

CULTIVATING SUSTAINABILITY: EXPLORING THE ROLE OF HOME GARDENING IN ENHANCING URBAN RESIDENTIAL ENVIRONMENTS IN LAGOS, NIGERIA

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Abstract

Home gardening is emerging as a viable means to sustain the urban residential environment in Lagos, Nigeria, as the city faces ongoing challenges of rapid urbanisation and environmental degradation. This study aims to investigate the potential of home gardening in promoting environmental sustainability and enhancing the quality of life in Lagos. Survey questionnaires and interviews were used to collect data examining the benefits, challenges, and practices associated with home gardening. 72% of the respondents are familiar with the subject while 28% are not. This signifies there is a level of literacy and understanding of the subject even though there is a need for improvement. The findings reveal that home gardening has numerous positive impacts on the urban residential environment in Lagos and it has the potential to significantly contribute to environmental sustainability by improving air quality through the absorption of carbon dioxide and the release of oxygen. It helps reduce the heat island effect thereby mitigating the adverse effects of urban heat. Home gardening in Lagos state, Nigeria is also playing a vital role in water conservation, as gardeners practice efficient irrigation techniques and rainwater harvesting. Other benefits as revealed by this study include: home gardening enhances food security by providing fresh produce and reducing reliance on external food sources; it fosters community engagement and social cohesion, as neighbors come together to exchange knowledge, resources, and surplus crops; and it improves residents' mental and physical well-being, promoting a sense of achievement, stress reduction, and increased physical activity. Despite its numerous benefits, home gardening in Lagos faces challenges such as limited space, lack of knowledge in this context, and inadequate access to resources and support. 95% of the respondents keep gardens for aesthetic reasons and not for biodiversity factors, there is more to learn. To overcome these barriers and maximise the potential of home gardening, recommendations are provided. These include the need for policy support, the establishment of community gardens, allotment schemes, and awareness campaigns to educate residents about the benefits and techniques of home gardening. There should also be a provision for training and resources to empower individuals to engage in gardening practices. By incorporating home gardening into urban planning strategies, Lagos can create a sustainable and resilient residential environment. The study is also a contribution to the United Nations Sustainable Development Goal 11.

Keywords: Home gardening; Environmental sustainability; Lagos; Urban residential environment; Benefits

1.0 INTRODUCTION

Background of the Study

Human existence showcases the need for man to take cover and find protection from various degrees of environmental elements (Cousins, et al., 2019). This further necessitates the requisite to interfere with nature for fulfillment purposes, as it also applies to other basic needs. Now, it is beyond imagination, how much damage has been inflicted on earth through building development and construction. Consequently, carbon was emitted from these buildings, as the manufacture of construction materials began to warm up the air and space (Sachs, 2015). There has been a conscious effort to abate this concern, which is however more or less an environmental responsibility by adopting an intelligent initiative of developing green belts along building lines.

Over time, the exploitation of human habitat brings a practical and mutually beneficial natural habitation between plants and humans, with all tending towards aesthetics and functional uses. On this note, study attributed the level of importance green spaces have on human existence to increasing human needs (Samsudin, Yok, & Chua, 2022). Zeybek (2020) identifies plants as the main factor that projects the image of an area and as a major contributor to the formation of identity besides structural elements that create urban identity. This further argues that, besides the formal elements, mostly structural, which create urban identity, plants are one of the main factors that also affect the image of the city if not properly protected (Salama & Wiedmann, 2016). With this in mind, planting design thus helps build a collective memory, while could also predict future changes. Interestingly, the adoption of green culture which often transcends into urban landscape has been a major factor accelerating the growth of environmental responsiveness of residential building development (Yazar, et al., 2020). This in itself has been able to produce the most interesting buildings of today which are, almost without exception, respectful of the environment, sustainable, and designed to consume the least energy possible. This move shares a distinct yet synonymous attribute with the concept of green architecture which focuses on saving energy production and consumption.

As the environmental impact of buildings becomes more apparent, the need for green buildings becomes imminent. Green, or sustainable, building is the practice of creating and using healthier and more resource-efficient models of construction, renovation, operation, maintenance, and demolition (Ragheb, El-Shimy, & Ragheb, 2016). Environmentally, green architecture helps reduce pollution, conserve natural resources, and prevent environmental degradation.

Problem Statement

Residential area development is a conscious effort designed to create an enabling environment to live and be protected from nature's extremes (Dawson, 2017). Interestingly, accelerated technological advancement has resulted in a parallel expansion of the environment through urbanisation, resulting in the rapid pasteurisation of greenery in the physical environment. This has resulted in expanding the structural outlook of the environment with undue regard to the natural ecosystem, thus defacing the naturally endowed physical environment with a hardscape, which is naturally not befitting for an urban residential environment. Whereas, innovative designs, variety of choice, quality of finish, and attractiveness of the layout, if well-articulated, shall be the priority concern, especially landscape design.

Unfortunately, the concern about the importance of landscape design in supporting a quality of life has been neglected especially in the face of housing development. These issues have raised concern for development and practices that would mitigate the negative effect of buildings on the natural environment. Consequently, this has paved the way for new design thinking and has hence birthed new strategies for the improvement of the environment. The rapid growth witnessed by Lagos State has been a boost to its economy, yet Lagos has also had to deal with an array of environmental challenges arising from its growth which could be described as bewildering.

The need to ensure that development efforts are carried out with utmost concern for the conservation of natural resources and the sustenance of the environment becomes a common goal.

Research Aim and Objectives

This research aims to examine home gardening as a means of sustaining the urban residential environment in Lagos to suggest measures for achieving more conducive indoor and outdoor spaces. In order to achieve the above-elucidated aim, the following objectives have been formulated to help the research:

- i. To assess the physical characteristics of the residential environment in the study area;
- ii. To examine planning regulations concerning residential greenery provision;
- iii. To identify the effect of the residential environment on the occupants; and
- iv. To suggest measures for achieving a more conducive indoor and outdoor space.

Research Justification and Scope

The era of industrialisation birthed discoveries and increased urbanisation, leading to rapid growth and expansion of urban centers (Atack, Margo, & Rhode, 2022). This in turn resulted in the human need to seek cover and create shelter for protection. Unfortunately, human exploration of the environment through massive construction of housing units and other allied developments was done without due regard to natural green areas (Scott, et al., 2020). Now, it is beyond imagination, how much damage has been inflicted on the environment through all these practices. Housing improvement remains one of the most important sectors, that can ensure the prosperity of urban development and sustainability.

Conversely, building designers often strive to maintain the aesthetics of housing appearances and neglect the demand for environmental values and sustainable living (Ibrahim, 2020). Most times, varieties of design solutions and innovative technologies are sorted only to incite a lot of challenges in the quality of accommodation in the long run. It only becomes imperative that residential design corresponds to day-to-day concerns of people's lives and addresses problems related to their life experience and ambiance.

There has been a conscious effort about the environment which is much of an environmental responsibility, or say measures to address these problems, one of these very intelligent initiatives is the conscious effort to develop environmentally responsive buildings (Linde, Sjödin, Parida, & Wincent, 2021).

The need to promote healthy living has inspired action action-orientated plan that is geared towards the desire to incorporate sustainability principles within the built environment (Velenturf

& Purnell, 2021). Premise on this practice comes the need to explore possible ways of encouraging home gardening in residential buildings. For this study, however, home gardening practices in Lagos State Development and Property Control (LSDPC) estate will be assessed to increase awareness and adoption. LSDPC as it is fondly called is a foremost property company and a state government-owned corporate entity that builds, rents, and sells houses to low, medium, and high-income families in Lagos state. LSDPC estate is one of the multifamily apartments developed by the corporation. One of the major areas in Yaba is Ebute Metta where the Lagos State Development and Property Corporation (LSPDC) estate is located and significant buildings including the Nigerian Railway Corporation headquarters, Lisabi multipurpose hall, Jaekel House – a mini museum that houses artifacts of the old Railway system during its prime.

Landscape and Architecture

Landscape remains a vital component of the environment, even though it comprises visual elements. These elements are composed of qualities that people see around and respond to in a space/place, and often represent. Landscape design is an important element of housing development used to infuse a sense of place whilst improving the visual quality of the housing area (Hussain, Tukiman, Zen, & Shahli, 2015). Landscape determines the best approach by which good design should contribute positively to making places better for people, the level of comfort for the residents, and the residential areas. This view was also supported by Shahli, Hussain, Tukiman, & Zaidin (2014) that landscape design blends arts with environmental, physical, and biological science which mainly focuses on outdoor space. They also further explain that well-defined landscape spaces can enhance the quality of living areas that meet people's preferences. However, landscape design is not only limited to plant material. It also focuses on the hardscape that complements the plants to create a successful design. Landscape often combines vegetation (and associated plants), topography, and spatial configuration into a unit to satisfy the visual needs of people (Shahli, Hussain, Tukiman, & Zaidin, 2014). They add that human-nature interactions gave way to contrasting preferences on the surrounding landscape and the environment since a pleasing landscape can be physically pleasing and/or mentally appealing.

Responsive Architecture

Within the broad context of environmentally responsive architecture, the desire to design spaces that can meet changing functional and aesthetic requirements becomes pertinent. Environmental responsive architecture is a well-known intelligent system that could increase internal comfort and at the same time decrease energy consumption for the building it encompasses (Fakourian and Asefi, 2019). This forms a part of architectural innovation and involves increased emphasis on sustainable measures that offer an energy-saving option and give the best regard to occupant comfort. Responsive architecture, as described by many authors, is a class of architecture or building that demonstrates an ability to continually reflect the environmental conditions that surround it. This means that responsive buildings need to be sustainable and must match performance concerning energy, water, waste, and pollution for future generations (He, 2019). Beyond this, buildings should be healthy places to live and work in; be equipped with appropriate reliable technology; meet regulations; respond to the needs of the occupants; be flexible, adaptable, and durable; and ultimately give value for money.

Gardening and Planting Design in Building Environment

Planting design is all enshrined in landscape planning and design; with its major function being to enhance the physical qualities of the environment. Interestingly, this visual quality serves a double role of revealing through feeling and illicit the emotional state of users. According to Taib and Abdullah (2016), the overall objective of plant design is to improve the physical and psychological well-being of people. This can however be achieved by both preserving (and enhancing) the existing landscape resources or engaging in planting operations often regarded as landscape planning and design. However, knowledge of the elements and principles of design is essential to designing a landscape, likewise the work through the entire design process (Kerr & Lawson, 2020).

Planting design is a branch of landscape design that focuses on plants as living components of the environment (Zeybec, 2020). If carefully planned, it helps build a coherent relationship between the building and the natural environment. A good design can only be attributed to how these components are selected and put together for best use – often time, to enhance the physical appeal and make it aesthetically pleasing. Shahli, et al. (2014) attributed a good quality living environment to be an important aspect of sustainable planning. Thus, the quality of the housing environment makes it an important criterion for creating a sustainable environment. In other words, the more aesthetically welcoming a space is, the more likely people are to visit, use, and enjoy a space. To this end, Ibimilua (2014) characterises landscape as a process that encompasses the use of available elements of the environment to enhance the physical appeal of a building, making the ethics of landscape enshrined in the beautification of the environment. However, using plants to complement design has its specifics, say for example in a residential area, cognisance is given to the right of way, service areas, as well as outdoor living space. This whole process of caring for the environment is another means to maintaining sustainability – creating an island of greenery and planting trees (for shade) along parks and walkways, among other things.

Gardening on the other hand is not easily defined by its contents, as there are potentials for variation as to what makes up a home garden (Schneider, Strohbach, App, & Schröder, 2019). In a broader sense, this can be explained in terms of aesthetics and functionality as there are different types of unconventional home garden styles depending on space availability such as kitchen gardens that utilise pots and trays for planting inside the home.

Gardening has been linked to improvements in human health and well-being, but it is not clear what aspects of gardening promote health, or indeed the extent to which any health benefits are recognised in the gardening community (Chalmin-Pui, Griffiths, Roe, Heaton, & Cameron, 2021). Home gardening is an activity carried out intentionally within the residential environment primarily for food and medicine, but more importantly for beautification (landscape) and sustainability (Zhou, Wei, & Zhou, 2022).

2.0 METHODOLOGY

Research Design and Data Collection

This study thus addresses landscape considerations in building design and planning with a focus on home gardening and sustainable living in residential development. On this ground, the research was designed to be cross-sectional, thus adopting both descriptive and explanatory

measures in discerning the relationship between landscape planning and sustainable architecture. For ease of gathering, however, the survey approach was combined with questionnaire administration and interview opinions about landscape planning, home gardening, and healthy living. Therefore, information for this research was obtained through both primary and secondary data sources. This whole exercise was structured to extract information surrounding issues surrounding urban residential area planning, landscape architecture, the impact of home gardening, and the level of responsiveness. Secondary data sources are major works of literature addressing the objectives of this study.

In all, quantitative and qualitative techniques of data collection were combined and utilised as the main research instruments for this study

Sampling Location, Population, Size and Technique

For clarity, LSDPC Estate, Yaba Lagos is chosen for the study. LSDPC estate was selected on the ground that; it is a public residential estate, and developed by the state government. The choice of this site location was on the assumption that the design and planning of the estate will assist in establishing a contrast between the study objectives. LSDPC estate was designed and built to accommodate 135 blocks, with each having 4-bedroom medium class apartment on 3-floors. By simple arithmetic, this brings the sample population to about 538 units, with an average of 4-families per block. For ease of assessment however, samples were treated per block, which equally mean that housing population was used as basis for sample size and questionnaire administration. For the purpose of accuracy and precision however, 50% of the total housing population was considered and that informed the sample size (Research advisors table, 2006). This brings the total number of questionnaires to be administered to 75 questionnaires. Respondents were drawn from all sides of the estate, while selection was done using convenient sampling technique.

The questionnaire was designed to ensure that appropriate constructs that define the aim, objectives and scope of research were captured. For this reason, variables that covers all necessary issues relevant to the study were considered.

In all, open and close ended questions seeking residents' assessment on green features in residential area planning were included, while aspects bothering around resident's perception on the need home gardening and/or other landscape considerations and its implication on the environment were considered.

3.0 RESULTS AND DISCUSSIONS

Discussion of Research Findings

Data generated through questionnaire survey, interview, and site observation are hereby analysed to give an account of the home gardening approaches employed within LSDPC residential estate, Yaba Lagos. It should be noted that the data generated were built on resident's perception of urban greening as a means to sustaining the residential environment, and to determine whether the environment dominated by plants is preferable and/or even regarded as valuable in terms of the purpose it serves. Views were gathered and perceptions were drawn from a self-administered questionnaire distributed randomly to various residential plots, on every street within the estate.

The responses obtained from the survey were analysed and presented in charts and tables, for easy identification of the peculiar factors and characteristics of the home gardening situations and perceptions in the area surveyed.

Demographic Information of Respondents

Respondent’s demographic data was collected to ascertain the variability in the characteristics of the people involved in the survey, and more importantly, to ensure that the study was not biased in getting accurate information. Table 1 gave a summary of the respondents’ demographic information, which in the long run presented an abstraction of their view as expressed in the sections that follow. Going by the findings presented in the table, majority of the respondents are male adult with 66%, above 40years of age (35.3%) and are graduate with at least Bsc/HND degree (72%).

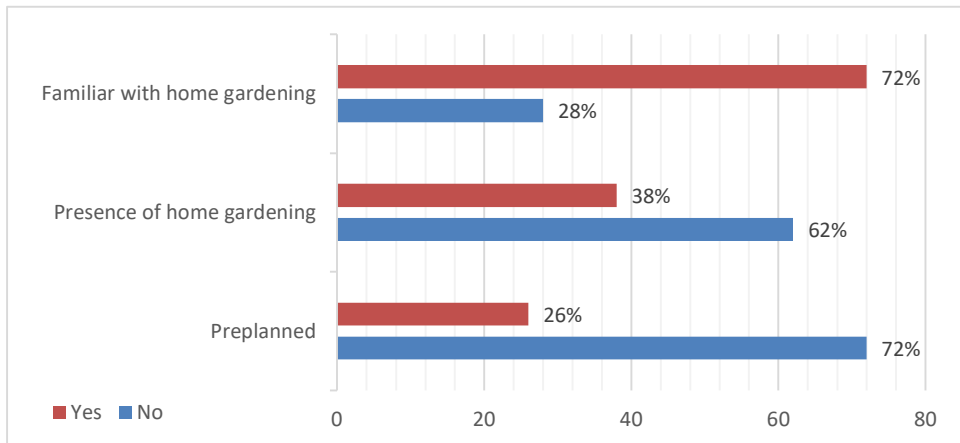
Table 1: Respondents Information

	Response	Frequency	Percentage (%)
Sex	Male	44	58.7
	Female	31	41.3
Age range	18-25yrs	9	12
	25-40yrs	38	50.7
	Above 40yrs	28	37.3
Qualification	SSCE	08	10.7
	Bsc/HND	53	70.7
	Post graduate	14	22.7
Occupancy	House owner	38	50.7
	Tenant	31	41.3
	Others	6	8
Total		75	100

Source: Authors’ report, 2022

This signifies there is a level of literacy and understanding of the discussion under review. Although, 50.7% of the respondents are the rightful house owners, the rest of the house samples are either rented apartments or a short let. Irrespective of what it was, they all found the study very interesting and relatable. Figure 1 shows that 72% of the respondents are familiar with the concept of home gardening, while 38% at least have a home garden feature in the residence, even though the bulk of this was preplanned with the building.

Figure 1: Application of home gardening (Authors' Survey, 2022)



Physical Characteristics of the Residential Environment

The application of plant elements within the built environment comes in different ways but is largely driven by purpose, position, function, type, and overall impact. For this study, however, Figure 2 gave a breakdown of residents' input and insight into understanding home gardening practice within the estate is majorly an outdoor exercise (80%). However, most are artificially grown (60%) which to a large extent qualifies it to be a home garden. Contrary to this, 40% of the respondents did submit that they grow their garden to create a flow with the natural environment. However, 65% of the respondents cultivate grasses often in the form of vegetable and/or medicinal plants, 55% goes further to having potted plants (cactus, aloe vera, etc.), and 20% are just trees and shrubs. Based on personal observation, one thing is common, while grasses serve as an organised garden, shrubs are used to give the landscape a defined pattern – mostly along building perimeter area, and trees strategically located around buildings to show off stand-off zone, indicate plot extent, complement the natural green habitat and/or provide a shading effect.

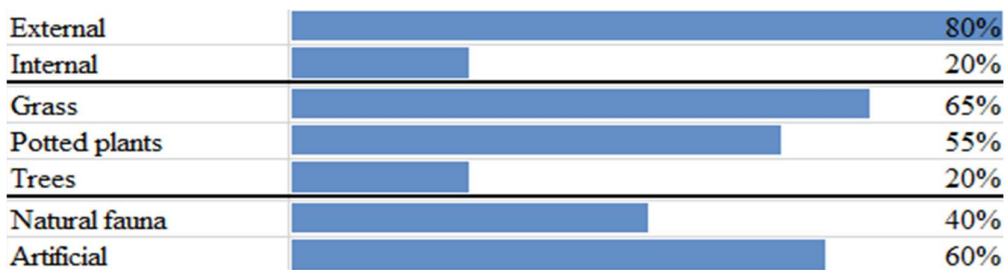


Figure 2: Features of home gardening and perceived impact on the environment (Authors' Survey, 2022)

From Figure 3, of the plots having home gardens from the survey, 55% of such are agricultural gardens, 20% are horticultural, while 25% of the home gardens grow both agricultural and agricultural crops. It can be inferred that most home gardens is just another way to practice urban agriculture.

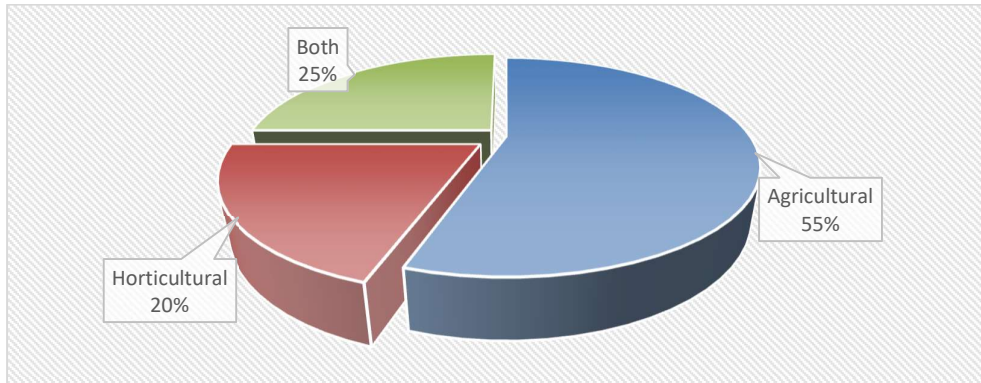


Figure 3: Justification for keeping home garden (Authors' Survey, 2022)

Environmental Characteristics of Plant Elements

However, it becomes important to state that a larger percentage (85%) of the plant elements present are artificially grown, and often include grasses, shrubs, and trees. The naturally grown planted areas are either dedicated children's play areas or herbaceous gardens. One thing is common though, while grasses serve as lawns, shrubs are used to give the landscape a defined pattern – mostly along perimeter (fence) areas, and trees strategically located around buildings to provide shading effect. All these characterise the outdoor environment, and so far the most basic and effective way of transforming an outdoor space. Going indoors, potted plants are often positioned by the entrances and balconies, while in a few cases in courtyards. The survey indicated some salient factors that residents observed to be the reason for maintaining urban greening. Figure 4 shows that 95% of the respondents are aware of the aesthetical value of keeping soft landscape, while 75% did share their opinion on the fact that it is an easy way to create breakout areas, which can also double as children playground.

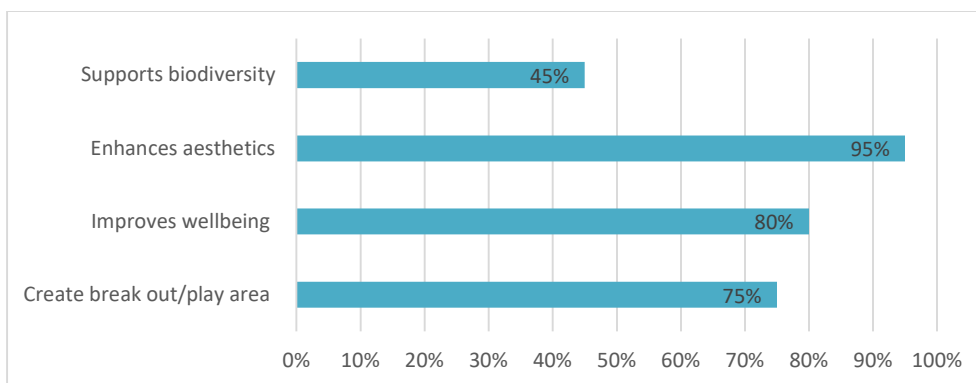


Figure 4: Reasons for maintaining green design (Authors' Survey, 2022)

Additionally, Figure 5 presented a summary of residents perceived physical and psychological impact of planting design in residential planning. The charts show that 68% agreed that physical impact is an important aspect of planting design, 58% submitted that it aids environmental control, 52% opined that it enhances psychological feeling, and 49% see it as a means to urban agriculture.

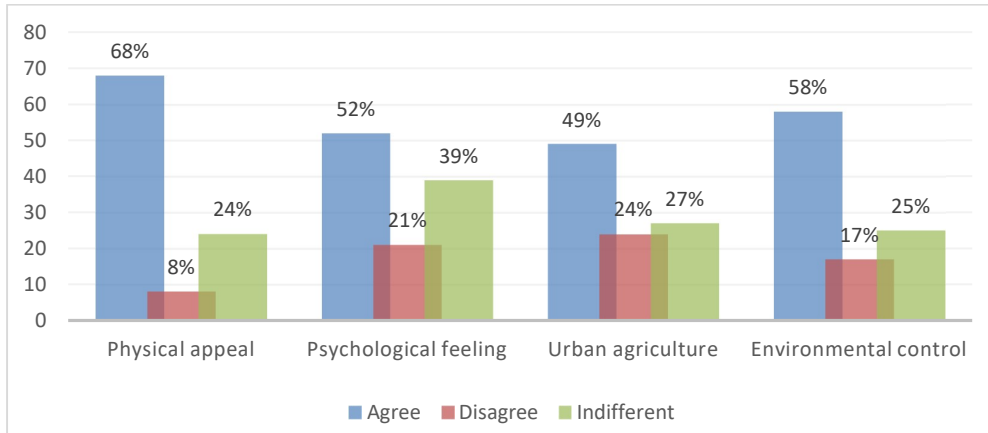


Figure 5: Perceived impact of planting design (Authors' Survey, 2022)

Summary of Physical Survey and Observation

LSPDC estate, Yaba is one of the many public housing initiatives in which residential properties were developed by the government. The estate is a multi-unit housing with unifying characteristics which is evident in its design and planning. Since the Estate has its master plan, it was envisaged that it should follow planning guidelines concerning built-up areas, building setbacks, spaces between buildings, and quite frankly, architectural landscape practice toward the application of soft landscape elements around building perimeters. Through careful consideration of the physical environment, it was observed that there is a conscious attempt to ensure environmental sustainability by maintaining natural habitat between and around building blocks. This created a blend of softscape materials including grass, shrubs, edges, and trees to mark building perimeters and pedestrian walkways (plates 1-3).

Though quite rarely, some of the inhabitants have been able to manage the presence in natural habitat and converted same to create gardening for vegetables and/or horticultural purposes. The efforts described above were made premise on the fact that planning standards were strictly adhered to, with the building footprint not exceeding 40-45% of the total floor size per plot, and maintaining standard setbacks of at least 4.5meters from the distributor roads and 3 meters between each building blocks, whilst ensuring that all these spaces are not paved or locked with hardscape. This thus complements the physical environment to create a good blend with nature, create a serene micro-climate, and provide a natural screening background for buildings.

It however becomes evident and highly demanding that all these characteristics can be put to use to improve outdoor home gardening as an effort to enhance the aesthetic quality of the environment.



Plate 1: Showing planting features used to highmark buildings



Plate 2: Showing presence of natural landscape features in LSPDC Estate



Plate 3: Showing streetscape of LSPDC Estate and building lines

4.0 CONCLUSIONS AND RECOMENDATIONS

Recommendations

Home gardening has been proven to be a sustainable building practice and a necessity in urban residential environments. Interestingly, the understanding of gardening differs between people and across cultures, hence calls for the need to factor in policies that enable successful

functioning, which must be culturally appropriated. To this effect, the impetus to improving landscape knowledge about the functioning and management of home gardening for a friendly, resilient, and environmentally friendly urban residential ecosystem gives room to the following recommendations;

- i. Motivate existing buildings on measures to incorporate green practices into their planning as a means to enhance resource efficiency, and sustainable change. This suggests the conversion of vertical walls or places to grow climbers, places with decorative block walls, or burglary to grow, design, and build healthy, comfortable, cost-efficient, and environmentally friendly living and working environments.
- ii. Planting design policies should be integrated into zoning codes and other building development regulations. This might be incorporated to require either small or large-scale building projects to meet a certain green design standard. Overall, such action will mandate multi-family residential buildings to that a considerable amount of floor areas designated for home gardening or similar practices.
- iii. Encouragement of designing with nature and due consideration for courtyard systems, facilities, or anything that connects with nature. This will help to encourage urban agriculture, which in turn creates buildings filled with edible and decorative plants.
- iv. Building performance measures can be improved with the development, adoption, and implementation of indoor-outdoor gardening. This in other words becomes an essential tool for the successful implementation of sustainable building practices using potted plants to grow herbaceous plants which can be positioned at different areas of the building including the entrance, lobby, or even by the kitchen windows.
- v. The need to create minimum standard requirements for new construction, especially public commercial housing. This will serve as a regulatory framework and footprint that can adopted to encourage home gardening and cultivate responsible environmental management practices.

Conclusion

The theoretical understanding of home gardening in residential areas has been highlighted to include elements and characters that have a positive impact on urban greening. Since landscape design has become a new branding for housing development nowadays, this study thus delivers a conceptual understanding of promoting landscape design in sustaining the living environment. Even though the residential landscape might seem homogenous and sometimes dominated by natural turfs, the situation can however be improved by legitimising urban greening as a form of self-help and a path to economic independence through home gardening. It might seem like the term urban greening is a move to professionalise home gardening and/or masculinise the practice, but it is often more akin to domestic gardening which is a sustainable means of keeping the built environment alive.

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