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ANALYSIS OF POLYTHENE AND PLASTIC BAG WASTES GENERATION AND DISPOSAL IN ABA URBAN, ABIA STATE, NIGERIA

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Analysis, Polythene, Plastic Bag, Waste Generation, Disposal, Urban.

Abstract

The term 'plastics', include materials made up of various chemical elements such as carbon, hydrogen, oxygen, nitrogen, chlorine and sulfur. Waste is defined as unwanted and unusable materials and is regarded as a substance which is of no use. World's annual consumption of plastic materials has increased from around 5 million tonnes in the 1950s to nearly 100 million tonnes. This implies that: more resources are being used to meet the increased demand of plastic, and more plastic waste is being generated. Due to lack of integrated solid waste management (ISWM), most of the plastic waste is neither collected properly. In developing countries, rapid population growth, urbanization and industrial growth have led to severe problem of waste generation in urban centers. The statement of the research problem make a cursory look at aba cityscape, leaves an observer with more to wander whether polythene and plastic bags are part of the soil constituents and [redacted] environmental aesthetic display, particularly as polythene and nylon bags litter all over the city environs. Aba being a mega commercial center, witness rapid population growth, and this growth appears to be associated with increase in the use of consumable goods packaged and wrapped in cellophane and plastic bags, with adverse consequences like environmental littering, clogging of inland waterways, environmental

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injustice, and devaluation of urban aesthetic quality, among many others. findings from available literatures so far reviewed, shows that the subject under investigation has been attempted at various aspects of human endeavors such as, Brazil, South Africa, Port Harcourt, Lagos and Ibadan. However, none has been carried out in south eastern Nigeria, let alone aba urban. It is, therefore, the need to fill this gap in literature that the research is necessitated sequel to the statement of the research problem, and aim of the study, it is expected that the study when completed will procure feasible measures, by recommendation practicable ways of ameliorating environmental impacts occasioned by incessant use of polythene and plastic products in aba urban, consequently, contributing significantly to the body of global knowledge, especially in the aspect of environmental solid waste management.

Introduction

The term 'Plastics', include materials made up of various chemical elements such as carbon, hydrogen, oxygen, nitrogen, chlorine and sulfur(Fobil and Hogarh2016). Plastics are macromolecules, formed by polymerization and having the ability to be shaped by application of reasonable amount of heat and pressure or another form of forces (Vimal, Mathiyazhagan, Agarwal, Luthra, Sivakumar, 2020). Plastics, depending on their physical properties, may be classified as thermoplastic or thermosetting plastic materials (Andrade and Neal, 2019).

Internationally, the world has not givenmuch attention to the impacts of population growth with regard to the use of plastic products. This has led to unparalleledquantity of plastic waste littering almost all over the environment without proper management. Nylon (polythene) and 'pure water'(plastic) bags account for significant quantity of plastic waste, mostly in urban areas like Aba.According to Marsh (2022),plastic waste, after food and paper wastes, constitutes the major type ofurban wastes.

The world's annual consumption of plastic materials has increased from around 5 million tonnes in the 1950s to nearly 100 million tonnes (Jefferson, 2021).This implies that: more resources are being used to meet the increased demand of plastic, and more plastic waste is being generated.Due to lack of integrated solid waste management (ISWM), most of the plastic waste is neither collected

properly nor disposed of in appropriate manner to avoid its negative impacts on environment and public health.

In developing countries, rapid population growth, urbanization and industrial growth have led to severe problem of waste generation in urban centers. According to Lau, Shoran, Bailey, Cook, E.; Stutter, Rosella, Velia, Godfrey, Boucher, and Murphy (2020),plastic waste quantities increased from 46 million tons in 2001 to 65 million tons in 2010. Similar report has it that per capita per day production will increase to 0.7 kg in 2050 (McDermott, 2023). The characteristics of waste depends on various factors such as food habits, traditions, lifestyle, and climate (Marsh, 2022).

In Africa, the economic growth and changing consumption and production patterns are resulting into rapid increase in generation of waste plastics in the world (Jefferson, 2021). Even the cities with low economic growth have started producing more plastic waste due to: plastic packaging, plastic shopping bags, bottles, and other goods/appliances using plastic as the major component.

On a positive note, plastic waste recycling can be economically viable, as it generate resources whichare in high demand.Some of the developed countries like China, USA and Germany, have already established commerciallevel of resource recovery from waste plastics in the most environmental friendly way.

Plastics, are not only enduring, lightweight and available at low prices, but also have very good thermal and electrical insulation properties. The versatile properties of various plastic polymers being water resistant, non-porous, ductile and malleable - make them suitable for manufacturing a wide range of products that also bring medical and technological advances in our modern society (Zibo and Brent, 2023). We have seen how plastics proved beneficial in making personal protective equipment (PPE) during the past COVID-19 outbreak around the world. Sectors such as food production and preservation, electronics, packaging, textile and transportation are highly dependent on plastics in our present day life. Plastic packaging has also facilitated ease in transportation of a wide range of food, beverages, and other goods to far-off locations, which was earlier not possible (Mottle and Bales, 2023). The light weight of plastics makes transportation economical and its barrier properties help in increasing the shelf life of food items, thus leading to reduction in food waste (Omnia, Saris and Davin, 2015). As a result, plastics are gradually displacing other packaging materials.

EDITOR-IN-CHIEF
Prof. W. F. HILL [MALAWI]

According to Reddy, Mira and Bhatia (2023), cellophane and plastic bags take between 500 – 1000 years to degrade, however, about 50% of the plastics are used just once and throw away (use-and-throw), hence millions of tons of plastic waste are generated annually, about 5% of this are collected and recycled, while the remainder continue to dominate our landfills and many did not even make it to the landfill sites, and due to longer years to degrade and indiscriminate littering of these cellophane and plastic products, it is common to find plastics and cellophane bags litter every part of the densely populated area in Abia State and its environs. Consequently, during rainy season they make their way back to the drains, with some into gutters and canals which eventually results in flooding, soil contaminate, proliferation of mosquitoes and many of this plastic bags drifting on the ocean for many decades, thereby creating life-threatening risks to aquatic animals, turtles, fish and birds are especially vulnerable as this animals can mistake plastic for food which can lead to indigestion or get tangled up in the venture, which can prevent the animals from submerging resulting to death.

Autopsies have shown an abundance of red-coloured debris in the gut of dead albatross birds, other risk attached to waste in plastics bags include the strangulation, suffocation or death of animals and birds and even after death and decay of the animals still continue to poses threat to other animals and environment.

The impacts of chemicals associated with plastic waste is another growing concern in the damage inherent with plastics waste. There are several chemicals within plastic materials itself that have been added to give it certain properties such as Biphenyl, - a, phthalates and flame retardants which has negative effects on human and animal health, mainly affecting the endocrine system. Plastics are made from monomers which have been linked to cancer and reproductive problems, although it has not been clearly established the level of exposure by plastic waste or by which mechanism the chemicals from plastic may have an impact on humans and animals. The

Statement of the Research Problem

A cursory look at Aba cityscape, leaves an observer with more to wander whether polythene and plastic bags are part of the soil constituents and environmental aesthetic display, particularly as polythene and nylon bags litterall over the city environs. Virtually anywhere one turns to, one's sight will eventually be

welcomedby heaps of polythene and plastic wastes of assorted sizes, shapes and colour. One might begin to wander if plastic waste issue is such intractable and unsurmountable.

Aba being a mega commercial center, witness rapid population growth, and this growth appears to be associated with increase in the use of consumable goods packaged and wrapped in cellophane and plastic bags, with adverse consequences like environmental littering, clogging of inland waterways, environmental injustice, and devaluation of urban aesthetic quality, among many others.

In fact, if Cellophane and plastic bags are not properly disposed, they can impact negatively on the environment by causing littering and blockages of storm water drainage channels. Animals may also get matted and masked in plastic bags, and may die out of suffocation. Furthermore, evidences garnered from literature reveals that animals often mistake plastic bags for food and consume them, therefore blocking their digestive processes, which inadvertently can result to death, consequently rendering animals an endangered species.

Aim and Objectives of the Study

Aim of the study

The study will aim at analyzing the use and disposal of polythene and plastic bag wastes in Aba urban, in order to find a feasible solution to environmental pollution caused by solid waste (polythene and plastic bags) littering in Aba urban environment.

Objectives of the study

The following objectives will be conjectured in order to address the aim of the study:

i. identifying the existence polythene and plastic bag waste items;
ii. classifying various forms of polythene and plastic wastes;
iii. determining the impacts of polythene and plastic bag wastes on the urban environment;
iv. examining the relationship between polythene and plastic wastes disposal and urban aesthetic values;
v. determining the association between polythene and plastic waste generation and increase in urban population.

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The Study Area

The study analyses the impacts of cellophane and plastic bag wastes disposal in some selected urban areas of Abia State, South Eastern Nigeria. Nigeria, in its national contest, plays host to the area of study, Abia State. Geographically, Nigeria is located within latitude 5°N to 12° 30'N and longitude 2°30'E to 2°30'E. (Figure 1). For the purpose of convenience and time, this research shall focus on the three (3) key urban areas of Abia State, explicitly: Aba, Umuahia and Ohafia, as illustrated in Figures 2, 3 and 4. Therefore, in order to secure a firmer grip of the subject of the study, it is relatable to mention some of the study area's geographical considerations.

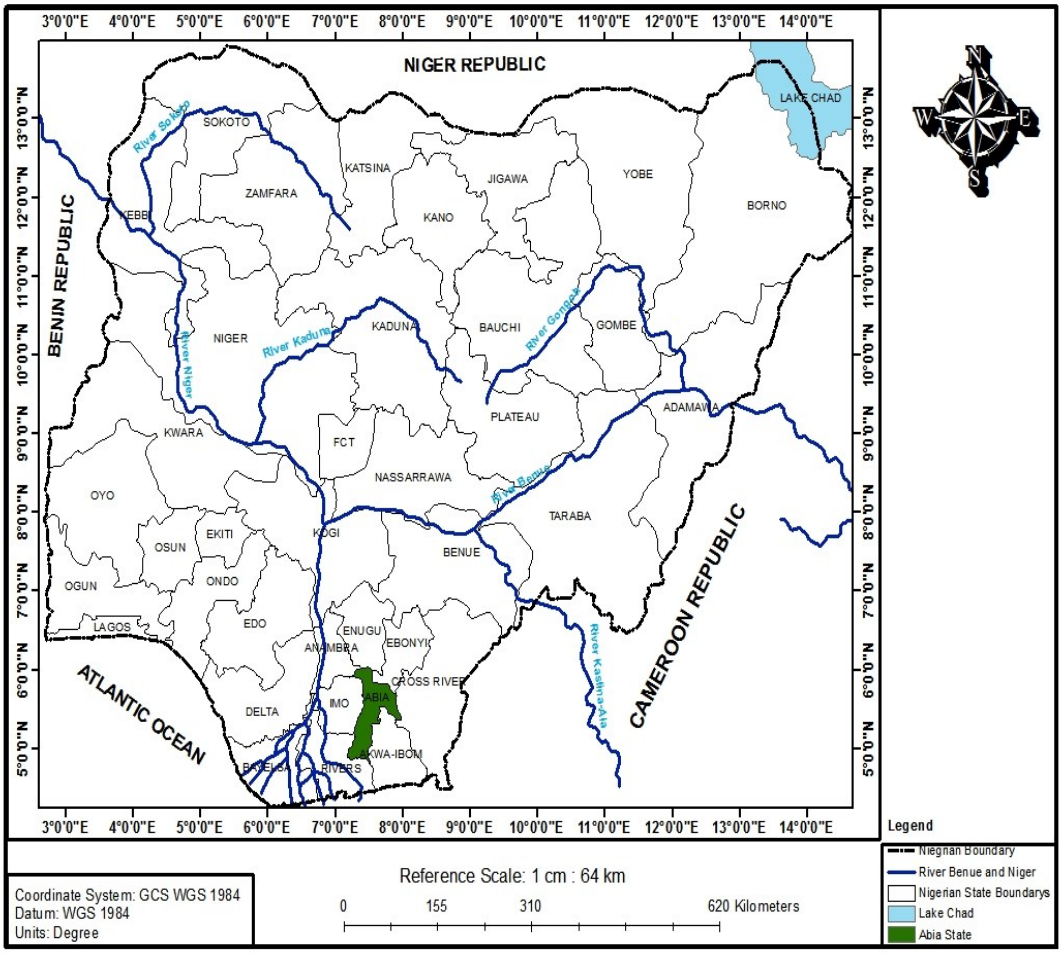

Figure 1: Map of Nigeria Showing Abia State

Sources: (1) Geography and Planning Department, Abia State University, Uturu (2023 (2) Ogbah S.I (2021).

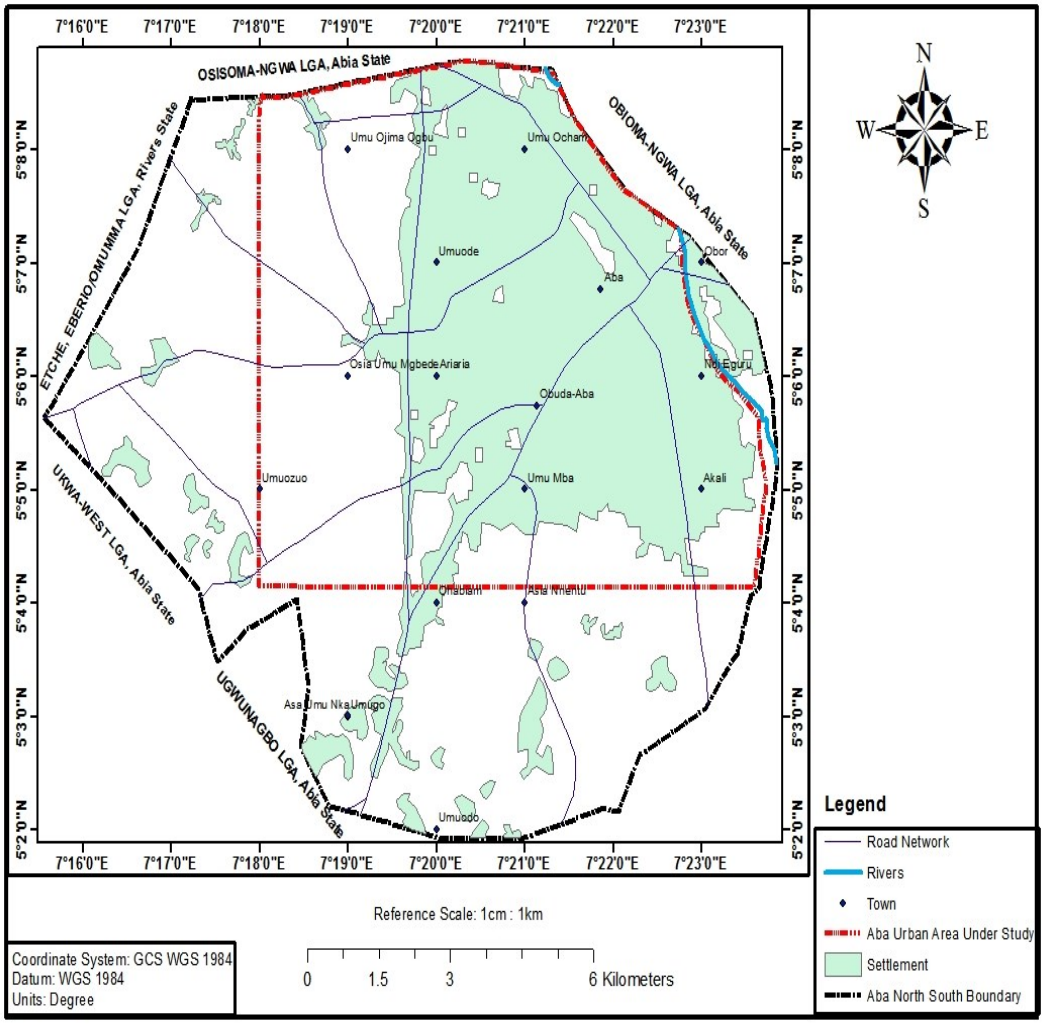

Figure 2: Map of Aba North and South LGA Showing Aba Urban

Sources: (1) Geography and Planning Department, Abia State University, Uturu (2023). (2) Ogbah, S.I. (2021).

Population

According to the National Population Commission (2006) Aba North Local Government has 1991 provisional figures of 86,331. By the projections of the National Bureau of Statistics, based on the 1991 census figures, Aba North was expected to have a population of 140,000 by 2018 (Nmeregini, Okechi and Raymond, 2022). Secondly, about 65% of this population constitutes the urban population of the area that engage in all forms of urban transportation be it inter

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Prof. W. F. HILL [MALAWI]

or intra urban journeys either by public or private vehicles. In 2006, the National Population Commission allocated 106,844 as the population of Aba North.

On the part of Aba South Local Government, provisional figures of 413,852 were recorded in 1991 according to the National Population Commission (2006). Also, Aba South was expected to have a projected population of 559,900 by 2018 according to the projections of the National Population Commission which was based on the provisional figures of the 1991 census.

According to Abia State Official Website (2015), these population figures for Aba North and South were contested at the population tribunal. The basis being that the survey carried out in Aba showed that Aba has more than 1.5 million houses. Taking each building to house an average of 4 persons, it means that Aba alone has a population of at least 6 million (Table 1).

According to the National Population Commission (NPC, 2006), the population of Aba was 534,265. Projecting the population to 2023 using the exponential trend extrapolation model of population projection with the formula stated as:

$$P_1 = P_o (1+r/100)^n$$

Where:

P_1 = Present year population (2023)

P_o = Base year population (1991)

1 = Constant

n = Present year-base year (2023-1991)

r = growth rate (2.6% according to World Bank, 2023).

Table 1: The 1991, 2006 and the Projected Population Census of Aba North and Aba South

Local Government Areas	Population Census 1991	Population Census 2006	Population Projection 2010	Population Projection 2023
Aba North	86,331	106,844	153,200	761, 354
Aba South	413,852	427,421	598,700	1,095,379
Total	500,183	534,265	751,900	1,856,733

Source: National Population Commission Umuahia, Abia State, 2023.

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REVIEW OF RELATED LITERATURE

Introduction

This chapter shall bring to limelight the theoretical and conceptual framework of the study. Suitable theories that underpin- cellophane and plastic waste activities -wll be presented. Other literature related to the subject matter shall, as well, be reviewed with the hope of extracting facts from the key findings of previous studies on cellophane and plastic bag waste in particular, and solid waste management in general, consequently, using it as a platform to enrich and strengthen the study.

General Perspective of Plastic Bag Wastes

Plastics, over the years, gained general acceptance, due to its numerous benefits of being low-cost, ponderous, resilient, strong and durable with good insulation properties, providing benefits particularly in the health sector and other areas. Due to these advantages, the production of plastic bags increased significantly from 0.5 million tons in 1950 to 260 million tons in 2008 (Coppola and Gaudi, 2021). Packaging, electrical equipment and plastics from extinct vehicles are a major source of domestic and industrial wastes (Daija and Xiao, 2020). In the case of plastic bags, most of them are disposed of as waste after single time usage. It is stated that plastics can remain in the environment for 1000 years without decomposition from the sunlight, microorganisms or bacteria (Ellington, 2019). The common problems associated with these bags are deterioration of the environment and direct or indirect threat to the life of a human as well as animals (Reichert and Canes, 2020). If the bags get buried in agriculture land, they reduce the percolation of water and passage of necessary air to the soil which results in the reduction of overall productivity of the land (Maser and Arras, 2021). Moreover, in poor and underdeveloped countries, plastics are commonly used for the packing and carriage of food products. This practice can cause complex health issues as several cancer-causing elements can be produced in chemical actions which occur in plastics and food items because of temperature differences (Romero and Kerry, 2018).

Plastics and Environmental Economics

A very different perspective on the discourses on plastic pollution is the framing as an economic problem. As discussed above, many solutions are not competitive

in the marketplace due to their high costs. Accordingly, the low price of virgin plastics which is a result of the low oil and natural gas prices can be considered the major cause of plastic pollution. Taking such view implies that one major benefit of plastics – their low price - is driving consumption which, in turn, results in their emission to nature. It also dictates that solutions should address the economy of plastics.

The goal of economic solutions to plastic pollution is to reduce plastic consumption either directly via financial (dis)incentives or indirectly via creating a level playing field for other solutions, including alternative materials (e.g., bio-based plastics), recycling, and circular business models. The simplest and most widely adopted economic instrument is to place levies on single-use products, especially on plastic bags. For most cases, increasing the price of carrier bag reduced the consumption but the global effect of such policies remains uncertain (Chen and Oldfield, 2020). In addition, there may be unintended consequences and the ecological impacts of replacements in particular often remain neglected.

Taxing the Use of Plastic

Plastic taxes follow the same logic as levies and fees but target a wider range of products. While there is no literature on the implementation of plastic taxes across countries, the European Union, for instance, plans to implement a plastic tax on non-recycled plastic packaging waste (World Economic Forum, 2019). Similar initiatives exist in the US State of California (Hong and Chen, 2023). In principle, such taxes can be raised at the counter to change consumer behavior and/or directed toward plastic producers (Bacardi, 2023). The latter aims at internalizing the external costs of plastics in such that their negative environmental impacts are reflected in their pricing, in line with the idea of extended producer responsibility. Although the actual external costs of plastics are far from clear and depend on the specific context, ecosystems services approaches, valorizing the supporting, provisioning, regulating, and cultural services nature provides, can be used to estimate those. According to a recent assessment, plastic pollution results in an annual loss of $500–2500 billion in marine natural capital, or $3300–33,000 per ton plastic in the ocean (European Environmental Agency, 2023).

Benefits of Taxing the Use of Plastic Products

The benefit of taxing plastic producers would be twofold. If targeting the sale or purchase of non-recycled plastic monomers or resins, a tax would incentivize recycling. If the tax revenue would be collected in a dedicated fund, this could be

used to subsidize other solutions, such as innovation in materials, products and business models, or awareness campaigns. General plastic taxes could be modeled after carbon taxation following the polluter pays principle. However, the latter requires a value judgment regarding who the polluter indeed is, and different actors would certainly disagree where to place responsibility along the life cycle of plastics. An additional challenge can be that the taxes are absorbed by the supply chain and, thus, not achieve the desired aim (Chili, Silva and Tacna, 2021).

Plastic Bags and the Environment

Plastics remain in the environment for a long time because they are non-degradable. They are made from exhaustible resources, petroleum and natural gas are major components among them. Polythene of various densities is the basic materials commonly consumed for the production of plastics. Linear low-density polythene (LLDPE) is widely used for the manufacturing of shopping bags and commonly used in retail and superstores, to attain a preferred thickness, shiny and smooth look (Lee and Lavoie, 2013).

Plastic bags' disposal has a dangerous impact on soil and water due to the presence of toxic chemical substances. In Mumbai (city of India), plastic waste has become a major problem for the municipal authorities due to the littering practice and poor waste management system. Many of the plastic bags are failed to reach the recycling process because most of the times plastic bags are treated as domestic waste (Roseboro, Langer and Avers, 2022). Plastic wastes in large amount are difficult to finish in the world but we can take steps to come out of this problem by becoming more aware of the issue and initiating work on the reduction of waste. Regular use of plastic is among the major reasons for the increase in environmental degradation.

Plastic Bag and Water Pollution

Plastic is also responsible for most of the pollution in the river and land as it has a horrific impact on both water and land species (Saratou and Incognito, 2021). This can result in a poor economy and inadequate food supply for societies that are dependent on fishing. Small organisms like plankton can be hurt by plastic that large animals eat for food. If these tiny organisms are poisoned by ingesting plastic, the large animals will also consume chemicals. This trend will go in the upward direction and the chances are there that these chemicals can be present

in the fish which people eat. It is not only polluting the oceans but also the groundwater resources. Generally, many areas all over the world are facing major issues due to the use of plastic but the water resources across the globe are particularly in danger. Dumping and littering of plastic waste can result in seeping of plastic toxins into the groundwater which people drink regularly. On the land, deterioration of natural beauty can be observed. Moreover, wind can carry plastic waste or litter throughout the atmosphere (Tibet, Molting and Ray, 2022).

In the process of plastic production, various harmful materials are produced to impact the environment. These materials contribute to acid rain which is the real threat to the natural and artificial environment especially in the regions which were historically highly dependent on coal, such as Eastern Europe. On the other hand, smog is also responsible for human health issues. Furthermore, two plastic shopping bags manufacturing produces 0.1kg of waterborne waste that is capable of disrupting associated environment such as water channels and the life therein exist (Slithers, 2019). The problem of air and water pollution is more intensified when it is found that most of the plastic shopping bags are manufactured in the countries having few eco-friendly regulations like China that comes up with adverse effect on the environment and human health (McDermott, 2023). These bags are not only causing air and water pollution but they have also made a negative impact on agriculture lands.

Plastic Bag and Environmental Health

Such problems are developed due to non-seriousness of peoples for disposing of litter including plastics and other items in open places. Some people burn plastic bags at roads or grounds that produce very harmful smoke fatal for health and increase environment temperature. It has been learnt that in Malaysia, the temperature is gradually but slowly increasing due to which sea level may rise and result in flash floods.

Measures to Control the Use of Plastic Bags

To control such untoward situation, Malaysia restricted the use of plastics (Saratov and Incognito, 2021). Singapore, the neighbour of Malaysia has already banned the use of plastic bags to avoid the harmful effects of plastics on agriculture production and environment (Sinha, Krieger and Hew, 2020). In this regard, a study was carried out to find out the effects of the decrease in plastic bag usage

in big markets (Oliver, Edward and Kasarachi, 2021). The study was carried out by adopting a dual motivation model about the usage of plastic bags and it was evaluated that how environment-friendly behavior affects actual behavior of the individual (Oeuvre, Moeller and Zee, 2022). In the first week, the shop keeper gave free plastic bags to purchasers in routine.

In the second week, the intervening week, of study, customers were asked if they wanted to get plastic bags or otherwise. According to Mehta, Cunningham and Roy (2020), it was analyzed that during the pre-intervention week (first week), 78% of the customers accepted to receive plastic bags and 22% did not accept. In the post-intervention week (second week), 73% of the customers refused to accept plastic bags and only 27% accepted to receive plastic bags. A significant difference in acceptance of plastic bags was observed in pre and post-intervention week. This shows that the question asked by the shopkeeper helped in reducing the use of plastic bags. Therefore, it indicates that planned human efforts always help to achieve objectives. In this case, the objective was to reduce the usage of plastic bags because of their harmful effects.

Summary of Literature Review

The process of literature review, so far, has been so onerous, time-consuming and quite tedious. The review of related literature was reasonably encompassing, consisting the theoretical framework, Circular Business Model (CBM) via Circular Economic Model (CEM). The CBM/CEM pressed harder in its disposition to provide a theoretical drift from the circular waste management trend, to offering a more pragmatic and resilient solution to plastic wastes pollution as a panacea to overcoming the odds of its intractable impacts to the environment, consequently ameliorating its debilitating effects on the general urban health.

The research further reviewed other related literature on plastic bag wastes, considering such sensitive areas as the general perspective of plastic bag wastes, plastics and environmental economics, plastic bags and environmental pollution, plastic bags and water pollution, plastic bags and the drainage system, plastic bags and environmental health, measures at controlling the ever-growing use of plastic wastes, plastic bags and agriculture, plastic bags and commercial activities, plastic bags and its alternatives.

Gap in Literature

The panaceas to either reduce or abate the negative impacts of plastic wastes on man and his environment, hitherto, has not attracted adequate attention it

deserves from research scholars, although findings from available literature shows that some works has already been done in this regard in advanced economies like USA, Japan, China, London, and Switzerland (mostly in the aspects of plastic management, plastic recovery, plastic elimination, plastic reuse, plastic reduction and plastic ban). A closer look at the results from their studies, proved that western economies has been quite successful in plastic waste management, however, the level of success recorded has not been quite inclusive.

Theoretical Framework

This study will employ the Circular Business Model, also called Circular Economic Model, to explain the relevance of plastic bags, as well as the need to curtail its excessive negative impacts on the environment, thus paving way for Reversed Logistics Model (RLM) which advocates for a regenerative approach to natural resources management, as opposed to linear models that is highly unsustainable as a result of the finite availability of raw materials for production and the associated environmental degradation.

Circular Business Model

Circular Business Model (CBM), also called Circular Economic Model (CEM) is framed on the assumption that plastic pollution as a resources problem is based on the idea that we are losing valuable materials when using plastics in short-lived product, such as packaging and single-use items.Such framing is closely connected to the waste problem as waste management is transforming into resources management. In a broader context, however, this idea can be reformulated as a problem of extractive fossil industries in such that the cause of plastic pollution is indeed the abundance of fossil feedstock. Both aspects of the resource framing result in divergent sets of solutions.

To achieve the closed-loop use of resources of a circular economy in plastic waste management, there should exist genuine cooperation between all sectors of a society. The following Figure 6 displays the relationship between the players that can bring about real change.

The government plays the role of an overseer and is responsible for monitoring and gathering data on the production, use and disposal of plastics. This information can be used to draw up policies and design systems for waste

reduction. Coupled with research on key issues, effective and sustainable policies can be developed that can give birth to a circular economy.

A very different solution, namely, the shift to bio-based plastics, emerges when framing plastic pollution as a problem of fossil feedstock. Here, the idea is to reduce the use of petroleum and natural gas to manufacture plastics and foster the transition to a bio-based economy. Bio-based plastics can be produced from natural polymers (e.g., starch, cellulose), by plants or microbes (e.g., PBS, PHA), and by synthesizing them from biological feedstock (e.g., ethylene derived from fermented sugarcane) (Kotler, 2021).

The Two Main Processes for Manufacturing of Bitumen Mix Roads Using Plastic Waste .

Dry Process

In Dry process, the waste plastic is used in high percentage. This is the best process for utilising the high value of plastic waste. The stone aggregate this mixture is used for rod laying. CMP is the another way to carry out the dry process. It is helping to have a uniform coatingby better mixing of material and control of temperature.

ADVANTAGES

1. About 10% reduction is occur in the use of bitumen.
2. Use maximum amount of plastic waste.
3. Increase in the performance and strength of the roads. They are not degradable even after the years of construction.

Wet Process

Firstly, collect the waste plastic and then cut into fine pieces. At 160degree Celsius, the waste plastics are blended by the direct mixing of shredded plastics with the hot bitumen. This process is not commonly used because it requires a bigger plants and the lots of investments. There is difference in viscosities of molten polymer and bitumen which cause the difficulty in mixing. Therefore, Mechanical stirrer is needed in this process.

ADVANTAGES: Procedure might be used for reusing of any sort, shape, and size of waste material .

Other Methods

Some other methods to manage the plastic waste are: reuse, recycling, landfills and incineration. Reuse of plastic waste helps to save the time, money, energy, and resources. The process of recycling the plastic waste is to convert the waste material into new items to forestall the waste of helpful materials. The oldest form of waste material treatment is a landfill which is otherwise called a dumping ground site for the removal of waste materials by entombment. Incineration is a process to convert the waste into heat, debris, and vent gas.

Reuse

It is a middle-man between reduce and recycle. Some would be surprised to see how many opportunities are there to reuse the waste. Without undergoing a physical change, we can use a product for the same or new purpose by the reuse of waste which is known as waste reduction strategy. In this process, energy is not used. Most of the people skip this step and directly go to the recycling, but reusing the plastic is the best process which can reduce the demand for new plastics to be created. Extra tough and multi-trip plastic bundling has become an enormous style in India in current ages, supplanting much fewer strong and single-trip options.

Recycling

This is the way towards recouping the waste plastic and reprocess again into helpful items There are several advantages of recycling and re-utilizing of the plastic wastes. Plastic recycling can be complicated by the number of factors, such as the collection of plastic waste, separation of different types of plastic, and cleaning of the waste. Currently the most common method is
mechanical recycling which is used to recycle the plastic waste; the term covers its collection, sorting, washing, and grinding. Post-industrial wastes any organic residues and has known compositions. Recycling plastic takes less energy than making plastic from raw materials.

Landfills

For managing the plastic waste, Landfill is the main traditional approach. But there is one issue in most of the countries in the world i.e. space for landfill. Removal of wastes into landfills infers an irrevocable harm of significant crude resources and vitality. A low density of non biodegradable plastic waste, makes them unfit for

removal in landfills. Solid waste is dumped into the dump yards where waste is either buried or left as it is. In India, solid waste generation per capita varies from 0.17 kg/individual/day in modest communities to roughly 0.62 kg/individual/day in urban areas. In Landfills, plastic degrades into leeches and these leachates from landfills contain metals, such as lead, mercury, cadmium along with the pesticides,disinfectants, chemicals, pharmaceutical wastes, organic compounds and so landfilling and dumping, all the inorganic materials are used.

Incineration

This process discourages the need of landfills of the waste plastics and it tends to be utilized for the recuperation of the energy part of the plastic. The volume of solid waste is diminished by consuming the loss in appropriately structured and working conditions, this process is known as incineration. The burning and the other higher temperature squander treatment frameworks are
temperature. Damaging plastic structures by the destruction process which can be done by landfilling or incineration.

Utilization of Plastic Waste within the Construction of Road

A standout amongst other strategy to utilise or reuse the plastic waste is construction of roads with that plastic waste. Utilizing polymers changed bitumen to gain higher asphalt pavement generally speaking execution has been resolved for a long TERMS.

Bitumen: It acts as aggregates in bitumen mixes. 85% of all bitumen is used as a binder in asphalt for foot paths, runways, roads and parking lots By the use of volatile diluent, sometimes the viscosity of bitumen is reduced, this material is known as cutback.

Basic Process: Waste plastic material is grounded and made into a fine powder. Approx. 3-4% of this plastic powder is mixed with the bitumen. This destroyed plastic waste goes to acts as a solid restricting specialist. It makes the black-top enduring. At the time of blending, the temperature remains at 55degee Celsius when the plastic is mixed but normally before mixing plastic the blending takes place when temperature reaches at 45.5degree Celsius.

Findings from available literatures so far reviewed, shows that the subject under investigation has been attempted at various aspects of human endeavors such as, Brazil, South Africa, Port Harcourt, Lagos and Ibadan. However, none has been

carried out in south eastern Nigeria, let alone Aba urban. It is, therefore, the need to fill this gap in literature that the research is necessitated.

Conclusion

- The collected data shows that we can control the plastic waste by some appropriate methods.
- We can save our environment from this hazardous increase in plastic waste by the above methods.
- This paper finds the importance of managing plastic waste.
- The methods discussed in this article are easy, pocket friendly and good for the environment.
- By this paper we focus on the problems that occur due to plastic waste and the methodology to control that waste.
- By the use of road construction, we can get a flexible and better durable road.

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