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Waste Management and Environmental Protection for Community Sustainable Development in Nigeria

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ABSTRACT: *Waste, environmental protection and community sustainability are products of development, and most daily activities of human beings generate waste. The negative consequences of economic development have long been observed by eminent economic theorists, such as Smith, Marx, Malthus, Ricardo and Mill (Clarin, 2018). There are some indicators that show that most countries have failed to achieve sustainable development, and some countries are far from it. There has also been a growing concern about the environmental limit to growth and development as well as the imperative of environmental quality and management. As a result, this paper firstly conceptualized the following terms-"Waste","Waste Management","Environment", "Environmental Sustainability", Community, Community Sustainability, and Sustainable Development. The paper further discussed the composition of waste materials in Nigeria. It again examined various international and national measures or activities taken in relation to the concept of community sustainable development. The scholars in addition discussed the rationale for environmental protection and the negative impacts of waste on Nigerian environment. Furthermore, several measures taken internationally and nationally to ameliorate the negative impacts of wastes on environment were concisely discussed.*

KEYWORDS: waste management, environmental sustainability, sustainable development, development, community sustainability, and waste classification.

INTRODUCTION/REVIEW OF RELATED LITERATURE

Researchers have had several studies with regard to various environmental problems in Nigeria, with little or no attention given to their implications for sustainable development in literatures (Daramola & Ibem, 2010). This has been affirmed by Olukanni (2014), as the scholar stated that the waste generation and its likely effects on both human, environmental health, and the urban landscape have become recurring dismal in Nigeria (Olukanni, 2014) and UNEP (2005); at the same

time noting the dangerous and acute nature of waste management in economically developing countries, where financial, human, and other critical resources generally are scarce. Hence, they stated thus:

> "The collection, transport, treatment, and disposal of solid wastes, particularly wastes generated in medium and large urban cities have become a relatively difficult problem to solve for those responsible for their management".

The body further stated that the Nigerian cities are witnessing high rate of environmental deterioration and are rated among urban areas with the lowest livability index in the world. The collection, transport, treatment, and disposal of solid wastes, particularly wastes generated in medium and large urban centres have become a relatively difficult problem to solve for those responsible for their management (Singh, Saxena, Bharti & Singh, 2018). The problem is even more acute in economically developing countries, where financial, human, and other critical resources are generally scarce (UNEP, 2005). Nigeria, as one of the developing countries is not left out.

Since the Stockholm Conference on Environment and the Rio Conference in 1992, there has been a growing concern that human activities increasingly threaten the health of the natural systems that make life possible on this planet. The damage being inflicted by human activities on the natural environment render the activities unsustainable because they alter the environment irreversibly. Today, there is a scientific consensus that these environmentally damaging activities cannot continue in the future because they have destroyed the environmental conditions necessary for their continuation (Karpagam, 2014).

The dilemma of sustainable development in Nigeria has been highlighted by Ejunudo (2015) thus:

> "In Nigeria, the need for a pragmatic, action-based multi-dimensional approach to integrated and functional policies that will enhance rather than constrain sustainable development is even more compelling. This is largely due to the policy gaps, policy disconnection and the action dilemma typified by governmental inaction and poor commitment, weak institutional capacity in the face of the unholy alliance between the government and the oil majors, particularly Shell Petroleum Development Company and the lackadaisical attitude, poor predisposition, responses and participation by corporate bodies, communities and individuals in Nigeria" p. 78.

Waste management is a by-product of most human activities, which is tremendously unavoidable in human existence. Several years past, human beings have been craving to improve the environment they live; the attempt to develop the environment for decades have negatively affected the environment we inhabit today and subsequently endangering the survival of the earth and the future generations. The efforts to develop the environment have giving rise to increasingly unfavourable climate changes and natural disasters, also aided by wars, political and socio-economic instability. The attempts to advance the environment have caused some changes in the behaviour aiming towards more rational and efficient management of all resources that will allow less pressure and environmental impact (Klarin, 2018).

Hence, such responsible behaviour continued will ensure the long-term exploitation of resources, without jeopardizing the future generations is considered within unauthenticated concept of sustainable development (Klarin, 2018)). In the literature however, Vázquez & Sumner (2013) avowed that development embraces the following meanings: (1) development as structural transformation; (2) human development; (3) development of democracy and governance, and (4) development as environmental sustainability. But Thomas (2004) opined that development involves the positive changes that society has experienced throughout history, and still experiences; while Sharpley (2009) in his contribution stated that development outlines the plans, policies, programmes and activities undertaken by certain institutions, governments and other governmental and non-governmental organizations.

Nevertheless, before delving into the nitty-gritty of the subject matter, it will be pertinent to define and explain the conceptual meaning of the major terms as listed hereunder.

Waste: Waste, as asserted by Brunner & Rechberger (2014) and Amasuomo & Baird (2016) is an essential product of human activities. In concord, Brunner and Rechberger (2014) posited that most human activities generate waste. According to researchers, the term "waste" is to a very large degree subjective in meaning, as the term is open to several interpretations and also influenced by personal opinion. This stems from the fact that a substance can only be regarded as a waste when the owner labels it as such. This is particularly true because one individual may regard a substance as waste, while another may view the same substance as a resource.

As in the pre-historic times, as Masuomo & Baird, (2016) noted that waste wasn't a problem as the quantity generated was not much in commensurate with the small population, and immense amount of land was available to accommodate and also absorbed the waste generated without any form of degradation. Nevertheless, in the sixties, Wilson (2007) noted that the rate of waste started increasing due to the movement of persons from rural to urban areas, and in addition to- industrial revolution. This migration led to population explosion and industrial wastes led to variety in composition of wastes generated. The production of wastes today remain a major source of concern to human existence, as the situation is no more the same; the pace and magnitude of waste generation have been constantly on increase, and so does the variety of the wastes (such as metals and glass) began to appear in large quantities.

This unending increase in waste, which are indiscriminately littered and openly dumped on major roads, streets and corners have formed breeding grounds for rats and other pets in Nigeria. In concord, Osinibi (2014) also noted that it is no longer news that Nigerian cities are inundated with the challenges of unclean solid wastes. This act and uncontrolled manner of waste disposal by the generality of the public is currently posing great risk to human health, as several outbreaks of epidemics are recorded daily in our communities, thereby causing high death tolls in the country.

However, let us examine how some scholars defined the term "Waste". Waste according to Sridhar, Oluborode, and Uwadiegwu (2017) is referred to as any matter, which has no further use, based on the composition (e.g., garbage, trash, junks, domestics or ashes), and it may be domestic, non-

hazardous, hazardous or infectious. It has been conceptualized by White, Franke & Hindle (1995) as the useless by-product of human activities, which physically contains the same substance that are available in the useful product. Basu (2009) defined wastes as any product or material which is useless to the producer. While Dijkema, Reuter and Verhoef (2000) conceptualized wastes as materials that people would want to dispose of even when payments are required for their disposal. Cheremisinoff (2003) conceptualized waste as an essential product of human activities, but also the result of inefficient production processes whose continuous generation is a loss of vital resources. In conclusion, wastes are materials whose owners no longer have a need for.

Waste Management: Researches have shown that waste production is as a result of human interactions and/or activities with the environment. As Giusti (2009) reported in his research that waste production and management was not a major issue until people began living together in communities. Subsequently also, as population and purchasing power of citizens increased worldwide, more goods were produced to meet the increasing demands, thereby leading to the production of more wastes. These continuous productions of waste resulting from human activities, have overburdened the environment.

It has been affirmed that the production of waste materials have remained a major source of worry as it has always been since primitive period. In modern times, most developing or underdeveloped countries in various communities face lots of health and environmental pollution challenges in relation to daily wastes generation. This, among others is as a result of improper or irregular waste management systems in Nigeria.

What really constitutes a waste has been a problem to scholars of this discipline, as there are several opinions to what constitute a waste. Irrespective of the fact that the word is subjective in meaning, as it is open to several interpretations and also influenced by personal opinions, and subsequently no one-size-fits-all definition so far

Nevertheless, it is important to provide some acceptable definitions for the purpose of this paper. It is of note that several researchers have agreed that wastes are materials whose owners no longer have a need for (Amasuom & Bird, 2016; and Amasuomo & Baird, 2021). Therefore, waste management could involve a process whereby wastes are collected, transported and disposed of in the best possible way of limiting or eliminating the harmful effect of wastes to the citizens.

Demirbas (2011) has also provided a concise and acceptable definition that describes waste management as a process by which wastes are gathered, transported and processed before disposal of any remaining residues. Correspondingly, Tchobanoglous, Theisen and Vigil (1993) described solid waste management as the effective supervision and handling, keeping, collection, conveying, treatment and disposal of waste in a manner that safeguard the environment and for the community sustainability. Waste management involves a process whereby wastes are collected, transported and disposed of in the best possible way of limiting or eliminating the harmful effect of wastes (Amasuomo & Baird, 2016).

Environment: Environment has been defined as the combination of the atmosphere, hydrosphere, cryosphere, lithosphere and biosphere in which humans and other leaving species and non-animate phenomena exist (Dearden & Mitchekk, 2009). Similarly and precisely, Budnukaeku & Hyginus (2021) conceptualized the environment as the external conditions, resources, stimuli, etc., with which an organism interacts. In the same manner, Getis (2000) defined environment as the surroundings, and the totality of things that in anyway may affect an organism, including both physical and cultural conditions; a region characterized by a certain set of physical conditions.

Environmental Sustainability: For a better understanding of this term, let's first define "Sustainability" which is closely linked to ecological issues. Historically, the term sustainability, as declared by Jenkins (2009) literally means "a capacity to maintain some entity, outcome, or process over time" and carrying out activities that do not exhaust the resources on which that capacity depends; whereas Vezzoli and Manzini (2008) refers to "environmental sustainability" as systemic conditions where neither on a planetary or regional level do human activities disturb the natural cycles more than the natural resilience allows, and at the same time do not impoverish the natural capital that has to be shared with future generations. The increasing environmental problems faced by the world are mostly in lineation with the increasing human activities.

Sustainable Development: The phrase "Sustainable development" was brought into common use in 1987 by the World Commission on Environment and Development in its seminal report called "our common future" (Ejumudo (2015). In affirmation, Emas (2015) opined that in 1987, the Bruntland Commission published its report, *Our Common Future,* in an effort to link the issues of economic development and environmental stability. The concept of sustainable development in theory as acknowledged, is mostly related to ecological sustainability, that is, a development that provides the necessary environmental conditions, which enable life on a certain level of well-being for present and future generations. In concord, Holden & Associates (2014) in their research refers to the underlying pillars of sustainable development (preserving long-term ecological sustainability, meeting the basic human needs and achieving equality of current and future generations. In the same manner, sustainable development, according to Bruntland (1987), is a development that meets the need of the present generation without jeopardizing the possibilities of the future generation meeting their own needs. Other meanings have also been advanced by other scholars. Duran, Gogan, Artene and Duran (2015) conceptualized sustainable development as a development that protects the environment, because a sustainable environment enables sustainable community development. In the same manner, United Nations General Assembly (1987) provided the often cited definition of sustainable development as Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

Community: Goel (2014) asserts that earlier and most commonly held meaning of 'community' refers to people living in a place, who have face–to-face contact with each other. It has also been referred to as "A relatively small, often rural, community whose members share common interests, work and income, and often own property collectively. Commune members usually place the group ahead of the nuclear family unit, generally maintain a common purse and collective household and

make intimate as well as general decisions as a group" (https://www.powershow.com/view1/60402-ZDc1Z/SUSTAINABLE_COMMUNITIES_ powerpoint_ppt_presentation).

Hence, community refers to the citizens of a particular area, where face–to-face contact was possible in rural and tribal society. Smart (2019) conceptualized community as a geographical area; for example, a local government region or a particular town. Community can also be defined based on shared interests, such as identity or characteristics. For instance, it may be a particular cultural and linguistically diverse community. Nevertheless, the above definitions have changed based on the changes in industrialized society, where the 'organic solidarity holds no water. Again, with the emergence of new technologies of the 21st Century, where such tight compartmentalization has changed over time as community now cross physical boundaries of place and people, and could connect with each other by using technologies (Internet or Social media technologies) and still fulfill most of the functions of the nuclear community.

It is on the above assumption that Goel (2014) stressed that defining community in the context of community development requires a broadening of definition that includes both place-based, interest-based and other forms of new and emerging communities, for example, web community, Facebook or other social media community and online groups that traverse physical boundaries and relate with unknown people in diverse locations. In the light of the above, an online community could be defined as "a group of people coming together for a common purpose, interest, or vision, and doing so through the internet, especially via the use of chat rooms, mailing lists, and forums as their primary mode of interaction (DiRose, 2021). Onyeozu (2007) asserts that a community may have more than one ethnic groups which have different ways of life, still the social and economic problems which face them and which they fight together to eliminate remains the common bond that tie them together. **"**Community", be it natural or technological society, is presently said to exist when there is a sense of identity, commonality, or spirit among a group of people interaction between individuals, and has the purpose of meeting individual needs and obtaining group goals (Diaz, 2000).

Sustainability and Community Sustainability

The concept, "Sustainability" was popularized in 1987, which stands as a core conceptual framework for community development (Lew, Ng. Ni, & Wu, 2016). As the authors stated, it reflects a long history of environmental conservation development, emerged more gradually out of ecological studies in the 1980s, but has only recently, since the mid-2000s, emerged as a focus of public interest as a way of responding and adapting to the planet's growing anthropogenic changes. Sustainability focuses on climate change and seeking a balance between humans and nature. What the community wants to conserve and how they want to conserve it really constitute sustainability. Sustainability shares some important assumptions, methods and goals, which are the goal of system survivability and the assumption that there exists a state of harmony between how human societies function within the larger context of our natural world.

Invariably, Sustainable Community is a community that can persist while meeting the needs of its members and the needs of subsequent generations (https://www.power show.com/view1/60402-

ZDc1Z/SUSTAINABLE_COMMUNITIES_powerpoint_ppt_presentation). The most or common challenge for most communities worldwide is the problems of climate change; communities need to adapt to climate change, and additionally for housing; hence, there is need to build new homes and refurbishing homes that are better suited to different climate conditions, since climate change has taken a overriding role.

Among other important issues worth considering are efficient uses of resources, including land, sourcing food more locally, and reducing other forms of pollution. Sustainable Community best ensure for the survival of the system and how to achieve its state of harmony. In addition, they both tend to focus their research on the topics of natural ecosystems, the development of human communities, and climate change. (Lew, Ng. Ni, & Wu, 2016).

Human experience tells us that we live in a chaotic world that requires an understanding of how our environments and societies operate as complex adaptive systems. Therefore, to be sustainable requires that some sense of stability is possible, and that it is important to understand and manage impacts that disturb that community stability. Community sustainability mostly offers distinct perspectives on the contemporary challenges confronting human society (Calgaro, Lloyd, & Dominey-Howes, 2014). Sustainable communities are places where people want to live and work now and in the future, and tend to meet the diverse needs of existing and future residents, also be sensitive to their environment, and contribute to a high quality of life. They are safe and inclusive, well planned, built and run, and offer equality of opportunity and good services for all (www.communities.gov.uk/index.asp?id=1139866).

For the community to be sustainable, the government and citizens must be environmentally sensitive by providing places for people to live that are considerate of the environment. They must actively seek to minimize climate change, including through energy efficiency and the use of renewables, and protect the environment, by minimizing pollution on land, in water and in the air; also minimize waste and dispose of it in accordance with current good practices. The citizens should also make efficient use of natural resources, encourages sustainable production and consumption, protect and improve bio-diversity (wildlife habitats), and enable a lifestyle that minimizes negative environmental impact and enhance positive impacts. This is perfected by creating opportunities for walking and cycling, and reducing noise pollution and dependence on cars, creates cleaner, safer and greener neighbourhood, by reducing litter and graffiti, and maintaining pleasant public spaces (www.communities.gov.uk/index.asp?id=1139866). Finally, sustainable community will continually adjust to meet the social and economic needs of its populace, and at the same time preserve the environment, uses its resources to meet current needs while ensuring that adequate resources are available for the future generations. The community seeks a better quality of life for all its inhabitants and accordingly maintaining nature's ability to function over time by minimizing waste, preventing pollution, promoting efficiency and developing local resources to revitalize the local economy (https://www.sfu.ca/sustainabledevelopment/Archives/what-is-sustainable-community-develop ment.html).

Classification of Wastes: There are several wastes, and there are several classification types. But, how do we classify these waste materials within our environment? Waste, as essential product of human activities has been classified based on some common characteristics. For example, Polprasert (1996) cited in Odoh and Nnamani (2021) classified solid wastes generated from human activities from residential, commercial, street sweepings, institutional, and industrial categories.

However, despite its numerous classifications, Demirbas (2011), Dixon and Jones (2005) have classified waste based on the following criteria or characteristics as outlined hereunder.

1. Physical states 2. Physical properties 3. Reusable potentials 4. Biodegradable potentials
5. Source of production.

In the same manner, White, Franke and Hindle, (1995) pointed out that waste could also be classified broadly into 3 categories based on their Physical states thus: (1). Liquid (2) Solid (3) Gaseous. Amasuomo and Baird (2016) affirmed that several classifications also exist in different countries. However, the most commonly used classifications are illustrated below.

1. Physical state	2. Source	3. Environmental impact
*Solid waste *Liquid waste *Gaseous waste	*Household/Domestic waste *Industrial waste *Agricultural waste *Commercial waste *Demolition and construction waste *Mining waste	*Hazardous waste *Non-hazardous waste

General Composition of Waste Materials

There is no gainsaying that people discuss of waste materials in our environment. What really constitute wastes in our environments? Nonetheless, listed hereunder are some of the things that constitute wastes within our environments. A typical waste composition in Nigerian environments include the following as reported by these scholars - Kumar, Smith, Fowler, Velis, Kumar, Arya, Kumar & Cheeseman (2017); Erdogan & Baris (2006); Dixon & Jones (2005); Berkun, Aras, & Anılan (2011); Chan & Lam (2001); and Amasuomo & Baird (2016).
These materials as suggested by the above scholars are:-

1. Food/Seafood waste 2. Glass 3. Plastics toiletries 4. Paper 5. Paints waste 6. Used batteries 7. Metals 8. Garden waste 9. Unused soap 10. Slippers 11. Newspapers 12. Carbon 13. Animal waste 14. Vegetable waste 15. Construction Waste 16. Wood 17. Ashes 18. Textiles 19. Agricultural waste 20. Construction waste 21. Soils 22. Consumer electronics 23. Used tires 24. Slippers 25. Unused soap 26. Animal waste 27. Packaging materials 28. Fruits 29. Baked products 30. Frozen products, 31. Sanitary materials and blood containing textiles, etcetera.

Challenges/Problems of Waste Management in Nigeria

It is obvious that there are certain factors that prevent environmental factors from developing and flourishing. It is not a fairy tells that despite the degradation of valuable land resources and creation of long-term environmental and human health problems, uncontrolled open dumping of waste products are still prevalent in most developing countries, which Nigeria is not excluded which indeed desperately need immediate action due to the associated detrimental effects to our communities and the environment. Most Nigerians are carefree about wastes management, and there is not enough awareness created to enable the citizens show a good deal of concern and take active part in preserving the environments. For instance, Uwadiegwu and Iyi (2015) opined that the level of environmental management awareness in Nigeria is still very low; yet, it is the knowledge of environmental management techniques that can guarantee life sustainability in Nigeria. Odunjo (2013) further stressed that sustainable environmental management is far from being achieved in Nigeria because the activities of man still degrade the environment. It is an open secret that in Nigeria, the existing practice of urban or municipal waste management as noticed by Odoh and Nnamani (2021) is open dumping in any available open space, while the incineration technique is rarely put to practice.

Again, a survey in Hong Kong (Chan & Lam, 2001) revealed lack of information on the impact of solid waste generated by hotels on the environment added to the lack of interest to reduce solid waste by the hotels. Further, urban residents in Nigeria are often confronted with the hazardous impact of nucleated solid wastes found in their environment. Therefore, there is need for the citizens to be informed to comply with the environmental laws and rules guiding the wastes disposal arrangements by the governments, or the private organizations or institutions alike. Many laws are made to safeguard the environment, but the implementation of the laws by not just the management agencies but the law enforcement department of the state.

There is no doubt that illiteracy forms part of the wastes management problems. When the citizens are literate, they will be more informed and able to take quality decisions that affect themselves and the generality of the people. When the citizens are not literate, they will not be able to comply with existing rules and regulations governing the effective disposal of wastes; they will also have very wrong attitudes to waste disposal initiatives. They will not be able to read some sign posts, such as “Do not dump wastes here”. They will not have both administrative and managerial personnel skilled that will efficiently plan and have the needed legal framework required to handle serious environmental issues regarding wastes management and improvements.

The issue of rapid population growth is yet one of the problems affecting effective wastes management in Nigeria. This is because, as the population increases, so are wastes recklessly generated and the environment ultimately polluted, especially when there are no effective wastes disposal systems in place to cope with the quantity or volume of wastes generated daily. Additionally, the Nigerian citizens are very poor and do not have the sufficient funds to invest on infrastructure development that will enable them evacuate and recycle the wastes generated. In concord to the above statement, a survey in Hong Kong, as Chan & Lam (2001) claimed, revealed that the lack of interest to reuse waste in the hotel industry is as a result of the cost associated with

the purchase of recycling materials. This goes to mean that lack of funds makes useless any other plans or measures put in place to curtail or curb the rate of wastes disposal within the environments irrespective of the country involved.

The issue of uncontrolled urbanization will not be overlooked, as this seriously affects the environment and the populace, and lack of effective legal framework need not be overlooked to improve wastes management systems in Nigeria. Furthermore, the Nigerian government attitude towards the education sector poses another serious problem. It is when the educational institutions are adequately funded and research grants provided that scientific research will adequately take place. In a system where the education sectors are in shamble, with weak political will on the part of leading state officials, and the corruptive tendencies inbuilt in the political leaders, much room will be created for inefficient systems for data management and inaccurate planning for wastes management and disposal systems in Nigeria.

Oftentimes, despite some laudable government agencies, plans and programmes, because of problems of finance and its management strategies they fail woefully (Odunjo, 2013). Yet, as Okoli, Egobueze and Briggs (2020) reported, apart from Lagos state that has commercialized waste management and created institutions to support it, all other states still see waste management from the social service viewpoint, thus, rather than earn revenue for the State, the State spends high junks of her revenue on managing waste (Okoli et al, 2020).

According to Adewole (2009), some of the major problems confronting and militating against effective management and sustainable development of waste collection and disposal in some parts of Nigeria have been identified to include but not limited to: (i.) Population growth (ii.) Waste disposal habit of the people (iii.) Attitude to work (of those rested with the responsibility of collecting and disposing the waste) (iv). Lack of adequate equipment and plant, and other tools necessary (v). Corruption (vi.) Overlap function of enforcement agents. Another setback in effective waste management of environmental policies includes waste management, which has been generally slow due to various bureaucracy, lack of political will and continuity of programmes and policies by successive governments (Sridhar, 2017).

According to Oruonye and Ahmed (2020), some of the challenges of waste management, especially the effective compliance to environmental regulations include outdated laws, high cost of environmental standards, weak institutional capacity, poor governance. Others are under staffing, inadequate funding, and vested interest, multiplicity of legislations /conflicting laws, ignorance and lack of rule of law among others. Irrespective of the deleterious effects of environments on both human health and the environment alike, it has been revealed that corruption and inconsistencies in policies still remains the major drawbacks to environmental management (Odoh & Nnamani, 2021).

Conclusively, Nigeria has not made appropriate funds available to cover the costs for developing proper waste collection, storage, treatment and disposal systems or facilities (Kumar, Smith, Fowler, Velis, Kumar, Arya, Kumar & Cheeseman (2017).

Need/Importance of Sustainable Development and Natural Resource Management in Nigeria
Ejumudo (2015) has pointed out that the responsible management of natural resources is the key to attaining sustaining development in all sectors of the global economy, which Nigeria is not excluded. In order to maintain a sustainable environment for healthy living of humans, there is urgent need to utilize our natural resources in a sustainable manner with a focus on minimizing their depletion and pollution. Further, the scholar stated the welfare of human societies and the quality of life is directly linked to sustainable use of the natural resources. This, the author stressed that the concern has been duly recognized globally in Agenda 21, where it stated that "special attention should be paid to the demand for natural resources generated by unsustainable consumption and to the efficient use of the resources in a fashion that is in tandem with the goal of minimizing depletion and reducing pollution.

In attempt for global conservation of biological diversity, Ejumudo (2015) again opined that there are two United Nations conventions focused to deal directly with conservation of natural resources. The conventions are: The convention on biological diversity and the United Nations convention to combat desertification that were concerned with the growing global commitment to sustainable development and represents a dramatic step toward the conservation of biological diversity.

Since sustainable development, as noticed by Ejumudo (2015) is closely linked to its industrial progress, with the energy sector being the major driving force, thus, sustainable development cannot be achieved without significantly disrupting the environmental balance of nature and challenging problem facing mankind today (Narayanan, 2014). Admittedly, as noted by Ejumudo (2015), any industrial activity will pose some degree of environmental impact that could lead to environmental degradation and hazards to the well-being and the health of living organisms with the possibility of environmental crisis.

The federal and state governments' policy changes encourage proper waste management, which are potentially beneficial to urban dwellers. Possible benefits include reduced infectious disease rates and reduced mortality, as well as an improved quality and outlook on life, based on a clean environment (Omenka, 2016). The benefits of enforcement of environmental regulations as perceived by Oruonye and Ahmed (2020) include creation of employment opportunities, protection of the environment and environmental sustainability. Demirbas (2011) suggested that the main reason for managing waste is to ensure a safe environment. Improvements to waste collection and transport infrastructure as declared by the United States Environmental Protection Agency (2002) will create jobs, improve public health and increase tourism.

Negative Impacts of Waste on Nigerian Environment.
There is no aspect of environmental pollution that is not harmful to human existence. It is not a fairy tells that despite the degradation of valuable land resources and creation of long-term environmental and human health problems, as observed by Singh, Saxena, Bharti and Singh (2018), uncontrolled open dumping is still common in most developing countries, which Nigeria is not excluded which indeed desperately need an immediate action due to the associated detrimental effects this action has on the citizens of our community.

An indiscriminate and unmanaged waste dump causes unpleasant impacts on the environment and public health. Wastes are poisonous substances or materials that are injurious to the well-being of the public and the entire environment. Vergara and Tchobanoglous (2012) affirmed that municipal solid wastes negatively impact on the well-being of the public and the environment if not properly managed. For instance, a survey of solid waste management practice of small hotels in the United Kingdom by Radwan, Jones and Minoli (2010) revealed that operators of hotels and restaurants in the United Kingdom are not environmentally conscious, and do not reuse their waste. As a result of the huge volume of solid waste they generate daily contributes to environmental degradation and other sorts of environmental problems.

Effective of environmental management or control is as important as the air we breathe. Studies have shown that the air, water and land pollution cause different types of diseases, such as lung cancer, heart disease, cholera, hepatitis and so on (Amasuomo and Baird 2016). Air pollution carries its effects, such as odour, smoke, noise, dust, etc. (Odoh & Nnamani, 2021). It is also of note that floods, which are the resultant of heavy and high intensity rainfalls, have of recent destroyed many community. Flooding is usually caused by poor watershed management and unplanned rapid urbanization; improper waste disposal causes blockage of river/drainage channels, land clearing for agricultural purposes, and poor dam construction and deforestation among others.

Furthermore, the effects of indiscriminate waste disposal comes from the disease carrying insects, which includes flies and the germs they carry on their bodies and legs and also excrete them on our food. The mosquitoes breed in stagnant water, cans, used or discarded tyres at dumps collect rain water, and subsequently breed mosquitoes that bit and increase the risk of diseases, such as malaria, dengue for the citizens. The indiscriminate dumping of wastes breed rats that spread diseases, such as - typhus, salmonella, leptospirosis and others, and these insects can cause injuries by biting and subsequently spoil or poison millions of tons of food (Odoh & Nnamani, 2021). Open dumps as pointed out by Sridevi, Modi, Lakshmi and Kesavarao (2012) releases methane from decomposition of biodegradable waste under anaerobic conditions. The Methane so released causes fires and explosions, which is a major contributor to global warming.

Futhermore, Sridevi, et al (2012) also observed that uncontrolled burning of waste at dump sites releases fine particles, which are a major cause of respiratory disease and cause smog; open burning of municipal solid waste (MSW) and tyres usually emits tones of pollutants into the atmosphere with increased incidences of nose and throat infections, and breathing difficulties, inflammation, bacterial infections, anaemia, reduced immunity, allergies, asthma and other infections (Central pollution Control Board, 2000).

In addition, the refuse workers also face some health hazards, such as parasite infections, cuts from glasses, razor blades, nails, sharp zinc or ions. Others are discarded syringe middles, surgical needles, surgical knives, acupuncture needles, dental needles, broken glassware for experiments, tissue damage or infection through respiration (Singh, Saxena, Bharti and Singh, 2018), ingestion or skin contact from the disposal or dump vicinities (Odoh & Nnamani, 2021). Generally, communities living within the vicinity of most dumpsites suffer a lot of environmental and health

hazards, and the most concern presently is the issue of pollution caused to the earth, be it land, air and water (Ndukwe, Uzoegbu, Ndukwe, & Agibe, 2019).

Furthermore, the uncontrolled open dumping of garbage on the outskirts of many of the rural and urban cities have resulted in the degradation of valuable land resources and the creation of long-term environmental and numerous human health predicaments in Nigeria.

Curbing the Negative Impacts of Waste Mismanagement in Nigerian Environment.
The issue of waste management is a very big global problem, which Nigeria is not excluded. As a result, some measures have been taken to ameliorate its impacts on the global society as illustrated on the table 1 below, which shows some of the activities taken globally to combat the effects of waste on the environment.

Consequently, a proper organization of waste has become an essential task needed to safeguard the Nigerian environment. Hence, the provision of an efficient solid waste management system is now as important as other essential amenities, such as electricity, airports, and highways, Beranek (1992) directed. Also, since the volume of wastes in our environment is generally and constantly on the increase, there is urgent need for continuous processing of waste and disposal of waste materials to safeguard public health in Nigeria.

More measures have been suggested to efficiently manage wastes. As a result of this, scholars have suggested that governments at all levels of governance should encourage establishing recycling industries to collect, reuse, and recycle most of the waste materials generated or produced within the environment. Vergara & Tchobanoglous (2012) suggested that proper planning and control is required in other to prevent the negative impact of waste on the environment. While Oruonye and Ahmed (2020) in their study recommends among others, the employment of more staff, increase funding of environmental enforcement agencies, and review of old and outdated environmental laws and regulations. In the same manner, Abila and Kantola (2017) suggested the use of following methods to curtail wastes - landfill, incineration, composting and anaerobic digestion, and recycling to keep the environment free of numerous diseases. Below are some of the measures taken internationally to improve waste management and control.

Table 1: An overview of the various activities related to the concept of sustainable development

Year	Activities	Brief description
1969	UN published the report Man and His Environment or U Thant Report.	Activities focused to avoid global environmental degradation. More than 2,000 scientists were involved in creation of this report.
1972	First UN and UNEP world Conference on the Human Environment, Stockholm, Sweden.	Under the slogan Only One Earth, a declaration and action plan for environmental conservation was published.
1975	UNESCO conference on education about the environment, Belgrade, Yugoslavia.	Setting up a global environment educational framework, a statement known as the Belgrade Charter

1975	International Congress of the Human Environment (HESC), Kyoto, Japan.	Emphasized the same problems as in Stockholm in 1972.
1979	The First World Climate Conference, Geneva, Switzerland.	The First World Climate Conference, Geneva, Switzerland
1981	The first UN Conference on Least Developed Countries, Paris, France.	A report with guidelines and measures for helping the underdeveloped countries.
1984	Establishment of United Nations World Commission on Environment and Development (WCED).	The task of the Commission is the cooperation between developed and developing countries and the adoption of global development plans on environmental conservation
1987	WCED report Our Common Future or Brundtland report was published.	A report with the fundamental principles of the concept of sustainable development.
1987	Montreal Protocol was published.	Contains results of the researches on harmful effects on the ozone layer.
1990	The Second World Climate Conference, Geneva, Switzerland.	Further development of the climate change research and monitoring programme and the creation of global Climate Change Monitoring System
1992	United Nations Conference on Environment and Development (Earth Summit or Rio Conference), Rio de Janeiro, Brazil.	In the Rio Declaration and Agenda 21 Action Plan principles of sustainable development were established and the framework for the future tasks as well.
1997	Kyoto Climate Change Conference, Kyoto, Japan.	The Kyoto Protocol was signed between countries to reduce CO2 and other greenhouse gas emissions, with commencement in 2005.
2000	The World Summit on Sustainable Development, Johannesburg, South Africa.	Declaration containing eight Millennium Development Goals (MDGs) set by 2015.
2002	UN published Millennium declaration.	Report with the results achieved during the time from the Rio Conference, which reaffirmed the previous obligations and set the guidelines for implementation of the concept in the future.
2009	The Third World Climate Conference, Geneva, Switzerland.	Further development of the global Climate Change Monitoring System with the aim of timely anticipation of possible disasters.
2009	World Congress Summit G20, Pittsburgh, USA.	G20 member states made an agreement on a moderate and sustainable economy.
2012	UN conference Rio +20, Rio de Janeiro, Brasil.	Twenty years from the Rio conference, report The future we want renewed the commitment to the goals of sustainable development and encouraged issues of the global green economy.
2015	UN Sustainable Development Summit2015, New York, SAD.	The UN 2030 Agenda for Sustainable Development was published, setting up 17 Millennium Development Goals which should be achieved by 2030
2015	UN conference on climate change COP21Paris Climate change Conference, Paris, France.	Agreement on the reduction of greenhouse gases in order to reduce and limit global warming.

Source: Culled from Klarin (2018) and interpreted according to the objectives of IISD, 2015; SDKP, 2015; UN, 2015ab;
UNEP, 2015ab; UNDP, 2015c; WMO, 2015; UNFCCC, 2016.

Ejumudo (2015) declared that without responsible resource use and management in Nigeria, environmental utilization space, which is the total space provided by the environment for use by

the present and future generations will be grossly depleted. In Nigeria, as part of the measures taken to preserve the Nigerian environment and its resources, protect ecological nuisance, hazardous waste, and to combat and prevent pollution in Nigeria, the Federal government of Nigeria at all levels, as declared by Ejumudo (2015) have established various agencies to protect the environment. In concord, Budnukaeku and Hyginus (2021) also stated that as part of the measures taken by the government to preserve the environment and its resources, protect Nigerians from ecological nuisance and hazardous waste, to combat and prevent pollution in Nigeria, the federal government of Nigeria and several Nigerian states have established various agencies and organizations. These agencies are guided and function in accordance to the all the environmental laws and acts in Nigeria.

As shown on table 1 above, the Federal governments of Nigeria, at all levels of governance have likewise taken some decisive decisions and entered to protect the environment from total degradation. Presented hereunder are typical examples of some international treaties Nigeria is party to in order to address the environmental problems that would lead to sustainable development.

Table 2: Shows an Overview of International Treaties Nigeria entered into.

S/N	TREATIES	YEAR
1.	CBD: Convention of Biological Diversity	1992 (1993)
2.	UNCLOS: United Nation Convention on Law of the Sea	1982(1994)
3.	UNCCD: United Nation Convention to Combat Desertification	1975 (1994)
4.	CITIES: Convention on International Trade on Endangered Species	1973(1987)
5.	RAMSAR-CWIIEWH: Convention on Wetland on International Importance Especially as Waterfowl Habitat	1971(1975).
6.	UNFCCC: United Nation Framework Convention on Climate Change	1992(1994)
7.	Heritage: Convention Concerning the Protection of the World Cultural and Natural Heritage	1972(1975)
8.	Basel: Convention on Conservation of Migratory Species of Wild Animal	1979(1983)
9.	Ozone: Convention for Protection of the Ozone Layer and Montreal Protocol on Substances that Depletes the Ozone Layer	1985(1988)
10.	ICLS: International Convention for the safety of Life at Sea	2004
11.	ICEIFCOPD: International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage	1971(2006)
12.	ICPPS: International Convention for the Prevention of Pollution from Ships	1973(2007).

Source: Cunningham, et al (2003.).

In Nigeria, as part of the measures taken by the government to preserve and protect the environment and its resources from ecological nuisance and hazardous waste, and to combat and prevent pollution, the Federal Government of Nigeria and her states has established various agencies and organizations. These agencies are guided and function in accordance to the environmental laws and acts in Nigeria. The list below shows the major agencies established to save Nigerians from environment issues.

Table 3: Overview of various agencies set up by the Federal government at all levels to manage the increasing concern of waste and environmental management, preservation and protection in Nigeria that will lead to sustainable development.

S/N	Agencies and Environmental Organizations in Nigeria
1.	Federal Environmental Protection Agency (FEPA)
2.	Federal Ministry of Environment (FMOE).
3.	Federal Ministry of Environment (FMOE).
4.	Federal Ministry of Environment Housing and Urban Development (FMEHUD)
5.	Federal Ministry of Environment(FMOE)
6.	Federal Ministry of Environment, Housing and Urban Development (FMEHUD)
7.	Federal Ministry of Environment, Housing and Urban Development (FMEHUD)
8.	Forestry Research Institute of Nigeria (FRIN)
9.	Forestry Research Institute of Nigeria (FRIN),
10.	Friends of the Environment Nigeria (FEN)
11.	Friends of the Environment Nigeria (FEN, NGO)
12.	Friends of the Environment Nigeria (FEN, NGO)
13.	Ministry of Agriculture and Natural Resources (MANR)
14.	Ministry of Environment, Federal Environmental Protection Agency (FEPA),
15.	National Biosafety Management Agency (NBMA)
16.	National Biosafety Management Agency (NBMA)
17.	National Emergency Management Agency (NEMA)
18.	National Emergency Management Agency (NEMA)
19.	National Environmental Standards and Regulations Enforcement Agency (NEREA)
20.	National Environmental Standards and Regulations Enforcement Agency (NEREA)
21.	National Oil Spill Detection and Response Agency (NOSDRA)
22.	National Oil Spill Detection and Response Agency (NOSDRA)
23.	National Oil Spill Detection and Response Agency (NOSDRA)
24.	National policy of the Environment (NPE)
25.	Niger Delta Development Commission (NDDC).
26.	Nigerian Conservation Foundation (NCF)
27.	Nigerian Conservation Foundation (NCF)
28.	Nigerian Conservation Foundation (NCF)
29.	State Environmental Protection Agency, (SEPA)

Sources: Cunningham, et al (2003); Onibokun and Kumuyi (2003) cited in Odoh & Nnamani (2021); Vision 2010, 2003 cited in Maiyaki, 2020; Odunjo (2013); and Budnukaeku & Hyginus (2021).

Despite the lukewarm attitudes of most of the states in Nigeria on waste management, some states still spend high amount of their revenue on managing waste materials within their environment (Okoli et al, 2020). To minimize the adverse effects of indiscriminate waste disposal by Nigerian citizens, the methods of landfill and incineration should be vigorously practiced. This is so because, it has been acclaimed to be the cheapest urban waste disposal option, which is from time to time, used in Nigeria clinics where medicinal wastes are burnt at a nominal scale (Ogwueleka, 2009).

In conclusion, Odoh and Nnamani (2021) have suggested the application of the 2013 Bea Johnson's 5R's of environmental management, which she felt will be a perfect transformation from the three R's that was propounded in the 1970s. The five (5) R's are – Refuse, Reduce, Reuse, Recover, and Recycle.

Summary

There is no gainsaying that the most common and widespread method of waste disposal in Nigeria is the open dumping, which typically involves the uncontrolled disposal of waste without serious measures to control leachate, dust, odour, landfill gas or vermin. However, this paper has conceptualized the major terms: "Waste", "Development", "Sustainable development", "Environmental sustainability", "Environment", and the "Community sustainability" as contained in the subject matter. The paper discussed the importance of waste management; further examined are various national and international measures or activities taken in relation to curtail the waste management and community sustainable development to ameliorate the negative impacts of wastes on Nigeria environment. The scholars, among other things discussed the rationale for waste management and environmental protection' and the negative impacts of waste in Nigerian environment.

CONCLUSION

Waste, the unavoidable by-product of most human activities cannot be ignored in recent times. There is a growing global concern that human activities increasingly threaten the health of natural systems that is at the heart of sustainable development. Waste management has been defined by Bacinschi, Valentina, Stoian and Necula (2010) as the collections of all thrown away materials in order to recycle them and as a result decrease their effects on our health, our surroundings and the environment and enhance the quality of life. It is of note that few decades ago, waste materials were not given much attention because it was not considered a big problem; but of recent, waste management has become a very big issue to sustainable environment. Consequently, as Udoh and Nnamani (2021) observed presently that waste management has become every ones' business without class. That means that both the government and the citizenry alike must be involved in effective waste management in line with the sustainable developments of the 21st Century by adopting the collection, recycling, composting, incineration, land-filling, and costs typical solid waste management practices to save the environment and the lives of the citizenry in Nigeria**.** However, the paper examined waste management and environmental protection for community sustainable development in Nigeria, and how waste management practices in Nigeria, its effects on public health and on environment, and how to improve the disposal methodologies by suggesting among other techniques, which include recycling, composting, anaerobic digestion, incineration and land To achieve community sustainability in Nigeria, the government and citizens must be environmentally sensitive by providing a considerate environment for people to live, actively seek to minimize climate change, minimize pollution on land, water, air, minimize waste and dispose of it in accordance with current good practice. Others include efficient use of natural resources, encouraging sustainable production and consumption, protect and improve bio-diversity (wildlife habitats), enable a lifestyle that minimizes negative environmental impacts and enhance positive

impacts (e.g. by creating opportunities for walking and cycling, and reducing noise pollution and dependence on cars) create cleaner, safer and greener neighbourhoods (e.g. by reducing litter and graffiti, and maintaining pleasant public spaces). (www.communities.gov.uk/index.asp?id=113 9866).

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