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Sustainable Urbanisation: Managing Population Growth and Wastes in the Nigerian City

[1]Chikezie Okoronkwo, [2]Ezirim Onyekwere Nkem & [3]Keke Onyinye Vivian
[1]*Federal Polytechnic Nekede*
[2]*Nigerian Institute of Town Planners*
[3]*Nnamdi Azikiwe University Awka*

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Abstract

Cities are all over the world today. Their formation and continuous growth results to urbanization. Their existence and progress show their propensity to survive amidst all the problems associated with them one of which is the menace of wastes accentuated by ever increasing population as time progresses. Urbanization and the growth of cities are two sides of the same coin and therefore inseparable as they both play critical roles in economic development. This paper examined the menace of wastes as a result of increasing population and how this could be managed for a sustainable urbanization. The study assessed the formation and forces affecting city growth, and how these could be managed to condition a stable and progressive city where economic growth of the people could be guaranteed. It explored ways and means of containing as well as eradicating unnecessary wastes from our urban areas so that a cleaner city is possible within the multiplicity of contributing factors to urban stress. The study concludes that the efficient utilization of resources, improved technology, education and the will to enhance progressive endeavors geared towards humanity are necessary actions of government and the people that will address the consequences of wastes in any rapidly increasing urban area.

Corresponding Author:
Chikezie Okoronkwo

Background to the Study

Cities are born, grow, get sick and are cured. Cities may get sick and die. While this study will not be engrossed in the birth of cities, the study will also not be complete if no discussion is included on the growth and decay of cities. Spence, Wells and Dudley 1993; explained that the growth of trade, labour, specialization and of industries each stimulates city growth. These are factors that evolve to fashion the city as focal points of human settlement since the first city was born more than 5,000 years ago. It was not until 100 years ago that the effect of population became evident in propelling a city. The period witnessed industrial and communication revolutions particularly the 19th and 20th centuries.

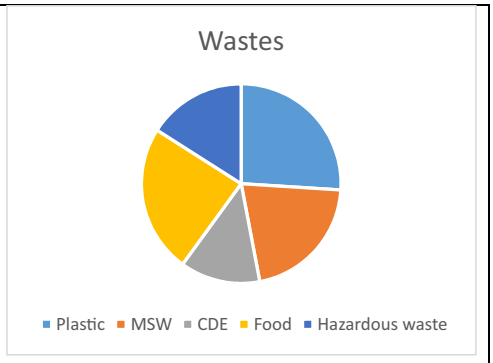
1. It is on record that Britain was the first country to be urbanized according to Jacobs (1970). At the beginning of the 19th century, less than twenty percent (20%) of the population lived in towns and cities with more than 1000 inhabitants. Communities were largely rural. The established sequence – first agricultural villages, then towns and finally cities, explains what cities are and their place in economic development of the people.
2. City Growth and Urbanisation: One of the major characteristics of a city is increased population. This is a function of the push and pull forces that results to migration from the hinterland to the cities. Population in the cities are swelled not only by natural population growth of people already living in the cities but also by the migration of rural dwellers into the city. It is estimated that 30% of the growth of cities results from this migration. People refer to this situation as over-urbanization – too many people in the cities; too few in the rural areas.

   The result of this large concentration of people in cities is the shortage of almost everything including accommodation, food, roads and other infrastructural facilities. Unemployment is rife in cities because the number of people chasing the so few jobs are limitless. In consequence, crime pervades and cities decay.
3. Wastes: One area through which city decay is manifest is the issue of wastes ordinarily called rubbish. These are refusing that many takes to be useless and no longer useful. They are discharges and discarded with reckless abandon and without thought to the consequences this may bring about. Wastes arise primarily because of rising and improved quality of life, and high rates of resource consumption patterns. Okoronkwo (2013) observed that these have had unintended and negative impacts on the urban environment. Due to varied lifestyle and consumption patterns of the people, the quality and composition of these wastes are becoming more varied and changing. With industrialization and better economic progress, more wastes are produce further exacerbating the challenges some of them toxic. Wastes are of different capacities depending on their composition which actually defines their propensity to degenerate and decay with time.

Table 1: Types of Wastes

Type of Wastes	**Time Needed to Degenerate If Left Untreated**
Organic Wastes (Vegetables, Fruits, Food)	7 – 15 days
Paper	10 – 30 Days
Cotton Cloth	2 – 5 Months
Woolen Cloth	12 Months
Wood	10 – 15 Years
Tin, Aluminum and other Metals and Cans	200-500 Years
Plastic	100-1000+ Years
Glass	Not Determined

Table 2: Composition of Urban Wastes

Urban Wastes	
1. Plastic – 26% 2. Municipal Solid Waste – 21% 3. Construction/Demolition & Excavation Wastes – 13% 4. Food Wastes – 24% 5. Hazardous Wastes – 16%	

According to the World Bank, the world generated 2.01 billion metric tons of municipal solid waste (MSW) in 2016, 2.24 billion metric tons in 2024 and this is projected to increase to 3.40 billion metric tons by 2050. The United Nations Environment Programme (UNEP) estimates that global e-waste production is expected to reach 74 million metric tons by 2030. Plastic waste is now a major concern worldwide. A study published in the journal Science Advances in 2017 estimated that since the 1950s, 8.3 billion metric tons of plastic have been produced globally, and only 9% of it has been recycled. One can only imagine what has become of the rest and the fate of the earth in the prevalence of the continual and surging manufacture and use of plastics.

In 2019, China was the world's largest generator of MSW, producing approximately 231 million metric tons, followed by the United States with 207 million metric tons, according to the World Bank. Low- and middle-income countries generate more than 90% of the world's waste but often lack the infrastructure and resources to manage it properly, leading to health and environmental impacts. According to UNEP, only 13% of all cities in low- and middle-income countries have formal waste management systems in place.

Construction and demolition (C&D) waste is a significant contributor to global waste production. The Global Waste Management Outlook report estimates that construction and demolition waste accounts for about a third of all waste generated worldwide. In Imo State it is now profitable for government to indirectly tax vehicles carting away construction and demolition wastes by insisting that any movement must get the approval of Imo State Environmental Transformation Company (ENTRACO).

Food waste is also a major issue globally. According to the Food and Agriculture Organization (FAO) of the United Nations, about one-third of all food produced for human consumption is lost or wasted, amounting to approximately 1.3 billion metric tons annually. United States Environmental Protection Agency EPA has classified more than 400 substances as hazardous, posing a threat to human health or the environment. Industrial wastes have grown steadily more toxic that currently about 10% of industrial waste materials are considered hazardous. Hazardous waste, such as electronic waste, medical waste, and industrial chemicals, pose significant health and environmental risks. The United Nations estimates that globally, around 44 million metric tons of hazardous waste are generated annually, and only about 10-15% of it is treated or disposed of safely.

Cities are facing an increasing growth in population, and shares in Gross Domestic Product (GDP) growth, resulting in, among other things, increasing quantities of waste being generated. These wastes are far beyond the handling capacities of urban governments and agencies. Cities are now grappling with the problems of high volumes of waste, the costs involved, the disposal technologies and methodologies, and the impact of wastes on the local and global environment.

Fig. 1: Tire Wastes

Some of the more than 270 million tires Americans replace each year. Most used tires are dumped legally or illegally. Some are retreaded, while others are shredded and burned to generate electricity. Most scrap tires remain unused and unwanted in growing dumps that are fire hazards and breeding grounds for rats and mosquitoes and the diseases they carry.

In Nigeria, like many other Sub-Saharan Africa countries, the amount of wastes generated every year is so gargantuan that with very poor data the management of wastes has become a big problem. The Nigerian National Municipal Waste Management Policy (2020) gives no estimate but states that "Nigeria produces a large volume of solid waste out of which less than 20% is collected through a formal system". This is lower than the 44 percent average waste collection for Sub-Saharan countries, as estimated by the World Bank. In comparison with the European and North American collection rate of ninety percent (90%) of waste generated.

Fig. 2 and Fig. 3: Wastes in the cities of Lagos and Owerri, Nigeria

Management of Wastes

Restated, the volume of trash or refuse generated by a community reflects a result of three factors - affluence, packaging and open space. Communities that rely on disposable goods that they may throw away after every limited use tend to have more trash than others. With increased and improved standard of living as well as quality of life, enormous refuse is generated. They are quite an eye sore as well as insulting as they are harmful to life and living.

Countries and cities have various methods of disposing their wastes; each with its own impact on the environment. Some coastal cities load wastes into barges and discharge them into the sea. They pollute the ocean. Some rely on open dumping on land with its menace to public health but they also harbor disease carrying rodents and insects. Others rely on burning combustibles thus discharging chemicals and particulates into the air thereby causing air pollution and other environmental hazards.

Hitherto, three methods of solid waste disposal have been thought to be appropriate for humans: landfills, incineration and recycling. Most unfortunately, some cities do not have much land space for dumping and may not be properly equipped for other methods. Cities in developing countries such as Nigeria fall within this bracket. In Owerri, the concept of land fill is reversed entirely to the detriment of the people. While refuse dumped in a landfill is expected to be compacted and covered by a layer of soil; they are left open. Most of these produce liquids known as leachate that contaminate the ground water. Landfills are not burrow-pits although burrow-pits could be converted to landfills only on the condition that they will have liners to prevent contaminants from seeping into ground water supplies. Leachate forms when rain water entering the landfills interact with the decomposing materials. They are poisonous and contain more than forty (40) organic chemicals.

Incineration was once thought to be the quickest way to reduce the volume of refuse until concerns over air pollution became rife. Incineration involves burning refuse in open dumps. Yes, they reduce trash by as much as 90% but they pose environmental problems of their own by generating toxic pollutants in both air emissions and ash that contain what is called alphabet soup of highly toxic elements including carbon monoxide, sulfur dioxide and nitrogen oxides.

The third option of solid waste management is Recycling and Reuse. Recycling is the process of collecting and processing materials that would otherwise be thrown away as refuse and turning them into new products. This process reduces the number of wastes needing disposal by making portion of it available for reuse. It is unfortunate that most cities in developing countries do not pose the technology for recycling of refuse. Non-the-less, waste pickers better known as scavenger ravage our refuse dumps looking for materials they can sell to small scale businesses and industries. (Figs 2 and 3). It is estimated that in Indonesian cities for example scavengers reduce total urban refuse by 33%. While it is true that these scavengers feed from the money, they make out of it, the environmental conditions under which they work are not good and they run the risk of illness from disease carrying organisms and injuries from scrap metals and broken glasses.

Sustainable Urban Management of Wastes

In 1987, The United Nations Brundtland Commission defined sustainability as "meeting the needs of the present without compromising the ability of future generations to meet their own needs." In the context of our study, sustainable urban management of wastes is

intended to imply ways and means of handling our wastes to benefit todays' citizens without compromising tomorrows. This presupposes the careful implementation of the goals of sustainable waste management system in Nigerian cities. A careful articulation of these goals will help in understanding why our cites are presently lacking in the management of wastes and how this could be ameliorated for a better living and improved quality of life of the people.

Table 3: Goals of sustainable urban waste management (Adapted)

Goal	Meaning
Environmental	Minimizing the adverse health and environmental effects of the urban waste management system
Economic	Economic and financial sustainability of the urban waste management system
Technical & infrastructural	Optimizing existing processes in the application of urban waste management technologies
Institutional	Integration and inclusion of the key elements of the urban waste management system
Socio-Cultural	Attracting the maximum participation of citizens and service recipients

It is as a result of the foregoing that a plan of action is necessary for optimum result in the management of our wastes for a sustainable urbanization of our Nigerian cities.

Plan of Action

Sustainable urbanization and management of wastes implies that the growth of the city should not in any way be affected by enormity of wastes that arise as a result of the increase in the population of the city. To achieve this, it is important that a new forum of actions must be developed to take care of hitherto accepted and acknowledged understanding.

i) **Developing A New Mindset and Nomenclature:** The first of these is the nomenclature attached to outcome from use of materials which are either labelled waste, trash, refuse and so on. These indicate that they are worthless, useless and not fit for anything. We can confirm that this mind set is not correct. What we call refuse or trash are materials and resources that are useful in one way or the other since they can be put to use in achieving so many other predetermined objectives. If we are able to stamp this on our subconscious, the journey is half way gone.

ii) **Orientation (Waste Prevention & Source Reduction)**. By waste reduction it is envisaged that waste generation will be minimized by reducing materials used in production and consumption such that the total outcome will be less than ordinarily expected. To achieve this, factories and industries, businesses and organizations will be involved in auditing their input and output differentials for maximum result. In so doing any or all unavoidable materials that may be tagged

as waste will be reclaimed and converted to other uses by recycling. One way of achieving this is by designing products for longevity instead of the current plethora of "use and throw-away" that is ravaging our urban areas.

iii) **Resource Recovery**: This is an important arm of waste management as it embodies the criteria for sustainability. Resource recovery ensures that nothing is put to waste except where it will be harmful to the people, in which case it will be discarded or put to other uses. Resource recovery ensures that our so-called wastes are collected as resources and not thrown away as rubbish or trash. Fortunately, hunger has permeated our society to the extent that scavengers are now the people making the money that our industries and municipalities should be making.

It is within the ambit of resource recovery that waste from one sector becomes an input for another. This increases industrial symbiosis and inter-relationships. Non-the-less, a lot of recycling infrastructures will be needed to maximize material recovery to a profitable level because of the level of mechanisation required to be funded by government to aid this venture profitably and purposefully.

Fig. 4: Waste Life Cycle
Source: Okoronkwo (2015)

iv) **Producer Responsibility –** Responsibility is a word that is seriously lacking in the administration of wastes in municipalities, industries and communities. This was the attitude of our oil producing companies that resulted in the degradation of our communities in the oil producing states of Southern Nigeria until the "Polluter Pays" mantra came into force. Although the oil spill problem is a study for another occasion, it must be stated that producers must be held accountable for the wastes they generate either by action or inaction. They should be held responsible and accountable for every post-consumer waste generated of their products or to lack of eco-friendly packaging or other negligence.

v) Technology and Improved Solutions- There is no gainsaying the fact that today's world is driven by technology. This also applies to the management of wastes. The introduction and use of robotics are a great leap in waste management as well as

the use of artificial intelligence (AI). Indeed, drones have added to this sophisticated and improved technology in addition to the use of Light Detection and Ranging (LIDAR) technology. In advanced European countries, sensors are now built into lids of waste bins such that they beep once full and attract the attention of offices of those concerned with its disposal, recycling and other purposes. Other current technologies advance waste-to-energy solutions such as conversions to biogas and biofuels.

Fig. 5: Plan of Action for sustainable Urban Waste Management

vi) **Government Action**: Legislation and laws have not done much in the management of wastes especially in urban areas. Though this has been the case, yet it seems the best way through which government can assist in this debacle. It is true that we have several laws enacted to curb waste mismanagement but the implementation of these laws has always left sour tastes for the people. With poverty ravaging the citizenry, enforcers of the laws look the other way for only a tiny pot of porridge. It is hoped that things will improve for every person to be the man he is created to be and stand up to be counted.

Epilogue

This study only tried to look at the menace of wastes and what could be done to control its effects on the growth and sustainability of our cities and urban areas. It did not cover all that is required although it exposed the shortcomings of government and citizens towards waste management and its effect on the city. It is hoped that further study will address other areas of waste management and proffer further solutions on how best to handle the menace in our cities.

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