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## ADDRESSING THE DESTRUCTION OF THE ENVIRONMENT IN THE LAGOS MEGACITY THROUGH SUSTAINABLE LANDSCAPING

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### ABSTRACT

With a population of 12.1 million people, Lagos is the world's 25th-largest metropolis. Lagos' population is predicted to grow to 15.8 million by 2025, putting it as the earth's 12th most populous city, thanks to an influx of around 6,000 new residents every day. In contrast to many other megacities, however, slums house more than half of the population. Pollution of the air and water, floods, mismanagement of trash, instability, and restricted access to critical facilities and city services are all outcomes of unfettered urban expansion. Lagos' economic significance has been recognized "it contributes more than 40 per cent of the national GDP". *Nevertheless, the state administration has been challenged to address these issues through the "Lagos Mega City Area Development Program."* The "Lagos State Environmental Protection Agency" is one of the government bodies tasked with correcting environmental deterioration via landscaping. This study examines how to educate and organize citizens, as well as to construct landscaped areas, and stroller, bicycle and bicycle-friendly pathways and water flow. Numerous instances are provided to show how these activities have aided in the enhancement of living situations and the reduction of greenhouse gas emissions.

**Keywords:** Sustainable landscape, megacity, environmental degradation

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### 1.0 INTRODUCTION

Environmental Degradation (ED) is the "deterioration of the environment through depletion of resources such as air, water and soil; the destruction of ecosystems; habitat destruction; the extinction of wildlife; and pollution" (Koengkan et al., 2023). According to Chertow, (2008) "I=PAT equation, environmental impact (I) or degradation is created by a combination of an existing large and growing human population (P), continuously increasing economic growth or per-capital effect (A), and the use of resource-depleting and polluting technology (T)." (Chertow, 2008) Environmental degradation is one of the ten hazards listed by the United Nations high-level panel on dangers, challenges, and change. The International Strategy of the UN for disaster reduction (2010) defines ED as "the reduction of the capacity of the environment to meet social and ecological objectives and needs". There are several forms of environmental deterioration, the ecosystem gets degraded when natural habitats are destroyed, or natural resources are

exhausted. Environmental production and environmental resource management are two approaches to addressing this issue. There are several examples of environmental deterioration throughout the world. The recent fire on the Amazon is one example. It accounts for 60% of all rainforests. (Lovejoy & Nobre, 2019) It is the earth's lungs, and its destruction poses a significant threat to the ecosystem and the entire globe. The repercussions of deforestation will have a significant influence on the world's supply as well as CO<sub>2</sub> absorption. If deforestation continues, there will be less accessible oxygen on the planet, which might be harmful to human health. Another issue that arises as a result of this is the overconsumption and waste of paper goods derived from these trees. Because most garbage is not recycled, a massive amount of waste is generated. An additional harmful result from this is the degradation of the soil to become fewer nutrients which makes it harder to be used again. The primary cause of degradation is a human-being disturbance. (Chaudhary et

al., 2015) The nineteenth-century industrial revolution automated the production and manufacture of products introducing the use of machinery and other heavy equipment, which in turn requires fuels as a source of energy, harming the environment. Modern technological advancement, which we are proud of, is the primary source of environmental destruction. To address the issue, we must maximize resource use and management, promote sustainable development, apply a green idea, and, most importantly, include the community in all development initiatives. Because of the severity of environmental deterioration throughout the world, the World Bank and other environmental organisations have performed research to give an environmental degradation cost estimate. (Chaudhary et al., 2015) According to Maslow's hierarchy of requirements, people prioritize certain demands above others. The most basic demands are physiological: oxygen, food, water, and everything else they require to thrive, (Gitz et al., 2016) individuals' to have fundamental needs, physiological safety, and security are jeopardized as a result of environmental deterioration. (Koengkan et al., 2023) The inhabitant of a community will have less clean air, healthy food, and clean water, because of the depletion of natural resources such as air, soil, and water. (Chaudhary et al., 2015; Gitz et al., 2016; Lovejoy & Nobre, 2019) Furthermore, the dispersal of disease and the natural ecosystem disturbance does not offer a safe environment for people to live in because of the high danger of illness, outbreak, or natural catastrophes; consequently, safety and security requirements are deficiency needs. As a result, people will be hesitant to engage in any political or economic activity. This study is to evaluate how sustainable landscaping can be used to reduce the impact of environmental degradation on the environment.

“The Lagos Mega City Project” aims to alleviate Lagos State's uncontrolled urban expansion, which bears a harmful influence on the surrounding state and the nation's wealth. Granted Lagos's speedy population expansion and its 60% contribution to the national economy. (Ilesanmi, 2010; Samson Olanipekun, 2013) The “Lagos Mega City Region Development Authority” was established by the Federal Government to handle Lagos's developing status as a megacity. This region encompasses nearly the whole state of Lagos, as well as four (4) LGAs in neighbouring Ogun State. (Ilesanmi, 2010) Lagos megacity aims to tackle a variety of evolving issues, such as “power generation, fire prevention, security, geographical restructuring to leave ample parks and open gardens available as recreational facilities; potable water provision, pollution prevention, and flood control by preventing drainage blockage”. While Lagos is not the only polluted metropolis in the world, it does face serious environmental issues that are compounded by the daily influx of roughly 6,000 people seeking a better living. The dumping of potentially dangerous industrial waste, inadequate solid waste management, insufficient sanitary infrastructure; soil, air, and water pollution; floods, ocean surges, insecurity, and limited access to basic infrastructure and municipal services are among the challenges. (Chaudhary et al., 2015; Nwagwu & Oni, 2015) This research discusses how landscaping projects may be used to prevent the blockage of drains with waste (a significant source of floods), as well as to discourage the dumping of garbage in public places through beautification initiatives. The utilization of direct labour in the execution of these projects also generated job possibilities, lowering poverty, which has been shown to be intrinsically linked to ecological deterioration. (Oduwaye & Lawanson, 2007; Olusegun Akiyoke, 2011)

### **Combating Environmental Degradation through Landscaping in Megacity**

The ecological issues that plague Lagos megacity necessitate multifaceted and diversified solutions. Controlling the climate or local climate via landscaping is one of these techniques. e.g., “Air-soil temperature, humidity, air velocity and wind speed, wind direction, surface absorptive and reflectance (albedo); seasonal shading, pollution, glare, air freshness and fragrance and how this can be achieved using soft and hard landscaping”. (Anthony & Stephen, 2019; Ogunsote et al., 2011) Soil temperature management, such as ventilated shade given by vines, trees, and shrubs, may be used to reduce the radiant temperature as well as lower soil relative air and surface temperature. The radiation from the sun that reaches earth and walls of the building is lowered by ventilated shades, which lowers the sun-air temperature. Lowering sun-air temperatures through ventilated shade is how air temperature is controlled and managed. Evapotranspiration, a technique through which plants acquire water from the soil and lose it through evaporation from the leaves, is enhanced by ventilated shade. This causes cooling in the same manner that sweat does in humans, (Anthony & Stephen, 2019) with the energy used to change liquid to vapour absorbed from the surrounding air. Plants in general enhance humidity in an area, which can effectively aid human comfort in dry seasons. Trees are useful in reducing airspeed and enhancing the speed of still and slow-moving air. Trees planted in rows are effectful as Windbreakers, reducing airspeed and removing dust, likewise, directing wind to and away from structures, by way of Landscaping can be achieved. (Misni, 2012); (Anthony & Stephen, 2019) Fences, walls, hedges, and trees can all be used to create an obstacle that deflects the wind over structures. On bigger plots, clusters of trees can be utilized to control wind flow in a specific direction. The landscape of an area may be utilized to influence how quickly solar

energy is reflected by a surface or absorbed by the same surface. The use of grass, plants, colour, and careful pavement material selection can all help to regulate the amount of solar energy absorbed by that reflected. (Anthony & Stephen, 2019) Plant selection may be used to manage shadings at different seasons. Trees are utilized in the rain, and dry seasons to shield the chilly north wind while permitting the sun to shine in through the south. Plant material, particularly thick evergreens, and plants with dense leaves can block cold season wind. (Ogunsote et al., 2011) A smart design in the South would involve the planting of deciduous trees, which cooled the air in the hot season and shed their leaves in the cold season. Plants are very effective in reducing pollution levels because they take in harmful pollutants such as carbon dioxide, which is linked to the city's heat islands, also lowering other pollutants, particularly those emitted by cars. Tree-planted buffer zones are utilized to separate industrial and residential regions. (Anthony & Stephen, 2019; Ogunsote et al., 2011) Glaring can be avoided by growing trees to isolate this section of the skies, but consequential brightness can be avoided by growing flowers, trees, and lawns on surfaces which would normally reflect light into the structure. Plants generate oxygen and aromas, which contribute to a refreshing environment.

### **Landscape Elements for Climate Control**

Hard and soft landscaping features might help to manage the climate. The term "soft landscaping elements" refers to plants, and "hard landscaping elements" refers to everything else, such as basic buildings, steps, paving, garden furniture, walls, and fences. (Ogunsote et al., 2011) Trees, shrubs, and other plants are the most important in terms of providing shade and controlling humidity and airflow. Air travelling over hard surfaces is either reflected, or absorbed, such surfaces as car parks lots and pavements are warm, but air moving through trees and plants are cooled, just as grasses and herbaceous border are used

to cool the ground and minimize glare, in general, vegetation increases air freshness and aroma. Surface waters are used to create humidity and air cooling, while mulch protects plant roots from over-evaporation. Straw, fallen leaves, and plastic sheeting can all be used to make mulch. Gravel, wood chips, decomposing leaves, and grass are among the other ingredients. Mulches contribute to decreasing surface and air temperature by slowing the rate at which the earth absorbs. (Anthony & Stephen, 2019; Misni, 2012; Ogunsote et al., 2011) Trellis is a lightweight structure made of intersecting strips made from plastic or wood and other materials that are used to support climbers and are frequently attached to a fence. This may be utilized to give shade on the west walls or as free-standing pieces to screen out the light from the west.

#### **Elements of Hard Landscaping**

**Fences and walls:** Wind is deflected by walls, which may likewise be utilized to control the wind. The wall is typically solid, whereas the fence is constructed of posts, railings, cable, wire mesh, and other materials. Even with climbers, fences allow some wind to pass through them.

**Stairs and Pavement:** The ground cover finish, material, and structure of stairs and pavement can all play a significant influence in lowering the ground temperature. The use of the tarmac in car park lots in the absence of any sort of canopy is a major source of heat.

**Slopes and Barriers:** These are used to guide airflow and may be highly successful in areas with considerable topographic differences.

**Boulders and stones:** Boulders and stones can be placed to control airflow and create shade.

#### **Experiences of Landscaping in Lagos**

This research outlines examples of beautifying and landscaping initiatives in Lagos, which are done to recover public areas that were formerly used as waste dumps or were taken over by illegal shack constructions, these areas are now

reclaimed and converted to mini-parks and gardens. The conversion of medians around the cloverleaf junction into little parks is one of the most prominent beautifying works. In the past, squatters and hawkers occupied these public places, which were mostly utilized as open-air restrooms. Gani Fawehinmi Park and M.K.O. Abiola Garden are located near the renowned Ojota crossroads and are home to touts and migrant individuals who have already occupied the shacks and dumps in the place. Many regions of the state have converted large road medians into gardens, albeit this ornamentation is most noticeable in Ikeja, Ikoyi, and Victoria Island. The transformation of Overhead Bridge Parking Spaces into Car Parks. Before the government's implementation of landscaping initiatives, most places beneath overhead bridges were occupied by unlawful constructions, hawkers, the mentally ill, and trash dumps. Several of these have since been turned into parking lots and properly planted. Bridges around the Marina and Ahmadu Bello Way on Victoria Island are two examples. Even Bar Beach has been planted wonderfully. Many pedestrian pathways, as well as sidewalks and bus stops, have been built around the city.

#### **2.0 METHODOLOGY**

The procedures employed in carrying out the study, which includes the research design, the target population, the sample size and the sampling procedure, research instruments and data collection techniques. The scope of this study is restricted to the offices of both the Lagos Mega City Region Development Authority and town planners in both Lagos and Ogun states. The design for this research refers to the plan, and structure of investigations to obtain detailed responses. A structured questionnaire was used to obtain information from these offices. To achieve the desired objective for this research, the type of data that was collected is both primary and secondary in nature. In selecting respondents for this study, sampling techniques were used. A

questionnaire with closed-ended multiple-choice questions which were mailed and hand-to-hand distributed to the respondents. The respondents constituted the management personnel in the selected offices and other people living in the study area. A letter of introduction and an explanation about the purpose of the study was attached to the questionnaire. The use of Statistical Package for the Social Sciences (SPSS), is done by converting the numeral score of the respondents into percentages of the research and also getting the means and rank of the responses with the use of the Relative

### 3.0 RESULTS AND DISCUSSION

This study aimed to evaluate the means of using sustainable landscaping in combating environmental degradation caused by solid waste disposal in the emerging Lagos megacity. According to the findings, it was shown that the hazards or threats caused by improper solid waste disposal on people and their environment by soil contamination are ranked first, followed by air contamination which is ranked second, followed by water contamination which is ranked third, followed by bad impact on human health, and by a disease-carrying pest which is ranked fourth, followed by adversely affect the local economy which is ranked fifth, and finally by the impact on animals and marine life which is ranked sixth, which is also the least of the hazards or threats caused by improper solid waste disposal on people and their environment as a whole. Furthermore, the data analysis reveals how sustainable landscapes (green areas) can be used to combat threats imposed by solid waste disposal on the environment and its dwellers' soft landscaping elements are ranked first, hard landscaping elements are ranked second, followed by outdoor living spaces which are ranked third, and finally by plant selection in landscaping which is ranked fourth making it the least of how sustainable landscape (green areas) can be used to combat threats imposed by solid waste disposal on the environment and its dwellers. Also shown from

Importance Index (RII) formula (Fagbenle et al. 2004) which is as follows:

$$RII = \frac{\sum P_i U_i}{N(n)}$$

Where,

RII = relative importance index

P<sub>i</sub> = respondent's rating

U<sub>i</sub> = number of respondents placing identical weighting/rating

N = sample size

n = the highest attainable score

The findings are as follows below:

the analysis are the benefits of a sustainable landscape to society in combating environmental degradation by solid waste disposal. it shows that improvement of indoor and outdoor air quality is the number one benefit among others and an integrated and systemic approach to design is ranked 6th, making it the least of the benefits of sustainable landscape to the society in combating environmental degradation by solid waste disposal. Finally, to summarize the findings, the analysis reveals how a sustainable landscape can be achieved in society to combat the threats posed to people and their environment by solid waste disposal through the use of recycled resources such as glass, rubber from tires, and other elements to make landscape items was greatly preferred., followed by the construction of sidewalks and bus-stops.

### 4.0 CONCLUSION

From the study of evaluation of means of using sustainable landscaping in combating environmental degradation by solid waste disposal in an emerging megacity, and judging from the various computations, analysis and findings, the result revealed some relevant factors from which the researcher drew a certain conclusion. This research shows that the hazards caused by improper solid waste disposal on people and their environment as a whole which are soil contamination, air contamination, water

contamination, bad impact on animals and marine life, disease-carrying pests and adversely affecting the local economy. This study also shows how sustainable landscape can be used to combat threats imposed by solid waste disposal on the environment and its dwellers through soft landscaping elements, hard landscaping elements, outdoor living spaces and plant selection in landscaping. It also revealed the benefits of sustainable landscape to society in combating environmental degradation by solid waste disposal which is the improved indoor and outdoor air quality, increased energy efficiency, waste reduction, protection of ecosystem and resource conservation, integrated and systemic approach to design, economic performance and protection of public health and improvement of enhanced productivity. A sustainable landscape can be achieved in society to combat the threat imposed on the people and their environment by solid waste disposal which is through the conversion of road medians to mini-parks, conversion of areas beneath overhead bridges to parking lots, the building of walkways and bus stops, and reprocessing of items such as crystal, latex from tires, and other resources to make landscaping products. Therefore, the study

concluded that to combat environmental degradation by solid waste disposal, there is a need for a sustainable landscape which can be achieved by the conversion of road medians to mini-parks, conversion of areas beneath overhead bridges to parking lots, the building of walkways and bus stops, and glass, rubber from tires, and other materials are recycled to generate landscape goods such as paving stones, mulch, and other materials.

Towards effective usage of sustainable landscaping in combating environmental degradation by solid waste disposal in emerging Lagos megacity, it is recommended that landscape design should be one of the documents required for building document approval by the planning authorities. Soft landscaping elements should be greatly encouraged within the city since it combats threats imposed by solid waste disposal on the environment and its dwellers. Furthermore, recycling old items (solid waste) like glass, tire rubber, and other materials to produce landscape components such as paving stones, mulch, and other materials is one of the greatest methods to establish a sustainable landscape and address the risks posed by solid waste disposal.

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