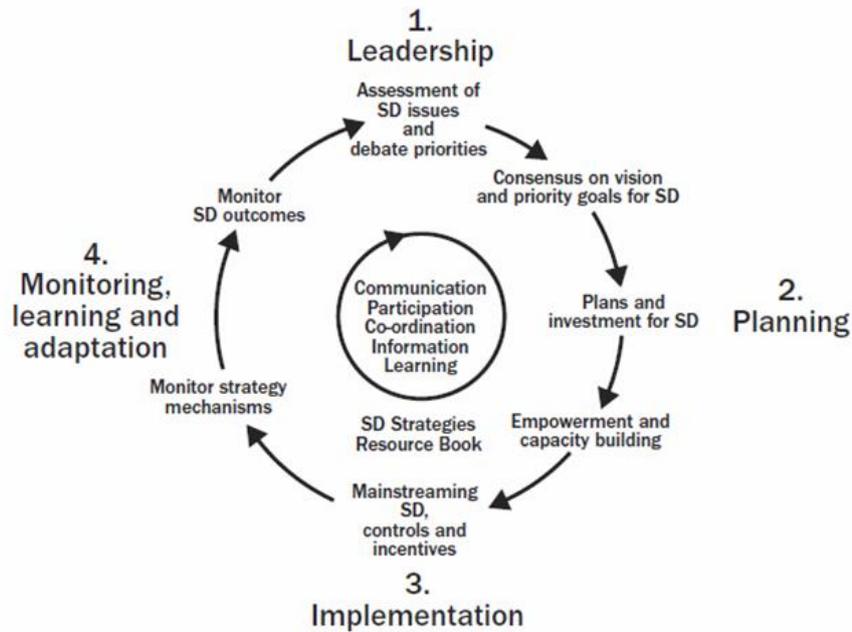


Figure 2 Elements of Sustainable Development Approach(Darren et al.2004,5)

2.2 Leadership

This is the most important part of any management concept. According to Darren et al. (2004,7), leadership involves the creation and developing a clear objective through agreement, effective and continuous processes. The success of sustainability development is dependent on a policy that cut across all sectors (European Commission,2016). Without leadership it will be difficult to implement and achieve sustainability development goals (European Parliament,2019).

Leadership must be bold about the principles on sustainability development i.e. the leadership must represent and consider the present and future generations. Leadership should know that the core elements of sustainability development-economic, social and environment depends on one another. (Darren et al., 2004,7). The most important aspect of leadership is the commitment to achieve sustainable development goals, and most countries that have been successful with some of the sustainable development goals have been lucky to leadership who have committed to sustainability development agenda (European Parliament,2019).

Among the qualities of exceptional leadership are realistic targets, political will, people centered approach, integrating short term vision to middle term and long-term vision etc. (Darren et al., 2004,7).

There are four different approaches to leadership: Comprehensive or detailed strategy, sectorial approach, integration with existing planning and cross-sectoral strategy. These approaches have its distinct qualities, and every government decides which of these approaches is applicable in its own situation. (Darren et al., 2004,7).

2.2.1 The comprehensive strategy

The comprehensive strategy uses a single document that integrate and process the core elements of sustainability development-environment, social and economic. The strategy also provides the structure for articulating strategies and policies towards the realization of sustainable development goals. (Dalal and Bass 2002). The United Kingdom and the Philippines are two good examples of a country that uses the comprehensive strategy (Darren et al., 2004,8). The United Kingdom sustainable development strategy provide a long-term outlook to the main sustainable development challenges facing the country and provide alternatives on how to solve the main problems. The objectives of the strategy are to ensure adequate protection of the environment, using the limited resources prudently, progress

geared towards the satisfaction of needs and maintenance of economic growth. The overall aim of the United Kingdom's sustainable development strategy is to provide quality life for the present and future generation. The strategy is balance because it gives adequate and equal attention to environmental, social and economic problems. (Darren et al., 2004,8-9).

Like the United Kingdom, the Philippine strategy is also practice comprehensive, its strategy is aimed toward a better and quality life. The Philippine Agenda 21 (PA 21) is a comprehensive document that compiles the strategies, approaches and actions of the Philippines towards achieving sustainable development. (Rosemarie, 2016). PA 21 aims to apply key concepts like stakeholder participation and consensus building, integration and operationalization into different ecosystems (freshwater, urban, coastal and forest). The strategy provides a time frame of 30 years for critical sustainable development issues, application of strategy and time bound process targets. (PCSD, 2010). The Philippine Agenda 21 (PA 21) also highlighted the need to fuse sustainable development into governance, provision of viable economic policies, detailed legislative plan, huge investment in human and social capital, and taking measures to solve strategic and critical problems as the conditions which should be met in order to ease transition into sustainable development. The last part of PA 21 also emphasizes enlightenment, information and communication about sustainable development. (Esther, 1998).

2.2.2 The cross sectoral strategy

Cameroon and Madagascar are examples of two countries which employ the cross sectoral strategy to achieve sustainable development (Darren et al., 2004,10). Cameroon's policies are guided by a document, poverty reduction strategy paper (PRSP). This document explained in detail the policies and action in relation to the cross sectoral strategy. Cameroon's PRSP shows that the country prioritizes poverty reduction, structural and social policies that aid economic growth. (IMF, 2010). It also reveals the need for financial assistance and the main sources of getting the finance. To achieve its goal towards sustainability development, Cameroon has prioritized improvement of governance, empowering the private sector, diversification of economy, promoting the framework of macroeconomic and development of economic and natural resources. (IMF, 2006).

2.2.3 Sectoral strategies

This strategy involves the central government shifting the responsibilities of policy making, sustainability development and waste management inclusive to each governmental agency or ministries. Each agency defines and decide the strategies, instruments and regulations it will use to achieve the goals of sustainability development. (European Parliament,2019). The national legislation requires the agencies to submit its strategies for sustainable development to the parliament on a periodic basis (Darren et al., 2004,11). It is also the responsibility of the agency to identify the most important issue in their strategies. Canada is an example of a country that practices sectoral strategies. (Government of Canada,2018). In Canada the waste management strategy employed is the waste hierarchy system. The responsibility of managing waste is shared by federal, provincial, territorial and municipal government. (Government of Canada,2019).

The agencies submitted their third round of sustainability strategies in February 2014.Happenings in the last 3 years were considered in the sustainability strategies submitted in February 2014. (Darren et al., 2004,11).

2.2.4 Integration of sustainability development into existing planning processes

This strategy includes a national developmental plan that last for a six years in some cases. The president or head of the country draws this plan at the beginning of the tenure. The aim of the plan is to facilitate social, political, economic and cultural development. (European Parliament,2019). The content of the plan are strategies which aid the realization of the objectives of the environment and the promotion of sustainability development. Long- and short-term vision that describe the major issues and those attributes that the country should hold on to for the next 25 years are also explain in the plan. Other elements of the plan are high quality of life, leadership, multicultural honour, encouragement of human right, transparency etc. (Darren et al., 2004,12).

According to Darren et al, (2004), Mexico is an example of a country that practices integration of sustainable development into existing planning process. The Mexico’s national plan is for 2001–2006 contain strategies of how to better social and human development, ensure growth with quality and mutual respect.

Figure 10 below shows the different leadership approaches; the time different countries adopted its approach.

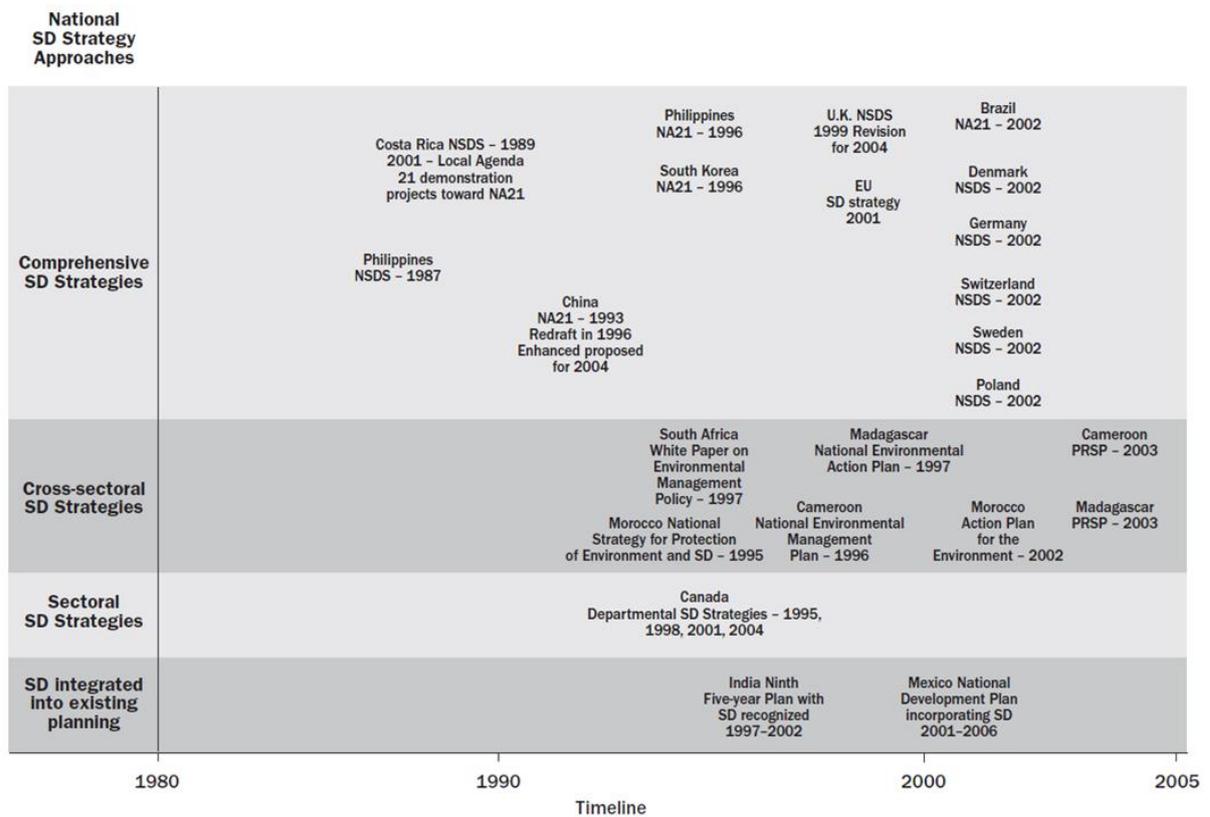


Figure 3 Countries and The Leadership style they Adopted (Darren et al.2004,6)

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provision of clear instructions for the adopted strategy. The essence of planning is to identify ways through which sustainability development goals can be achieved (Darren et al., 2004,15). Strong institution heading the planning process, all-inclusive participation, integrating regional, national and local levels together, detailed and well-grounded analysis etc. are some of the components of a good planning strategy. (Darren et al., 2004,15). Effective planning can be achieved with one or the combination of legal basis, institutional means or policy assessment.

2.3.1 Legal Basis

Establishing a law or regulation is a condition for the continuous existence of any sustainability development policy. Most countries do not have a clear law or regulations toward achieving sustainability the development goals. Canada is one of the few countries with a detailed law for strategy application. An example is the Canada's Auditor General act of 1995 which compels all the federal agencies to submit their sustainability policies to the parliament every 3 years. (OAG Canada,2019). Madagascar and South Korea are two other countries which uses legal instrument called legal mandate to achieve an effective plan towards sustainability development goals. (Darren et al.2004,15). The EU and Mexico are making attempts of utilizing legal instruments, but those instruments are not as effective as it should be. (Darren et al.2004,15). The Mexico constitution only demand the preparation of national developmental plan but didn't compel the integrating those plans into Mexico national developmental plan. The European Union legislation made provision for the integration of sustainability issue into European Union policy. (European Parliament,2019).

2.3.2 Institutional Basis

In this case, the environmental departments(institutions) are saddled with the responsibility of coordinating the sustainability development strategies (Darren et al.2004,15). The institution in some cases might comprise of inter departmental committee with the environment department chairing the committee. Germany and the United Kingdom are two good examples of countries using institutions to achieve sustainability development goals. (Darren et al.2004,16). In the United Kingdom, the institution used to achieve sustainability development goals is the cabinet committee on Environment. The cabinet committee on Environment comprises of green ministers who are appointed from different department. The job of the green ministers is to ensure that sustainable development issues are given consideration in their various departmental policies. (Darren et al.2004,16).The office of the chancellor heads the Green cabinet in Germany, it processes and coordinate all activities in

relation to sustainability development policies in Germany(EPRC,2004).The Administrative Centre for China's Agenda 21 together with the Ministry of Science and Technology in China and the Development Planning Commission(state) are the institutions responsible for the implementation of sustainability development policies in China. (Gan,2013).

2.3.3 Policy Assessment

Policy assessment is a tool created to review policies that are meant for submission to the authority for their likely environmental impacts (Darren et al.2004,16). In the past years there's always been the problem of ensuring that the theories of sustainability and the reasons for sustainability polices perform their roles in ongoing projects, plans, planned projects etc. Policy assessment is an instrument that solves the problem. (Darren et al.2004,17). The idea behind policy assessment is to estimate the likely implication(s) of draft legislations and projects in relation to the three aspects of sustainability development (environment, social and economy) and to specify the likely flaws earlier so as to influence the next phase of action. (Darren et al.2004,17). Switzerland and the United Kingdom are countries that have implemented policy assessment at the national level. In Sweden, the policy is partially implemented. Policy assessment is only used at the municipal level, not at the federal level. (Darren et al.2004,17).

2.4 Implementation

Implementation of sustainable development policies is one of the hinderances to achieving sustainable development goals. No matter how good and effective a policy is, correct implementation of such policy is a condition for achieving the desired result. Approaches to successful implementation of sustainability strategies involves entrusting the responsibilities of carrying out processes of achieving the goals of sustainability development to the best authorities in different conditions.

Some of the critical issues related to implementation of sustainable development policies as mentioned by Axel et al.2004 are; responsibility, financing, and implementing a Mix of SD Policy Initiatives.

2.4.1 Responsibility

Different systems have their challenges, the same logic applies to the situation when the ministries or governmental agencies are vested with the responsibilities of implementing sustainable development policies. The problem with this system is that those ministries have limited or restricted powers and as a result of this, the governmental agencies find it difficult to fully implement sustainability development policies (Axel et al.2004). This actions and reactions either slow down or put a clog into achieving sustainable development goals. (Darren et al.2004,18). Countries like Germany, Finland, Portugal, and Poland are some of the countries that have given the responsibilities of sustainability development to the office of the president or head of the country, which has the final authority in the country. (European Parliament,2019). In Germany, the office of the Federal Chancellor is in charge of the overall implementation of sustainable development policies, although the ministries play little and specific roles (EPRC,2004).. The European Council and commission is responsible for the implementation of sustainability strategies in EU, the European General implements sectoral measures. The president of Mexico is in charge of the National development plan, with each secretariat responsible for certain obligations in their different sectors. (Darren et al.2004,18).

2.4.2 Financing

The role of finance in achieving sustainable development goals cannot be overemphasized. Finance is needed to implement some of the sustainable development policies. Countries are faced with the problems of insufficient revenue for implementing sustainable development initiatives, a problem peculiar to developing nations and the non-provision of sustainable development policies in the National budget. (Klaus et al. 2004). Countries like Italy, Serbia, Denmark and Sweden have resorted to generating revenue for implementing sustainable development policies through ecological taxes and fees. Ecological fee is the act of increasing taxes of petrol, energy etc., while reducing the value added tax.(OECD,2015).Poland was passing through a difficult phase with economic recession and

unemployment, the source of revenue was through a private and municipal initiative, a model that was used to take care of the most important sustainability development policies. (Darren et al.2004,18). The approach used by Costa Rica was to develop a model “the adoption, by decree, in which a certain percentage (5%) on fuel is set aside to support the local component of environmental services. The model is in form of a carbon levy which is income source to pre-payment for environmental services. This model can be modified or developed to meet international requirement. (Kenneth et al.1998).

Cameroon and Madagascar have adopted different system of financing sustainable development policies. The system is called the poverty reduction strategy paper (PRSP), the initiative is applicable to countries with high debt rate. PRSP involves two stages of eligibility, to be eligible for the first stage of debt relief, the country must be able to proof a sound documentation of excellent performances and collaborate with civil organization to formulate PRSP.The second eligibility condition is that the country should also proof that it has implement policies related to PRSP. (Danniel,2001). Madagascar has attracted hosts of donors who have always contributed to finance environmental plans of the country. The development of Madagascar’s National Environmental Action Plan (PNAE) facilitated the donors to finance sustainable development projects in the country. The office of the financing organization was set up in Madagascar and finance by World bank and USAID. (Darren et al.2004,19).

2.4.3 Implementing a Mix of SD Policy Initiatives

To be able implement and achieve the desired goals of sustainable development, it is important that policy makers or government needs to take into consideration instruments which can neutralize the challenges in achieving sustainable development goals (Darren et al.2004,19). Different country employs different tools to implement array of sustainability development policies. Economic tool, regulatory tool, expenditure tool and institutional tools are the known methods of implementing mix of policy initiatives.

Economic Instruments are any action that affect the cost a producer and or a consumer pays for a product. Examples of economic instruments are; commerce permits, down payment

refunds, performance bonds, taxes, user fees, subventions, tax breaks, designated taxes and funds, and regulated prices. (Darren et al.2004,19).

According to Darren et al., (2004), In 1991, Sweden tried to experiment with tax swap,it does that by increasing the taxes on Sulphur and carbon emissions and reduces its income tax at the same time. Exemptions were given to manufacturing companies; the manufacturing companies were also given rebates on environmental taxes. As at 2001, Swedish government has successfully shifted 6% of its revenue, they achieved this by further decreasing social income contribution and income taxes, while increasing diesel fuel tax, electricity tax and heating oil tax. The implication of this policy is that Sweden was able to achieve greenhouse gasses reduction earlier than expected. (Darren et al.2004,20).

Another good example of the economic instrument is the Climate Change Levy (CCL), the climate change levy was launched in 2001 to support the United Kingdom's National Climate Change Programme.The operational principles of the CCL is that it charges on energy for commercial and industrial usage. (Darren et al.2004,20). The charges are 0.46p/kWh on the use of electricity, 0.15p/kWh on the use of gas and 1.17p/kg on the use of coal. The exemptions to these charges are CHPs, residential energy use, energy from renewables and energy used for public transportation. (Darren et al.2004,20).

The greenhouse gas emissions trading is an economic instrument been developed by the EU. This instrument is used by the EU to reduce its cost of combating the menace of climate change.

Regulatory Instruments involves the use of instruments like legislative, enforcement activity, liability, and competition and deregulation to bring about desired change (Darren et al.2004,20). According to Darren et al., (2004), the legislative is a governmental instrument which involves the use of laws or regulations to create an approval for change. For a legislation to be effective, such a legislation must come with an enforcement. The combination of legislative and enforcement will inspire socially responsible thinking to the people and stakeholders and as such make them legally responsible for actions like natural resources depletion, damage to human health, default in relation to tax, charges and levies,

default in relation to environmental legislations etc. (Darren et al.2004,20). Competition and deregulation are meant to provide prices and to make investments in competitive free functioning markets.

In the expenditure Instrument, Darren et al. (2004), explains that in this system the government uses its power to influence the behavior of producer and consumer by directing expenditure at the type of behavior the government is willing to influence. The government expenditure is targeted at different programs at the higher level to facilitate actions like technological transformation. The tools used for direct spendings are project operations, sustainable procurement and research and development. (Darren et al.2004,21). The United States of America and Mexico engages in a combine expenditure(bi-national).The aim of this bi-national expenditure between these countries is to encourage the practice of sustainable development along boarder line, protect natural resources and ensure safety of the public health. To achieve the set objectives of this expenditure, both countries provides resources like federal, tribal, and local entities which they work with. (Darren et al.2004,21).

Institutional Instrument involves how the working methodology of government is used to effect change. (Darren et al.2004,22). A typical institutional instrument includes changes in the way government make decision, internal policies and procedures, and efforts on internal education ((Darren et al.2004,22). The Philippines Integrated Environmental Management for SD (IEMSD) is an example of institutional instrument. IEMSD was implemented to aid in the incorporation of the environment when decisions are made, correct cost of natural resources and strengthening of people's involvement in environmental policy advocacies. (Darren et al.2004,22).

2.5 Monitoring

This is the feedback stage and the last stage of the strategic management mechanism of sustainability development goals. According to OECD guideline, monitoring and evaluation

should be based on clear index and incorporated into strategies to guide processes, track processes, capture lessons and notify when the need to change direction arises. (Axel et al.2004,22). The UN DESA also recommended the need for incorporated instruments that can be used for appraisal, follow up, evaluation and feedback. (Darren et al.2004,22).

Monitoring can either be process monitoring or outcome monitoring. The main objective of process monitoring is to analyses the progress that has been made towards the implementation of different policies. In other word, process monitoring answers the questions of what “we” promised to do and what have “we” done? Process monitoring is an important component for managing a country’s or organization’s sustainable development policies. Examples of countries with functional instruments for process monitoring are Canada, the United Kingdom, Denmark, Cameroon, South Korea, etc. (Darren et al. 2004,22).

In Canada, process monitoring is institutionalized. The Canadian Commissioner of the Environment and Sustainable Development (CESD) examines the government activities on environment and sustainability development. It also examines the commitments in departmental policies and ensure that reports are made to the parliaments on the overall progress that have been achieved within a specified period. (OAG Canada,2019). The observations and suggestions of The Canadian Commissioner of the Environment and Sustainable Development (CESD) have helped in getting direct responses from departments and agencies. It has also helped to shape the contents and rigor of different sustainable development strategies. (Darren et al.2004,22).

In the United Kingdom, the mechanism deployed to monitor process is the spending reviews. Spending reviews is an opportunity to determine if the delivery targets reflect on the agenda of the summit on sustainable development (WSSD). The Green minister annual report is also a source where government performances about sustainable development can be gotten. (National Audit Office,2016).

In as much as monitoring the progress achieve towards the implementation of sustainable development policies is important. Most attention should be given to tracking the progress

on sustainability development that has been achieved. Although monitoring outcome progress is not an easy task because it involves developing a set of indicators which has many components. (Darren et al.2004,23). Darren et al. (2004), explain that the indicators must reflect the most important issues that should be monitored. Invariably the indicators should be incorporated into the procedure of setting the sustainability development goals. The indicators must be smart in nature i.e. it must be measurable, specific, realistic, and time bound. For example, in the United Kingdom, the indicator used to monitor the progress include 15 main indicators, and another set of 147 national indicators and zonal indicators. The indicators were gotten via the process of public discussion and contribution, and have been refined over time. Also, the government of United Kingdom releases a yearly document that states the gains achieved towards the sustainability development targets. Achievements gained are compare against baseline data, and overall pattern are identified.(Darren et al,2004).

2.6 Learning and Implementation

It is important for countries, organizations and or stakeholders in environment and sustainable development to reflect and learn from its activities and make plans on how to adjust to the new information. In most cases, the learning and adaptation process occurs through ad hoc manner (Darren et al.2004,25). Sometimes, organizations rely on formal instrument which they check periodically to retrieve the most important lessons from monitoring data and then modify their plan to fit into the new information they get from the instrument (Darren et al.2004,25).

For example, in the United Kingdom and Canada, the independent auditing system can be a informative instrument for sustainable development strategy policy. The auditing process identify the limitations and suggests functional solutions to the identified limitations. In Canada departmental strategies are review, reassess and re-presented every three years. These actions provide opportunity for learning and adaptation. (Darren et al.2004,25).

According to Darren et. al., (2004), the specific commissions are additional mechanism for learning and adaptation. The United Kingdom's sustainable development mission identifies unsustainable trends and suggest solutions to the government. The task force for Sustainable Development in the United Kingdom also provides an avenue for learning and adaptation. It does a critical review of the current sustainability development policies and will present a new and improved strategies. (Darren et al.2004,25). Other tools that are used for learning and adapting are research network which is also used in the United Kingdom, strategy project report used in Sweden and Germany, in the EU sustainability development spring review is used for learning and adaptation. (Darren et al.2004,25).

2.7 Co-ordination

Co-ordination is an important mechanism for achieving and maintaining sustainability development goals. According to Darren et. al., (2004), co-ordination is a mechanism that cut-across all other mechanisms (leadership, planning, implementation and monitoring). Co-ordination can be vertical, horizontal or inter-generational. A vertical coordination is one which links local, state,zonal and world priorities and actions. A horizontal coordination provides a balance between budgets and strategy priorities, it also links different sectors. The coordination that links short term, medium term and long-term priorities is called inter-generational coordination. Co-ordinating sustainability development with National Budgeting requires countries to creative and decisive with it. (Darren et al.2004,28).

Darren et al. (2004) explain that some countries are faced with challenge of incorporating the principles of sustainable development into their national budgeting process. For example, Cameroon needs to give attention to its national budget, so that the country can attain the Heavily Indebted Poor Countries (HIPC) debt relief completion points (Darren et al.2004,28). In the United Kingdom, all governmental agencies are required to present a sustainable development report that states the likely implications of sustainable development spending on proposed policies, plans and programs. When a link is established between a nation spending and sustainable development impact, this will show how committed a nation is in improving its sustainability development performances. (Darren et al.2004,28).

Darren et al. (2004) explain that Sweden was able to coordinate sustainability development with National Budgeting through tax shifting. Tax shifting is applicable in countries where environmental tax represents a substantial part of the total revenue generated by the government. Six (6)% of the generated revenue in Sweden is through environmental tax. The fact that environmental tax takes a substantial part of the generated revenue is an indication that such a country has successfully coordinated sustainability development with National Budgeting. (Darren et al. 2004, 28).

2.8 Participation

Participation is another mechanism which cut-across all other mechanisms (leadership, planning, implementation and monitoring). Participation is so important that it exists in both UN Department of Economic and Social Affairs (UN DESA) and Organization for Economic Co-operation and Development- Development Assistance Committee (OECD DAC) guidelines for achieving sustainable development goals (Darren et al. 2004, 32). A national sustainability development policy must include participation system that collect opinion or comments from all stakeholders in the country. Most countries have started to incorporate public engagement in the formulation of sectoral policies. This is possible and easier after the progress and efforts in 1992 Earth Summit. (Darren et al. 2004, 32).

According to Darren et al. (2004), approaches to participation are; national councils for sustainability development, cross-sectoral councils, and independent advisory bodies. Germany is an example of a country whose approach to participation is the national councils for sustainability development. German Council for Sustainable Development (RNE) has 17 members that represent specific environmental, economic and social interests. (Darren et al. 2004, 32). The main responsibility of the German Council for Sustainable Development is to advise and guide the government on the formulation and implementation of the national SD strategy. The advice and guidance is in relation to elaboration and evaluation of long-term objectives. The council is also in charge of public debates on sustainability development, they do this to raise public awareness and to encourage a social dialogue on sustainability development. (Darren et al. 2004, 32). Other countries that have practice or are

practicing national councils for sustainability development are; the Philippines, Mexico, South Korea, and Brazil.

According to Darren et al. (2004), Some countries lean towards the cross-sectoral SD strategy approaches for participation. These countries either have or are planning to have a permanent participatory body. Known examples of these countries are Cameroon, Madagascar and South Korea. Cameroon is planning to float a National Poverty Reduction Network (NPRN). The network's responsibilities are to create an avenue where people can share experiences and exchanging data among themselves. It will also provide framework for societal supervision of all the activities undertaken to implement the poverty reduction policies. The Cameroonian government's plan is to introduce the network on a gradual process. (Darren et al.2004,32).

Canada, the United Kingdom and the EU practice the Independent Advisory Bodies participatory policy. These countries have independent advisory bodies which are created to counsel and guide the authorit(y)ies on sustainability development and environment-related issues. (Darren et al.2004,33). For example, in the United Kingdom, an independent advisory body called the Sustainable Development Commission was created in the year 2000.The commission comprises of over 20 members from business world, NGOs, local and regional government and academia. (Darren et al.2004,33) The prime responsibility of the Sustainable Development Commission is to champion sustainable development in all quarters in the country, assess progress towards sustainability development, and suggests necessary actions that needed to be done if further progress is to be achieved. (Darren et al., 2004,33).

3 WASTE MANAGEMENT AND SUSTAINABILITY

The importance of waste management system can never be overemphasized. Waste management is a delicate issue that need outmost attention of all and sundry. A nation or community that fails to implement an effective waste management system, such a country will experience societal, health and environmental crises. Likewise, any country that is able to effectively manage its wastes is likely to alleviate poverty by creating employment and protect the environment among other numerous benefits. (Ljiljana and David, 2017).

Population expansion and change in consumption behaviour had made waste management a complicated issue to deal with. Waste management has evolved from a local problem to a global problem, because there exist a strong relationship between waste management and global problems like climate change, public health, resources management, etc (UNEP,2015).

The production processes and consumption are the main sources of waste (UN-DESA, 2011). Wastes are generated right from the extraction of resources or in the conversion of raw materials to useful goods, to the consumption of the goods (Mahdi, 2018). The main problem with waste management are waste generation and waste disposal. According to Horttanainen (2017), population growth, GDP to person ratio, awareness, legislation are some of the factors that influence the rate of waste generation. Waste disposal involves landfilling or dumping of wastes (to some degree) with the utilization of landfill gases. Waste management can also be the incineration of wastes without energy recovery. For the reasons of waste generation and waste disposal, many nations have been trying different measures or strategies of how to achieve sustainable waste system. A typical waste management involves the following processes; waste generation, storing, collection, transportation, processing, recovery and disposal (Horttanainen ,2017).

The overall objectives of the EU waste policy is to reduce negative impacts of waste on the environment, ensure efficient utilization of EU resources, avoiding waste as much as possible, instil waste recycling into EU culture etc. (EU Commission, 2010). The EU waste

management policy gives priority in the order of waste avoidance, preparing for reuse, waste recycling, other recovery and waste disposal.

Figure 1 below, depicts a graphical representation of the waste hierarchy and briefly explain how each stage in the hierarchy is important to achieve the objectives of waste management.



Figure 4 The Waste Hierarchy (Racheal et al.2013,6)

The European Union waste management policy is aimed at minimizing the environmental and health implications of wastes and improve resources efficiency in the continent. The long term objectives of the policy is to ensure wastes are recycled in the continent, prioritise zero waste generation and in situation where wastes cannot be avoided, the waste will serve as a raw material for production processes.(European Commision,2010,2).To be able to achieve the objectives of the waste policy, the waste policy introduces the waste hierarchy system, where the most desirable of waste option is the prevention of waste in all

ramification and the least desirable is sending wastes to landfill. (European Commission,2010,4).

The prevention of waste as suggested by the waste hierarchy encourage that waste should be prevented from being produced, because when waste is not produced there won't be the need to discard it in the first place. The eco design is a vital instrument that is used to achieve waste prevention. An eco-design product is produced using secondary raw materials, less amount of energy is used in its production process and the product should be recycled after use. (European Commission,2010,13). In an extreme case where waste can be avoided, the policy encourages reusing of the waste. Reusing of waste refer to repeated using of a product (waste in this case) for the case purpose it was conceived. Examples of reusable situation as regards waste management are refrigerator, computer monitor, television etc. (European Commission,2010,13).

Waste recycling is the next on the waste hierarchy scheme, waste recycling is applicable only if the waste is not fit for reuse purpose. The objectives of waste recycling is to reduce the amount of waste that is transferred to the landfill, and at the same time it cut down the amount of raw materials, energy, water consumption etc. used for production of a product. Waste recycling is a means of reserving the natural resources. Recycling will reduce the over dependence of Europe industries on importing raw materials. Energy recovery is the next phase of waste management, it simply involves generating electricity and or heat from wastes. Landfilling is the last and the least desirable waste management option, because of many environmental implications associated with it. (European Commission,2010,13).

3.1 Waste management and sustainable development goals number 1&2 -No poverty and Zero hunger

Waste Recycling is an aspect of waste management which can be a source of employment for people thereby reducing level of poverty of people, and also increasing revenue to the people government through employment and taxation. Effective waste collection and elimination of indiscriminate dumping of refuse will also create jobs and income to people

and the country as whole (Ljiljana and David, 2017, 4). Therefore, the setting up of waste reuse, recycling ministry can be a good way for creating jobs and a means achieving poverty reduction in a system. Priula Consortium in Northern Italy was able to create work places in three years when it switches from the old or usual commingle waste collection to intensive source separation scheme (Sherien et al. 2016, 9).

It was also reported by the United Nations Environmental Programme (2011), that waste collection has created around 15 million jobs for people in the developing countries. Also, in Belo Horizonte, Brazil, about five hundred (500) people have gotten jobs through waste picking, there are also around 2400 waste recycling companies that employ people in Brazil. Likewise, in Dhaka, Bangladesh about 400 new jobs have been created through the generation of compost from organic wastes, also the composting process provide 800 jobs in the same Dhaka city. The collection of plastic wastes and its recycling has provided over 2000 jobs to people who earn between US\$24-US\$50 every month in Ouagadougou, Burkina Faso. (UNEP, 2011, 311).

Figure 2 below, shows the graphical illustration of employment statistics in EU, Norway and Switzerland. The figure shows that there is a steady increase (45%) the number of employed people in those countries from year 2000 to year 2007. Invariably, government and decision makers need to pay more attention to waste management to solve the problem of job creation and the reduction of poverty.

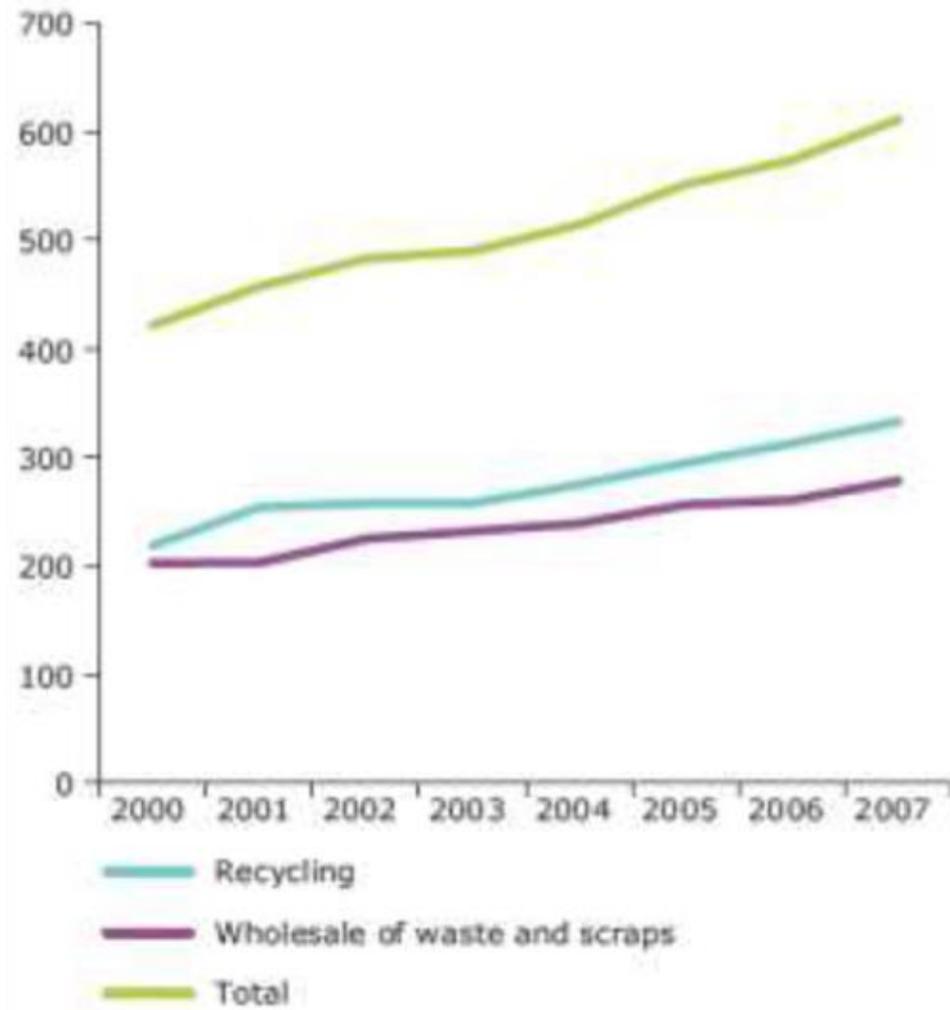


Figure 5 Employed Person (per million) in the waste recycling sector in EU, Norway and Switzerland (Sherien et al.2016,9)

3.2 Waste management and sustainable development goal number 13 - Climate change action

Waste management is also instrumental in achieving goal number 13 of the sustainable development goals (Climate change action). Although, it was estimated that the contribution of waste to the problem of climate change is a little bit over 3% (Dominic and Ann, 2015, 18). According to Chunmin (2012), methane emission from landfilling, sewage treatment etc., Nitrogen oxide emission from human sewage and waste water treatment and carbon dioxide emission from waste burning or incineration are sources of greenhouses

emissions from waste management sector. According to Alison et al. (2001), methane account for about 89% of the total greenhouse gases produced from waste management, while carbon dioxide, nitrogen oxide and other trace elements account for 11%. To be able to reduce the amount of greenhouse gases from waste management, focus should be on landfilling process, because if the amount of methane from landfilling is drastically reduced, the overall amount of greenhouse will be reduced. Methane recovery and utilization from landfill, partial and regulated of landfilling process for specified type of wastes as practiced in Germany and some other countries are some of the ways to reduce or minimize greenhouse gasses from waste management process.

Waste management practices like; avoidance of waste, eradication of open dumpsites, conversion of waste to energy and capturing and utilization of landfill gasses are some of the ways through which waste management can be used to achieve climate change action. (Racheal et al., 2013, 15) Sweden was able to reduce its waste related greenhouse gas emission by twenty five percent (25%) as at 2015 by changes its waste landfill and other policies (The global goals for sustainable development, 2017, 35). Germany was also able to achieve an excellent performance in global warming reduction and other environmental performance due to very low percentage of waste landfilling and very high waste recycling (Susana et al. 2017, 552). EU states were able to recycle 37% of the total generated wastes in 2005, this has led to saving about 158 million tons of CO₂eq. Prognos and IFEU in their study in 2008 conclude that through the combination of waste management and some policies, European countries can achieve the target of reaching 780 MT CO₂eq of waste related by 2020. (Dominic and Ann, 2015, 18).

3.3 Waste management and sustainable development goal number 13 - Affordable and Clean energy

Waste management can also help in achieving sustainable development goal number 7, affordable and clean energy (goal number 7). Production of affordable and cleaner energy (energy with little or no greenhouse gas emissions) is one of the environmental and economic benefits of a functional solid waste management. Energy recovery from waste is an aspect

of waste management which is performing dual functions; it helps to treat the huge amount of wastes generated, secondly it helps to increase the share of renewable energy by offsetting the quantity of fossil fuel that is consumed (Luke et al., 2018, 812). An analysis on the probable energy content of wastes shows that wastes have a huge potential of energy, the average heating value of municipal solid waste was estimated to be 10 MJ/kg, but might not be enough to alter the present dynamics of energy. Depending on the waste composition and type of waste conversion technology, it was estimated that a properly processed waste will give 150-650 KWh of electricity per ton of waste. (Sherien et al., 2016, 32). A typical case study is the USA waste to energy facilities (Incinerators), the incinerators have the capacity of producing 2796 MWh of energy from 96000 tons of wastes in a day. (Luke et al., 2018, 812). In Estonia, the first waste to energy technology was built in 2013. The facility processed 220000 tons of wastes in a year, and it co-produced 138 GWh of electricity in a year and 320-400 GWh of heat in a year respectively. (Jurgita et al., 2017).

Slovenia is another country that is harnessing the opportunity of converting waste to energy. The country installed a combined heat and power technology with a capacity of 24900 tons of wastes in a year, which in turn produces 7.5 GWh of electricity and 119.5 TJ of heat in a year.

3.4 Waste management and sustainable development goal number 3- good health and well-being

Achieving good health and well-being is goal number three (3) in the sustainability development goals. Improper waste management is a huge threat to healthy life and wellbeing of people, most especially to the children. In most developing countries wastes are often dumped indiscriminately or illegally burnt which causes air and land borne diseases. (UN HABITAT, 2010, 15-16).

According to UN HABITAT (2010, 14), the continuous piling of wastes on the road side makes it easier for people living in that community to get contact with the disposed wastes

which will serve as a route for the spreading of different diseases. Also, animal feed on these dumped wastes, which automatically makes them a spreading agent for different diseases.



Figure 6 Burning of Wastes in the Street of Cairo, Egypt (UN News,2012)



Figure 7 Animals Feeding on Wastes Dump by the Road Side(UN HABITAT,2014,14)

In some part of the world, wastes are dumped in waterways which contribute to flooding, pollution and contamination. The dumped wastes into the waterways also causes the drain to be blocked, non-movement of water or stagnation and different diseases. (UN HABITAT,2010,88). Some of the dumped wastes ends in the river or ocean, while some eventually ends in the landfill.



Figure 8 Clogging of Water Ways with Wastes (UN HABITAT,2010,88)

Improper waste management will continue to cause social and environmental problem to people of the world. (UN HABITAT,2010,89). The problem of waste management in the developing countries is compounded by the import of toxic materials from the developed countries. (UN HABITAT,2010,15). The developed nations have turned developing nations to a sort of dumping ground. For example, it was reported that about 900 people died in Côte d'Ivoire (Abidjan) due to the importation of 528 tons of poisonous waste in Autumn 2006. (UN HABITAT,2010,15). Also, in India, there was a case of a disease outbreak in 1994 which was caused by uncollected wastes. The uncollected wastes cause a plague like disease in the community of Surat in India. Fifty-six (56) people were reported to have died due to the uncollected wastes (UN HABITAT,2010,21). UN HABITAT,2010 further confirmed that the Indian government had to pay a price (12 billion rupees) for neglecting waste

management. Aftermath the plague epidemic, the waste management authority in Surat ensure an effective waste collection in the municipal of Surat.

A garbage landslide on a landfill in the capital city municipal waste dump tragedy that killed 200 people in the Philippines in July 2000, has forced the government of Philippines to review its waste management system, and enact the Republic Act 9003, the Ecological Waste Management Act, which is regarded as one of the most effective waste management system in Asia. Research data shows that children who lives near a dumping site or where waste are burnt in the compound are likely to get infected with sickness or diseases like diarrhea and acute respiratory infection. (UN HABITAT,2010,105).To avoid health issues related waste disposal, the minimum requirement is to avoid waste, if possible and if not, an effective waste management is needed in every situation.

3.5 Waste management and sustainable development goal number 12- ensure sustainable consumption and production patterns

Sustainable development goal number 12 focuses on how to achieve sustainable consumption and production pattern. This goal is central to achieving to some of the other sustainable development goals like zero hunger, good health and well-being, affordable and clean energy, and climate change (UNEP,2015,15).

According to the United Nation Environmental Programme, UNEP (2015,15), if a country or a nation can achieve sustainable consumption and production, it means it is likely the country has achieved six (6) out of the seventeen (17) sustainable development goals. Sustainable production involves the efficient utilization of resources, which is linked to good health and well-being, affordable and clean energy, and climate change. Avoiding wastes is one of the key principles through which sustainable consumption and production can be achieved, which is related to zero hunger. Without doubt the world is blessed with abundant resources, but the manner at which the resources are consumed possess threats to the environment and inability of the future generation to have resources to meet their needs. To achieve this goal, it is a must to change the methods that are used to produce and consume

the goods. Efficient management of resource plays a vital role for achieving sustainable consumption and production. It has also been noted that the volume of waste generated must be reduced drastically, when the generated wastes amount can be reduced by limiting the use of resources to produce goods and by recycling wastes to lower the need for virgin material(UNEP,2015,11). For example, bread is an important commodity consumed by people. Bread is produced almost every day with the combination of different resources. And there is an amount of bread that goes into waste every day. To avoid the overexploitation of the resources used to produce bread, it is imperative to reduce the amount of bread that are thrown away or waste every day. In their bids to achieve sustainable consumption and production different countries has adopted different strategies, for example in Australia, Mexico and New Zealand energy consumption and efficiency label is mandatory for household electrical appliances(OECD,2008,11).In the United State of America, the law demand that all prepackaged food are labeled be included in the label are nutrients related to diet-related disease(OECD,2008,11).

Some countries in Asia have identified waste management (reduce, reuse and recycling) as one of the ways to achieve sustainable consumption and production. Japan law has made it compulsory for food producers, bulksallers, retailers, and restaurants to meet a specific recycling rate. The law also encourages the production of fertilizers and animal foods from food wastes. (ESCAP,2018). Among the targets identified by the United Nations in its 10 years framework for achieving sustainable consumption and production is reducing food waste by 50% from the retailer and consumer level, as well as throughout the supply chain. The framework also noted the need to reduce waste generation through 3Rs (reduce, reuse and recycling). (UNEP,2015,11).

3.6 Waste management and sustainable development goal number 11- sustainable cities and communities

In the sustainable development goal number eleven (11), the United Nations identified the need to make city or community people life to be sustainable, secured, and strong. Urbanization growth is having a huge impact on the city(environment), this has led to global crisis that needs the attention of everybody. Sustainable cities play a huge role in reducing poverty, an estimate of 700 million people have been removed from poverty through sustainable city. (UN HABITAT,2016,3). A state that is able to create a sustainable city will have succeeded in solving urban problems, either social, economy or environmental (Svein,2001). Waste management is a condition that must be satisfied for a city or community to achieve the status of sustainable city. Ineffective waste management is the main cause of degraded environment and aggravated health crisis, most especially in developing countries. (Agata,2014,247). Environmentally sustainable living conditions is one of the factors identified by the United Nations in its global action plan on sustainable human settlement (Marie,2007).

Figure 6 below shows the pillars which a sustainable city is built upon. Waste management is an integral part of Environmental management, which is one of the pillars which a sustainable city is built on. Most of the cities that have made remarkable progress in achieving sustainable city have tried to solve local needs and reduce the amount of polluting wastes (David,2015,2).



Figure 9 Pillars which Sustainable Cities are Built on (United Nations,2013,62)

Dharavi a suburb city in Mumbai is an example of a town that has priorities reduction in greenhouse gas emission and maximization of waste management in its efforts of achieving sustainable city goal. The low greenhouse gas emission is due to recycling of wastes and reducing waste as low as possible among other factors (David,2015,6). The city of Curitiba in Brazil is another reference point of a sustainable city. Among the policies implemented by the city is the solid waste management programme called “The garbage that is not garbage” and the “garbage purchase”. These policies encourage the recycling of wastes (metals, plastic, paper and glass) through separate collection of waste, the positive mental change towards waste recycling is result from “garbage that is not garbage” policy. In areas where there is no room for waste collection van, residents sell their wastes in exchange for gifts like student note books, bus tickets etc. The garbage purchase policy has made it easier to clean the most populated areas in Curitiba like Favela. (Alex,2013). Freiburg and Copenhagen are examples of cities whose activities has little impacts on the environment.

4 WASTE MANAGEMENT IN NIGERIA

4.1 History of waste management in Nigeria

Nigeria like many other countries of the world have been battling with waste management crisis for a long time. The agricultural boom, discovery of oil with other factors like population growth, increased quality of life, increase in income rate and change in consumption pattern have contributed to waste generation capacity in Nigeria (Nelson,2013,183). As the quantity of generated waste increases, so are the problems associated with waste management. According to Nelson (2013), Nigeria encountered problems like indiscriminate waste disposal, low capacity for managing generated wastes, burning of wastes in unauthorized place etc. The earliest form of waste management is the dumping of wastes to open area (Sridhar et al.2017). Waste management received the needed attention during the “Koko incident” in 1989, when there was illegal disposal of toxic waste in Koko, South West Nigeria by Italian vessel. There was a national public outcry, and this incident forced the federal government to review its waste policies. The Koko incident lead to the formation of Federal Environmental Protection Agency (FEPA) by Decree 58 of 1988.In 1989, the Federal Government also formulated the national environmental policy. The policy will look into the best treatment for local and industrial wastes, design a waste treatment system that will consider environmental settings and encourage recycling etc. (Benefit et al.2012,14). Many other rules and regulations have been approved, the government has also empowered many agencies to help mitigate the problem of waste. Still the problem persists. (Nabegu et al.2017).

4.2 Existing Waste Management Practice in Nigeria

Nigeria is a country located in the Western part of Africa, with an area of 923 768 square kilometer, in which land comprises 910,768 km² and water accounts for 13,000 km². (OECD,2012,2). According to the worldmeters(2019), Nigeria has a population of 199 million people making the country the most populous country in Africa, the population is projected to increase to 206 million by 2020,with an annual growth rate of 2.62%.

Nigeria practices a federal system of government which means the people of Nigeria are govern by three tiers of government; The federal government, State government and the local government. (Ebikapade and Jim,2017,1). The Nigeria 1999 Constitution (Paragraph H of the fourth schedule) designate the responsibilities of waste management to third tier government, also known as the local government. (Benefit,2012,14). Evidence shows that the local governments does not have the required capacity to discharge the responsibilities of managing wastes in the country. The evidences are piles of wastes found on the road side, rivers, open spaces, unauthorized burning etc. (Benefit,2012,1).

Management has been identified as the main obstacle the local government faced in discharging it responsibilities. Local government did not have the human and capital resources to match the rate at which the quantity of waste generated increases, i.e. wastes grows faster than the resources needed to manage it(Agboje,2013,2).According to indexmundi(2019),the average GDP per capita growth over the last ten(10) years is 2.2%. A population that is increasing at the rate 2.62% ,industrialization, change in lifestyle and increase in consumption patterns are some other factors that contributed to the failure of local government to manage waste effectively(Olori,2016).The inefficiency and ineffectiveness of the waste management agencies has made most cities of the country to be dirty and unhygienic for living(Agboje,2013,2). The state government also augmented the efforts of the local governments by engaging agencies who can cover more than one local governments. For example, Lagos State government created Lagos State Waste Disposal Board (LAWMA). The agency is tasked with the responsibilities of ensuring clean environment through effective waste management system. LAWMA operated as a public-private agency (Agboje,2013,2).

Waste management is a systematic handling of wastes in a way that it doesn't pose any danger to the public health and the environment (Jonathan and Nateinyin,2015). A functional waste management system should include the following key elements; waste generation, storing, collection, transportation, processing, recovery and disposal (Horttanainen,2017). Waste management in Nigeria has not been efficient and effective, the situation has been a major concern to all stakeholder in Nigeria. It is obvious that the authorities in charge of waste management have failed in their responsibilities to manage and control the problem

of wastes in Nigeria. Uncollected Waste is becoming a normal thing in the street corners and open places in Nigeria. The inability to effectively managed waste has led to breakdown of law and order. For example, companies discharge their wastes indiscriminately without any regards to existing regulations. Wastes like plastics, nylon, polythene bags are seen littering the streets. Over 75 million liters of crankcase (an housing for the crankshaft of an engine) are discharged from mechanic workshop in 1989. (Sridhar et al.2017).



Figure 10 Waste disposal on a major road (Dayo,2018)

4.3 Amount of Generated Waste in Nigeria

It is very difficult to determine the total amount of the generated wastes in Nigeria. The reason is because Nigeria has an attitude of not keeping and monitoring records. However, there are estimates on kilogram per day basis. According to Abila and Kantola (2013,304), Nigeria produce an average of 25 million tons of waste in a year. In the rural areas an average of 0.44kg/cap of waste is produced in a day, while in 0.66kg/cap of wastes is produced in a day in urban areas.

Nelson (2014, 185), estimates that 0.49kg per capita of waste is produced in a day by person, therefore based on the 2019 population, Nigeria produce around 97,630 tons of wastes in a day. Babayemi and Dauda (2009),report an estimate of 0.58kg of solid waste per person per

day. Different other reports assume an average of 0.53kg of waste per capita for Nigeria, therefore based on 2006 population statistics a total of 74,428 tons per day waste generation for Nigeria. (Nelson,2014,185). According to the world population review (2018), the population of Nigeria in 2018 is estimated to be 200,000,000. Base on this figure and the report that an average of 0.53kg of waste per capita for Nigeria, total amount of waste generated in Nigeria is 106000 tons per day.

4.4 Composition of Wastes in Nigeria

The composition and rate of generated wastes in Nigeria varies with the population in different areas, industrialization level, prevailing climate and season, social behavior etc. (Benefit,2012, 16). The wastes common in all regions of the country (Nigeria) are; paper, vegetable matter, plastics, metals, textile, rubber and glass. (Benefit,2012, 16). Since it is a bit difficult to get the aggregate composition of wastes in Nigeria, the composition of wastes in some cities in Nigeria are gathered to table 1 below

Table 1 waste Streams of Some Cities in Nigeria (Tariwari et al.2017)

Composition (%)	Akwa Ibom	Ilorin	Edo	Kano	Enugu	Jigawa	Nasarawa	Abuja(FCT)
Food/Organics	59.60	11.15	46.53	41.50	46.16	60.58	27	53.8
Nylon/Plastic	13.72	15.80	26.32	21.50	35.32	5.95	8	7.04
Paper	13.13	8.81	14.77	23	10.17	7.01	2	9.58
Metals	8.07	-	3.32	14	6.84	12.17	6	2.54
Glass/Ceramics	-	-	8.16	-	2.57	14.29	10	7.32
Others	5.33	64.23	0.93	-	11.92	8.06	47	20.28

4.5 Collection and Transportation of Wastes

This is an arrangement in which stored wastes are taken from the stored points on a periodic basis using the collection truck. The cost of waste collection is determined by location and the type of household that generates the wastes (Agboje et.al.2014,1). The volume or amount of waste does not affect the cost of waste collection. In most cases the compact truck is used for waste collection. The manner of waste collection is door to door, but the system of waste collection differs from high income area to low income area. In low or medium area, the waste collector signifies mainly to the people by using the horn of the truck. In high income area the waste collector collects the waste from the bin which is placed in front of the house. In low income area, it cost the residents around ₦1000 to ₦ 1500 in a month, for medium income area the resident pays ₦1500 to ₦ 1800 and high income area pays ₦1500 to ₦ 2000. (Agboje et.al.2014,5).



Figure 11 Waste Collection and Transportation (Alba,2019)

4.6 Indiscriminate Waste Dumping

The inability of the constituted authorities to discharge its responsibility of periodical waste collection, has immensely contributed to the reasons why some Nigerians engage in indiscriminate or illegal dumping. In areas or locations where waste collection is a bit functional, some of the residents could not afford the cost of waste collection. Some locations are inaccessible, as a result collection of wastes in such location is hard to achieve. Indiscriminate waste dumping practices involves dumping wastes on the side of the road, open burning of wastes, dumping or throwing of wastes in the drainage or in the river.

4.7 Storing of Wastes

The wastes generated in different household are stored in a special bin provided by the government, or the bin provided the private body. Wastes are also stored in a drum. There are also some cases where the wastes service provider, provide a community with a central waste storing facilities



Figure 12 A typical Central Waste Storage System(Nkechi et al.2013)



Figure 13 Storing of Waste in a Metal Barrel (Adeleye et al.2014)



Figure 14 Waste Storage in a Specially provided Bin(Babajide and Frank,2016)

4.8 Illegal Waste Recycling

The informal wastes participants are involved in the illegal recycling of wastes. The informal participants include scavengers and buy-back traders. The scavengers “pretend” or act as waste collector, they collect only recyclable wastes or reusable wastes either at the point at which the wastes are generated or at the landfill. The buy- back traders moves from place to place to buy valuable materials from people. The buying of valuable goods can be in the form of cash or exchanging goods for goods.



Figure 15 Informal Recycling of Wastes(Aleema,2017)



Figure 16 Scavengers Doing their Work in an Open Dump Site(Betram,2015)

4.9 Disposal of Waste

In Nigeria, the techniques of waste disposal are uncontrolled landfill, open dumps and in some cases waste burning. Most of the dumping center are located along the road in most major cities in Nigeria. (Benefit et.al.,2012,17). The citizens in some cases creates illegal dumping centers in situations where the authorities fail to provide one. Wastes are either burnt at the house backyard or burnt at the dumping cites (Nelson,2014, 187).



Figure 17 A Typical Waste Disposal Practices in Nigeria (Benefit et al.2012,11)

4.10 Waste Management and Sustainability Development in Nigeria

Waste management has been a problem Nigerians and Nigeria government have been struggling to handle. This is because Nigeria produces a huge amount of wastes due to its population. Despite the environmental, social and economic benefits in Waste recycling and reuse practices, a formal waste reuse and recycling sector does not exist in the Nigeria legislation or in practice(Benefit et.al.2012,18).Although, the Federal and State government made efforts to include waste reuse and recycling into its policies, but the efforts yield no single positive result, aside from Lagos state who has a formal policy for waste reuse and recycling.(Peter and Chidi,2016,2).

The waste management practices in Nigeria does not in any way support sustainable development. Although, the Nigeria government has formulated a national policy on the

environment, the policy focuses on Nigeria's commitment in achieving sustainable development goals and how the country intends to achieve the goals of sustainability development. However, the reality on ground prove otherwise. The commitment is just on paper, the sincere commitment and technical know-how to actualize the plan is lacking.

The failure of waste management authorities to discharge its statutory responsibilities, led to the evolution and strengthening of the informal waste sector. The informal waste sector which comprises of scavengers and buy-back traders are in charge of waste recycling and reuse. The activities of informal waste sector involve processing of wastes, transforming of waste and trading of wastes. The scavenger pick or collect recyclable wastes from the bins on the street or on dump sites. The collected recyclable material might pass through washing and or drying (processing), the processed materials are then sold to waste dealers or waste traders who re-sell the recyclables material to manufacturing companies. (Ayodele et.al.2018,167). The operations and activities of the informal waste sector in Nigeria is similar to that of other developing countries like Brazil and Colombia. (Ayodele et.al.2018,167).

4.11 Waste and Sustainability Legislation in Nigeria

The constitution of the Federal Republic of Nigeria empowers the state to protect and improve the environment and protect the water, air, land, forest and wildlife within the territory of Nigeria (Sridhar et.al.2017,29). To be able to achieve the objectives of waste management, the Federal government of Nigeria created an agency called the Federal Environmental protection Agency (FEPA) by evoking Decree 58 of 1988. The Federal Environmental protection Agency (FEPA) was created in 1988, after the Koko incident. FEPA has the statutory responsibilities of management of waste regulations (S.1.9 of 1991) and Environmental Impact Assessment (EIA) Decree No. 86 of 1992. (Benefit et.al.2012,14).

The Federal Environmental protection Agency (FEPA) couldn't discharge its responsibilities mainly because it is an agency operating under the Federal Ministry of Works and Housing. The Federal Environmental protection Agency (FEPA) made almost sixteen different waste legislations, but there are no mechanism for coordinating the legislations (Sridhar et.al.2017,29). The emergence of democracy and the need to review the environmental policy in Nigeria, led to the conversion of the Federal Environmental protection Agency (FEPA) to a full ministry, called The Federal Ministry of Environment. The Ministry was given the following mandate; to prepare and review on a periodic basis the National Policy for the protection of the environment and conservation of natural resources, creation of master plans and advisory service to the Federal government towards the development of the environment, sciences and technology, and give useful suggestions to the Federal Government on the conservation of natural resources and sustainable development.(Sridhar et.al.2017,29).

Following the creation of the Federal Ministry of Environment by the Federal government, the State government also created the State Environmental Protection Agency (SEPA) in 1990's (Chukwunonye and Clive,2013, p.121). In some cases, the state government engages the services of private agencies to complements the efforts of the state's environmental agency so that it can achieve the objectives of waste management. (Sridhar et.al.2017,30). Some federal agencies also work with the Federal Ministry of Environment for the enforcement of environmental regulations (Nabegu et.al,2017, p.1). The Local governments also have the statutory responsibility of disposing municipal waste, they also have the constitutional right of making by-laws (Sridhar et.al.2017,29).

In summary, the Federal Ministry of Environment is the highest authority body in term of waste management in Nigeria. The ministry oversees the activities of states, local, and federal agencies, as well as organizations that functions within the territory of Nigeria, follows the rules and regulations as enshrine in the constitution of Nigeria. (Nabegu et.al,2017,1).

4.11.1 The Constitution of the Federal Republic of Nigeria (CFRN) 1999(as amended)

The constitution of the Federal republic of Nigeria that was amended in 1999 clearly stated that it is the responsibility of State(government) protect and improve the environment and safeguard the water, air and land of Nigeria. (Nnamdi.2014,79).

4.11.2 The National Environmental Standards and Regulations Enforcement Agency (NESREA) Act of 2007

The NESREA Act replaces the old Federal Environmental Protection Agency (FEPA) act. The NESREA act is the main legislation on environmental management in Nigeria. The National Environmental Standards and Regulations Enforcement Agency (NESREA) is the body saddled with the responsibility of ensuring that both local and international environmental legislations are complied to. The agency also makes laws on air and water quality, effluent limitations, control of harmful substances and other forms of environmental pollution and sanitation. The agency looks into the issue of pollution prevention and control through monitoring and regulatory measures. (Nnamdi,2014,79).

4.11.3 The Environmental Impact Assessment Act

This law makes it mandatory for organizations planning to do any project that is likely to cause negative implications on the environment to perform an environmental impact assessment test on the project before the organization starts the project. Permit is not granted to any project that will result into unjustifiable, immitigable, and significant adverse effects on the environment. (Nnamdi.2014,79).

4.11.4 National Environmental (base metals, iron and steel manufacturing / recycling industries sector) Regulations 2011

The objective of the regulation is to ensure the prevention and reduction of pollution from the activities of ancillary activities of the sector in the Nigeria environment. The regulation encourages the use of cleaner technologies to be applied for production processes, so that pollution is reduced as lowest as possible. The regulation mandated the use of the principle of 5R's i.e. Reduce, Repair, Reuse, Recycle and Recover in the management of scraps generated in the course of production. (Nnamdi.2014,80).

4.11.5 The Harmful Wastes (Special Criminal Provisions, etc.) Act

This Act prohibit illegal disposal of waste by anyone or any organization on any land, water within the Nigeria territory's Act pronounced it as an offence for any individual or any organization to deal(carry, deposit, dump) and or trade(buy,sell,negotiate,offer)any harmful waste on any land, territorial waters, contiguous zone, exclusive economic zone or inland waterways of Nigeria. The Act was promulgated immediately after the Koko incident. (Nnamdi.2014,80).

4.11.6 The National Policy on the Environment

This is a document that highlight how the Nigeria government aim to achieve the goals of sustainable development. The document reiterates Nigeria's determination of achieving sustainable development goals, through effective environmental management. The main goal of the Nigeria government is to secure the health and wellbeing of its citizen. Some of the strategies of achieving the goals are; creation of environmental standard, monitoring and evaluation of changes in the environment, periodic publication of environmental data, conducting environmental impact assessment etc. (Nnamdi.2014,80).

4.12 Prospect of Waste Recycling and Reuse in Achieve Sustainability Development Goals in Nigeria

Waste recycling and waste reuse is one element that is instrumental in achieving some of the goals of sustainable development. Although, there is no formal waste recycling and waste reuse sector in Nigeria. The informal waste sector has been efficient in waste collection, transportation, reuse and recycling. At the least, Nigeria will achieve the following sustainability development goals, if waste recycling and reuse, and the combination of sustainable water, wastewater management and other mechanisms are effectively practice; No poverty, zero hunger, good health and well-being, affordable and clean energy, sustainable cities and communities, responsible consumption and production, and climate change.

According to Oladipupo et al. (2017,36), the informal waste sector provided about 500000 jobs in Lagos state alone, also the informal sector is the largest employer of labour, accounting for 53% of new employment. The informal waste sector is also part of the informal sector. According to Nzeadibe and Iwuoha (2014,26) an average informal waste sector worker earns twice more than the minimum wage paid by the Lagos State government. On this basis, and in the long and short term it is obvious that a well-structured waste recycling and waste reuse sector will immensely contribute to reducing poverty, hunger, and good health and well-being, because creating employment or having a paid job has a multiplier effect on poverty, hunger and good health and well-being. An employed person will be getting a monthly salary which will reduce poverty level, a person receiving a monthly salary will have the money to purchase food which will reduce the rate of hunger and the person will be able to afford most of the things he or she needed for good health and well-being. People can also buy goods that have been previously used (waste reuse) at a very cheap price to satisfy their needs.

However, Nigeria has been losing and might continue to lose if the informal waste sector is not integrated in the waste management scheme. A lot of money is been lost to tax evasion because the income of informal waste sector is not taxed. Also the living and working

conditions around the sites is very bad, in case of any health challenges the government of Nigeria are partially responsible for the cost of health.

The production of a product requires the use of certain amount of energy. Energy is used in the extraction of raw materials, production process etc. With the use of recycling material as a raw material, the net amount of energy that is used for the overall production process is reduced, thereby reducing the emissions of greenhouse gases into the environment. (Ayodele et al.2018,169). The electricity saved is from extraction of raw material, processing or transforming the raw material etc. The amount of electricity saved is enough to power 400 homes in Campina, Brazil. In Japan, about 147 kg-CO₂/ton was saved when PVC sash are recycled. PVC sashes are materials used for installing windows and doors in buildings construction of buildings. Invariable, when waste recycle and waste reuse is inculcated into Nigeria's legislation, a huge amount of electricity can be saved, thereby solving a bit of electricity problem in the country. Greenhouse gases emission are also reduced which will improve the quality of life in Nigeria, and the World in general.

The practice of waste recycling and reuse is one of the ways of conservation and efficient utilization of resources. With waste recycling and reuse, a lesser amount of virgin raw materials is used in the production of products, lesser quantity of fuel is also needed for production process. (Ayodele et al.2018,169). Waste management and recycling is central to achieving responsible production and consumption (sustainable development goal number 12), because responsible production involves efficient use of natural resources, while responsible consumption is strongly linked with reduction of waste. It has also been noted that the volume of waste generated must be reduced drastically, when wastes are reduced there won't be need to use more resources to produce goods. Nigeria can learn from Japan who has identified waste recycling as one of the ways of achieving responsible production and consumption by making it mandatory for food producers, bulk sellers, retailers, and restaurants to meet a specific recycling rate. The law also encourages the production of fertilizers and animal foods from food wastes. (ESCAP,2018).

According to Emmanuel et al. (2016,183), it is not possible to achieve sustainable city (sustainable development goal number 11), when the waste the city generate is more than

the waste it can absorb. What Emmanuel and his co-authors are suggesting is effective management is a condition for achieving sustainable city. Sustainable cities play a huge role in reducing poverty, an estimate of 700 million people have been removed from poverty through sustainable city. (UN HABITAT,2016,3). A state that is able to create a sustainable city will have succeeded in solving urban problems, either social, economy or environmental (Svein,2001).

There is no doubt that Nigeria as a country stand to achieve some goals of sustainability development when and if waste recycling and reuse is properly practiced and made compulsory in the country. The task before the stakeholder in this situation is how the informal waste sector will be streamline into the formal waste sector.

Also it is necessary to show using the calculation method to proof the likely amount of recyclables wastes which can be gotten from the waste streams in Nigeria. According to Ayodele et al. (2018,167), the amount of recyclable waste in a waste stream can be obtained using the model shown below;

$$Q_{i\text{recycled}} = MW_{\text{collected}} * Q_{(i)\text{fraction}} * Q_{(i)\text{rate}} \quad (1)$$

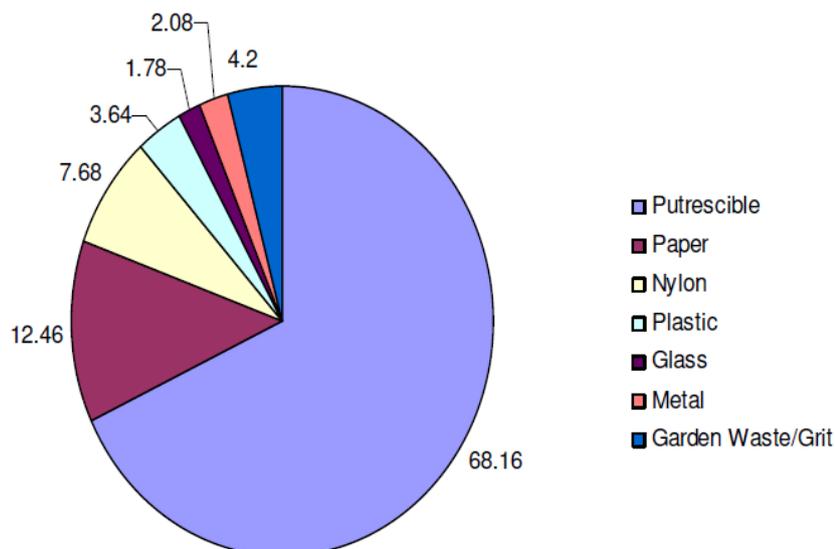
i is the index that describe the waste material e. g food, paper, metals etc.

$Q_{(i)\text{recycled}}$ is the share of a particular type of a waste in a waste stream

$MW_{\text{collected}}$ is the total amount of municipal waste collected at a time

$Q_{(i)\text{fraction}}$ is the fraction composition of a particular type of waste in a waste stream

$Q_{(i)\text{rate}}$ is the recycling rate of a particular type of waste in a waste stream



According to Nelson (2014,186), the average municipal waste generated in a day in the selected metropolis in Lagos is about 5748 tons/day

Also, according to Ayodele et al. (2018,169), the recycling rate for paper, plastic, metal and glass are 10%,10%,10% and 5% respectively.

Using the model in equation 1 and the given data, the amount of likeable recycled paper, plastic and metals for calculating the amount of recyclable waste within the metropolis

$$Q_{(paper)recycled}=72 \text{ tons/day}$$

$$Q_{(plastic)recycled}=21 \text{ tons/day}$$

$$Q_{(metals)recycled}=6 \text{ tons/day}$$

5 PROPOSAL TO WASTE MANAGEMENT IN NIGERIA

For Nigeria to achieve the goals or some of the goals of sustainability development, the country needs a total and strong commitment towards that course. The commitment starts with the integration of sustainable development goals into Nigeria's national budget. Finland and some other countries provide a good template for Nigeria to emulate. Finland has successfully upgraded its sustainable development strategy to be consonance with the global sustainability development goals, hence Finland has developed a long term (30 years) strategic policies for achieving sustainable development goals. (Prime Minister Office,2016). Nigeria, just like Finland can also choose a comprehensive theme for sustainability development and integrate it into the national budget. Finland in its case choose resource efficiency and neutral carbon, and non-discrimination and equality in Finland as the two-comprehensive sustainability development themes and integrate the themes into national budget through the Ministry of Finance. Under the leadership of the Ministry of Finance, sustainability development goal is the basis of major government spending, this action brings out the connection between spending and sustainability development. (European Union,2018).

Leadership is an integral factor for achieving sustainability development goals. I will suggest the Federal government of Nigeria provide the necessary leadership needed for achieving the goals of sustainability development. The reason is because countries like Finland, Germany, etc. have recorded a relatively huge success in the course of achieving sustainability development goals, also the central government of those countries have taken the leadership position in the formation and implementation sustainability development policies.(European Union,2018).Nigeria can replicate the Finnish sustainability leadership system provided by the Prime Minister, the Prime Minister and duly assisted by Inter-ministerial Network Secretariat, is designated to coordinate the representatives of Prime Minister's Office, Ministry of Foreign Affairs and the Finnish National Commission on Sustainable Development (FNCSD).The Prime Minister is also directly involved in the systematic link of internal and external dimensions of sustainability development.(Prime Minister's Office,2017). With the Federal government of Nigeria in firm control of the leadership, it will be easier to achieve the horizontal coordination and policy coherence

needed to achieve sustainability development goals, aside from this, the practice will shift the concern of sustainability beyond different ministries.

One of the important variables needed for successful implementation of sustainability development agenda is the inclusion of different stakeholders in decision making. One of the best approaches to the inclusion of stakeholder is one which gives room for multiple aspect of stakeholders' participation and coordination. This practice creates opportunities for experts to be involved in the implementation process of sustainability development goals. It also creates different platforms for open consultations and dialogues which leads to wider public participation. Germany is a good example of a country that practices multiple aspects of participation and coordination. In Germany, expert's participation at high governance level is achieved through sustainability forum that has been in existence since 2017, and the German Council for Sustainable Development. The creation of the dialogue group gives opportunities to non-state actors to directly connect to the German State Secretary Committee.(European Union,2018).

Political instability and periodical change of governments and their policies is one of the factors that slows down sustainability development goals agenda in Nigeria. To be able to solve this problem, and hence achieve some of the goals of sustainable development, there is the need to develop a long-term sustainability development into governance in Nigeria. There is need to create an institution whose function is to facilitate, coordinate and prioritize long term sustainability development inclusion into governance and also to horizontally integrate the concept of long-term sustainability in Nigeria. Malta and Hungary are good examples of countries that has adopted the long-term sustainability inclusion into government. (European Union,2018).

The Nigeria parliament both at state and federal level have a crucial role to play for Nigeria to achieve the sustainability development agenda. The parliament should include reviewing the policies or legislations made by the state and federal governments and ensure that it has elements of sustainability development and will contribute to Nigeria achieving sustainability development goals. The parliaments should be able to determine whether the government actions contribute or mitigate achieving the sustainable development goals. The

parliament can also extend its oversight function to include review of government budgetary allocation towards Nigeria's sustainable development goals and evaluate the implications of government's spending towards sustainable development agenda. The parliament can also enhance transparency and accountability by inviting the government officials to present detailed information of the impacts of its policies on sustainability development.

5.1 Lessons from European Union in Sustainability Development

The European countries are not immune from sustainability challenges, just like every other country, the European countries also faced unemployment problem, ageing population, climate change, energy security etc. In 2001, the European Union launched its sustainable development strategy, revised the strategy in 2006 and reviewed it in 2009. Beginning from 2010, sustainability development has been introduced into the Europe 2020 sustainable development strategy. The strategy was centered around education and innovation, creating jobs and minimizing poverty, reduction in carbon emission and environmental impacts. (European Commission, 2016, 2).

To be able to meet with the targets of the 2030 agenda, The European Union formulated two strategic policies, the first is the fully integration of sustainable development goals into the European Union policies, and to review the position of European Union and identify the most important sustainability issue. The second strategy is to develop a long-term vision towards sustainability development goals and to priorities sectoral policies after 2020. (European Commission, 2016, 3).

The European Union has identified governance, financing, monitoring progress, and shared responsibilities and rewarding excellence as the instruments that the European Union will use to achieve the targets of the 2030 Agenda. Governance is important because it brings the needed leadership and it will ensure policy coherence between different areas, and between European Union external actions and its policies. The European Union project-based team collate different sectoral policies and ensure inter relationship between sectoral policies, i.e.

Policy in one area reinforce initiative in another field. The project based approach is meant to create a shared and common agenda. It is the responsibility of the vice president of the commission to perform a coordinating role in implementing 2030 Agenda. (European Commission,2016,14).

Finance plays a vital role in achieving the targets of sustainability development. Implementation of some policies requires finance, as a result of this, the European Union set aside an investment budget, which is 1% of its Gross National Income to complement the national budgets, and other regulatory instruments to combat the challenges within and outside the Europe community. The European Union budget is directed towards results, and to ensure that every tax payer's money is used to improve the future. Other financial instruments are the European Structural and Investments funds and Connecting Europe Facility which operates with alongside the European Investment Bank to finance and promote sustainability objectives. The government also set aside 20% of the budget to combat climate change. (European Commission,2016,15).

There is also periodical evaluation of the progress made after implementing the policies. Periodical evaluation will help the European Union to maximize, encourage accountability to the citizen and make sure everybody is carried along towards achieving the goals of sustainability development. The evaluation is done on global, regional and national level. (European Commission,2016,16).

In summary, the lessons Nigeria can imbibe from the European Union as regards sustainability is to integrate sustainability development goals into Nigeria's internal and external policy frameworks. The European Union were able to achieve this by linking sustainable development goals to Europe 2020 strategy. The Europe 2020 strategy is a ten years policy of the EU which is geared towards economic growth and job creation, it also focuses on EU sustainability development policies. The key elements in the Europe 2020 are; knowledge-based economy, encouragement of resources efficiency and creation of jobs to tackle poverty problem. Nigeria can also do the same by linking sustainable development goals to its short- and long-term economic policies. The Nigeria's economic policy can be tailored towards; encouraging innovation and research towards sustainability development,

encourage greener market and resources efficiency, and roll out incentives e.g. tax reduction, low lending rates etc. That will motivate investors thereby creating employment opportunities.

Another lesson Nigeria can learn from European Union is mapping of sustainable development goals with its National goals and objectives. This action allows the European Union to thoroughly appraise the situation and measure any progress made towards achieving the goals of sustainability development within a specific period of time. With the mapping system Nigeria can determine if any progress has been made in term of social development, economic development and environmental development. This will help Nigeria to see if there is any need to review its policies towards achieving agenda 2030.

To be able to achieve the goals of sustainability development, Nigeria as country should also learn from the European Union and ensure policy coherence for sustainable development. According to Organization for Economic Co-operation and Development (OECD),” policy coherence for sustainable development is a methodology of incorporating the economic, social, environmental, as well as governance dimensions of sustainable development at all stages of policy making”. The European Union was able to achieve this by ensuring a vertical coherence across regional, national and international level. The benefits Nigeria will derive in policy coherence for sustainable development are; strengthen cooperation across economic, social and environmental policy areas, discover trade-offs and harmonize internal policy goals with internationally agreed objectives, review of overlapping issues with domestic policies.

One of the reasons why European Union countries have been able to achieve relatively high success as regards sustainable development is the all inclusion policy that is practiced by the European Union countries. In the European Union both state and non-state actors are involved in policy making. The non-state actors use the public consultation window to propose new ideas to different institutions. Nigeria can emulate this idea and involve non-state actors and considers their ideas in policy process.

6 CONCLUSIONS

Waste management and sustainability development are strongly related, failure in one is likely to result in failure in the other, and success in waste management is one of the important variables needed to achieve at least seven of the sustainability development goals. It is for these reason that Nigeria has found it difficult to achieve sustainability development goals in all aspects.

Waste management regime which are not working in Nigeria require a proper re-evaluation in order to proceed with the 2030 sustainable development agenda. The national policy on environment shows Nigeria's commitment to sustainability development, but commitments should transcend beyond pages of paper.

The non-inclusion of informal waste sector into the mainstream of waste management is one of the major waste regulatory blunder in the country. There is need to review the waste legislation and address the overlapping issues on the functions of different waste authorities. The legislation should also involve the aspect that will protect, coordinate and regulate the activities of the informal waste sector.

The Federal government of Nigeria is overburden with conducting most its statutory responsibilities effectively. It will be wise to the shift some of the burden of waste management to private bodies. Private bodies or organizations have the history of being efficient in their activities. The Federal government can promulgate the legislations that will control the activities of the private bodies and allow the private bodies to the field work.

Although, waste management doesn't come at a cheap price, neglecting or improper waste management comes at much bigger price. Most countries in the Europe continent have achieved success with regards to waste management and sustainable development. These countries can serve as a template for Nigeria.

It is very possible that the more sustainability development goals can be achieved through waste recycling and waste reuse, than these seven of the goals in the focus of this study.

Further research can be done to explore the possibility of achieving more of the sustainability development goals through effective waste recycling and reuse.

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