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PREFERENCE FOR GREEN SPACE ON URBAN RESIDENTIAL PLOT IN IBADAN, NIGERIA

S. A. Adejumo
Department of Urban and Regional Planning, Faculty of Environmental Design and Management, University of Ibadan, Ibadan.
sambayo372@gmail.com

Abstract

Green infrastructure within the residential plot is important to human well-being but lacking particularly in rapidly developing cities. This study therefore, examined the proportion of residents that provided for green space, the size of green space, and challenges encountered in providing green space within residential plots. A cross-sectional research design was adopted to collect information while data were descriptively analysed. A total of 284 pretested questionnaires were systematically administered to residents in six localities of two Local Government Areas (LGA) in Ibadan. Findings revealed that only 38.4% of the buildings have green space. The majority (70%) provided space less than $10m^2$, 22% allotted 10 to $20m^2$, while 8% apportioned $20m^2$ to green space. A proportion of 30.5% provided green spaces for windbreakers and beautification, 28.5% aimed at air quality improvement, 27.5% for carbon monoxide reduction, while only 11.9% developed green plants for vegetable and medicinal purposes. As high as 61.5% of the respondents chose to maintain their green spaces personally. The study suggests public enlightenment on the importance of green space and plants and corroborates with stringent enforcement of physical planning regulations on green space development for sustainable green infrastructure.

Keywords: Green Space, Green infrastructure, Residential plot, Human well-being, Ibadan.

Introduction

Urbanisation is a global phenomenon happening at an unprecedented pace and scale. The previous scale of urbanisation had 3.7 billion people living in cities, and by 2050, this will increase to 7 billion (Chaolin, 2019). The current scale of surbanisation has surpassed the ability of urban managers to offer and sustain acceptable and useful public health facilities, physical infrastructure, environmental safety, and economic vitality in the cities (Kuddus et al., 2020). Many cities of the world, particularly in developing countries, are seriously suffering covertly from gross depletion of green spaces primarily due to rapid urbanisation, the low resource base of institutions on green spaces, low preference for green spaces, and uncooperative attitudes of the community people (Ramaiah and Avtar, 2019). The increasing pressure on the natural environment through converting green areas for residential housing development, especially in urban areas, is becoming worrisome. Ecosystem services and their benefits to human welfare are undervalued and not adequately assessed in planning and policy (Oliver, 2011).

The planned green space is among the social capital and public goods required to maintain well-being in residential quarters (Rao, 2021). Urban green space is a social capital and public good whose benefits are not limited to the developer but enhance the well-being of the neighbourhood dwellers. Green space on a residential plot benefit adjoining land occupants' indeterminate way, ranging from the cooling of the surrounding temperature to air purification. The vegetation recharges the groundwater table, integrates man into nature, and controls runoff and flooding. Vegetation in cities and suburbs is important in making the built environment more liveable, economically, and ecologically sustainable (Ezeabasili et al., 2015).

Among the many benefits of plants, "health" stands out as an extremely cherished benefit (Magdalena et al., 2015). The nexus between green space and health have been summarised in many publications (Hartig et al., 2019; WHO Regional Office for Europe, 2016). Plants in natural and upgraded forms have been found potent to influence the people's social, physical, psychological, cognitive, environmental, and spiritual well-being (Hall and Knuth, 2019). Past studies showed a significant inverse relationship between green spaces and stress levels, with higher levels of green space resulting in lower stress levels (Roe et al., 2013b).

Women were found to exhibit higher trauma levels than men when exposed to the same amount of (or less) green space. A positive correlation exists between urban street tree density and self-reported stress recovery (Jiang et al., 2016). This discovery underscored the therapeutic effect of green plants, especially on human traumatic stress. Some other studies have shown that contact with nature can promote human well-being, both in the form of curative effects, as well as enhancing cognitive capacity, efficiency, mental mood, and lessening stress and anger (Gifford, 2014; Hall and Knuth, 2019). Beyond healing from stress, the horticultural product enhances diets and offers major nutrients for balanced nourishment. Furthermore, horticulture and plants can benefit individuals and families by supporting health through food nutrient supply and well-being (Diekmann et al., 2020). Gardening can serve as a medium of physical exercise, become a primary source of vegetables, herbs, and nourishment, and helps in creating a sense of belonging and connectedness when a tree plant is grown within a compound of a large family (Yogendra, and Prerak, 2019). In traditional compound living, commonly seen in Nigeria before independence, compound buildings often adore a centre tree as a significant point where family members converge after work hours for recreation and other social functions before night rest. Thus, compound green infrastructure strengthens social connectedness and enhances evening children's excitement and relaxation activities.

Throughout the history of cities, a wide range of social actors have contested urban land as a scarce resource (Fazal, 2015). Already, a great percentage of the urban population lives in decaying urban areas with health and life-threatening conditions (Hala, 2013). Since the advent of the Industrial Revolution, urban expansion and growth of urban infrastructures have precipitated the rapid disappearance of the natural environment. Rapid surbanisation remains a significant threat to urban green preservation. As urban areas become more compacted, cultivating greens within different land uses is difficult, especially in residential areas (Abdulraheem et al., 2022). This is a significant attribute of the urban core where the predominant residential plot size is high density, grossly lacking accessibility without green vegetation in most places.

Another dimension of the subject matter is the management of urban green space in residential living plot. The management and maintenance of urban green spaces (UGS) at the city, neighbourhood, and local scales affect their capacity to support biodiversity (Beninde et al., 2015) as well as their contribution to aesthetics and ecosystem services. Maintenance of green plants and space in multi-tenanted residential structures could become a major issue to discourage property owners' establishment of green space. The issue may arise from each occupant's different preferences for green plants and levels of understanding of plants' benefits to human well-being.

The immediate challenge of accommodation for rural-urban immigrants, natural population increase in major cities, and development of urban infrastructures, among other factors, are persistently calling for more housing projects, which occasioned continuous destruction of peri-urban vegetation, gardens, etc., for the construction of housing units. This is particularly common in developing countries where cities developed without a master plan to guide physical development. Likewise, cities are experiencing increasing signs of environmental stress brought about by rapid urbanisation consequently resulting in poor air quality, noise pollution, a rise in air pollutants, congestion, traffic, and extreme heat (Ukpebor et al., 2021). These adverse effects trickle down to adversely affecting people living in major cities in developing nations. The presence of urban green spaces can mitigate this current harmful experience and mend the city dwellers' general quality of life (De Haas et al., 2021). Many empirical studies have been conducted to define and measure the urban green space in major cities, its social benefits, and its connection to human well-being and health. This study has observed that

the amount of space allocated to green space in private residential plot has not been measured and documented in the literature. Therefore, this study aims to determine the size of green space built on individual residential plots particularly in the study area. On this account, this paper examined the proportion of residential buildings owners that established green plants, examined the rationale for the green infrastructures, the maintenance methods adopted, and the challenges encountered by residents.

Conceptual Review of Green Space Provision

Many empirical studies have attempted to define and elucidate the premise of green space provision concerning availability, accessibility, and connection to urban human wellness in residential areas. Many previous models and theories substantiate that the usability of green space is directly associated with its accessibility (Prashanti, 2020). The usability of green space differs due to different spatial arrangements within the residential communities and variations that exist in the provision of green concerning quantity and quality. The usefulness of green infrastructure in residential areas can be environmental conservation, maintenance of biodiversity, and enhancement of property value (Naumann et al., 2011). Another usefulness of green infrastructure is the reduction of urban water runoff through the establishment of green roofs and green walls and the reduction of groundwater pollutant load (Dipeolu et al., 2018).

The concept of green infrastructure has emerged as an effective solution to urban heat challenges, runoff development, and as mitigation to climate change. Trees help to fight global warming by reducing the amount of greenhouse gases in the atmosphere. Green space absorbs carbon dioxide and pollutants, fuelling climate change, and offsets warming effects in cities, making them cooler (Dipeolu et al., 2015). The multi-functionality of green infrastructure differentiated it from the majority of its grey counterparts, which tend to be designed to perform one function, such as transport or drainage, without contributing to the broader environmental, social, and economic context (Naumann et al., 2011). The loss of urban green space has consequently increased urban heat and flooding, which are amplified by climate change and can threaten human health and well-being (Xiaolu and Masud, 2012). Plants in the home have been a major source of pleasure. Indoor and compound gardening relieves stress, boosts creativity, productivity, and focus, and promotes recovery (Ke-Tsung, 2022). Mental health benefits from exposure to vegetation consistently lower levels of anxiety, depression, and trauma in adults as well children. There is some evidence that houseplants may positively influence air quality (El-Tanbouly et al., 2021), which covertly impacts health. Association has been found between access to green space and raised levels of physical activity, which in turn improves individuals' health (Dipeolu et al., 2018).

Well-planned green infrastructure has been shown to increase property values and decrease the costs of public infrastructure and public services (Otegbulu, 2011). There is evidence that green infrastructure can impact local economic regeneration through job creation for gardeners. Green space enhances stronger community and social cohesion by providing compound meeting points where social activities take place (Mass et al., 2008) to strengthen unity among residents of a residential compound. At community or institutional levels, the green infrastructure nurtures friendship among students of an institution of learning and enhances cordiality and neighbourliness among the residents in the neighbourhood. Often, the location of green trees serves as a recreation point where a proportion of the community meets and plays consequently fostering unity.

From the foregoing, it is evident that trees provide habitat and food for man and animals and support human health. Trees and associated greens are valuable infrastructure in human living areas to manage stormwater and improve the quality of health (Mullaney et al., 2015). Money spent on urban forestry and green space in residential apartments has a high return on health investment and social cohesion and enhances social security. As we live in this human-dominated era, we need a policy to improve the built environment and trees in the cities.

Study Area

The study was conducted in Ibadan North and Egbeda Local Government Areas (LGA) of Ibadan. Ibadan North was carved out of the defunct Ibadan Municipal Local Government in 1991 while Egbeda

Local Government was created out of Lagelu Local Government Area in 1989. Ibadan North is situated between latitude 7^0 23^1 and 7^0 24^1 while Egbeda is located on the Longitude 30˚56'54.753"E and 40˚8'58.585"E and Latitude 70˚27'23.532"N and 70˚18'34.578"N. The people of the two LGAs are predominantly Yoruba with a small fraction made up of Hausa and Igbo tribes commonly living in Bodija, kongi and Ashi communities all in Ibadan North while Hausa are largely living in Egbeda settlement around one of the periodic markets in Egbeda LGA. The economy of the people in Ibadan north and Egbeda LGAs is of mix; comprising agriculture, commerce, handicrafts, manufacturing, civil service and service industries. Though the agrarian population has tremendously declined due to urban expansion on agricultural lands, but a thin proportion among the people still practice agriculture on a part time basis. The climatic condition is the tropical wet and dry climate with a relatively constant temperature throughout the year because Ibadan lies within the tropical forest zone belt close to the derived savannah. Ibadan north local government area can of a vibrant local economy over Egbeda LGA. Both Ibadan north and Egbeda LGAs are host of at least a big market in Ibadan, Bodija and New Gbagi markets respectively which operates intra and interstate trading activities and they are of international status. The two LGAs are characterized with almost the same people of economic status living is relatively same building structures and of similar income status. The two LGAs have similar residential densities (Low, Medium and High). Because of the similarities among the residential densities, the study randomly selected a residential area to represent a density zone in each LGA (Table 1).

Method and Materials

A multi-stage sampling approach was adopted to determine the study locations in the selected LGAs. Ibadan region is made up of Eleven Local Government Areas (LGAs): Ibadan North, Ibadan North-West, Ibadan South-West, Ibadan South-East, Ibadan North-East, Ido, Lagelu, Oluyole, Ona-Ara, Akinyele, and Egbeda out of which the first five are prominently urban while the remaining six have both urban and rural characteristics. Therefore, the study randomly selected two LGAs (Ibadan North and Egbeda) among the Eleven LGAs in the region. The study sourced information on the existing political wards from the Independent National Electoral Commission (INEC) office to have a comprehensive list of political wards with residential localities. The Ministry of Lands, Housing and Urban Development, Oyo State, categorised the wards into residential zones, out of which the study randomly selected a residential zone in each LGA. The sampling frame comprises 5,680 buildings found in the selected areas. The Yamane formula of 1967 was adopted to determine the sample size to have a fair representative sample. The model is presented thus:

$$n = \frac{N}{1 + N(e)^2}$$

Where: **n** = the sample size.

N = Population size (housing population).

e = the desired level of precision (±3%).

Table 1: Selected Local Government Areas, Residential Density, Number of Residential Buildings and Houses Sampled

LGA	Localities			No of residential buildings	No of buildings sampled (5%)
	Low density	**Medium density**	**High density**		
2. Ibadan North (IBN)	Oluwo			560	28
		Ijokodo		1440	72
			Yemetu	1380	69
1. Egbeda	Olubadan Estate			240	12
		Mojawe		1400	70
			Gbaremu	660	33
Total				**5,680**	**284**

Source: Google Earth Count (2022) and author's ground truthing (2022).

A 95% confidence level and P-value of 0.5 are assumed for the equation. The sample size is calculated thus: n = N/1+ N(e)² 5680/1+ 5680 (0.03)² = 284. Thus, the study sampled a total of 284 buildings and adopted descriptive data analysis essentially percentage.

Presentation of Findings

Socio-economic attributes of respondents and green space provision

The study was conducted at the household level, where the male or female head of the family was interviewed. Respondents were sampled at different residential densities. The proportion of female respondents was 61.6%, while the male counterpart was 38.4%. Among the female sex, 57.8% adopted green space within their residential location. On the other hand, the proportion of male respondents that provided green space within their residential area was 42.2%. Similarly, the respondents' education was considered, and the study revealed that 85.6% were educated regardless of the level attained. Of all the educated respondents, only 41.2% provided green space in their residential buildings. Among the respondents without formal education, 22% provided green space in their residential buildings. Employment is an important socio-economic attribute of respondents that strongly determines one's income, taste, and preference. Therefore, regardless of the status and type of job engaged, 88.7% of the employed respondents provided green space. A sum of 35.2% of the employed provided green space in their residential houses, while 53.5% made no provision for green space. Of all the respondents, 38.4% make provision for green space in their residential homes.

Among the respondents, 65.1% are owners of buildings, while tenants were 34.9%. About half of the landlords (50.8%) were sampled medium residential densities, high-density areas shared 30.8% while low-density zones shared 18.4%. Similarly, tenants were sampled from all residential density areas. The highest proportion (51.5%) of respondents were sampled from high-density areas; the proportion of medium-density zone was 39.4%, while the least, 9.1%, were sampled from low-density areas. The type and location of buildings are supposed to have influenced the taste for green space provision and sustainability of the green where it is provided. The major types of buildings in the study area are Brazilian and flat buildings. The proportion of Brazilian buildings was 79.5%, flat buildings shared 19.4%, while others (1.1%) consisted of shop and boys' quarters.

Table 2: Respondents status and type of houses where green spaces are provided

	Residential Density			
Respondent Status	**Low density (%)**	**Medium density (%)**	**High density (%)**	**Total (%)**
Landlord	34 (18.4%)	94 (50.8%)	57 (30.8%)	185 (65.1%)
Tenant	9 (9.1%)	39 (39.4%)	51 (51.5%)	99 (34.9%)
Total	43 (15.1%)	133 (46.8%)	108 (38.0%)	284 (100%)
Type of building				
Face to face (Brazilian)	24 (10.6%)	99 (43.8%)	103 (45.6%)	226 (79.5%)
Flat	18 (32.7%)	33 (60.0%)	4 (7.3%)	55 (19.4%)
Others	1 (33.3%)	1 (33.3%)	1 (33.3%)	3 1.1%)
Total	43 (15.1%)	133 (46.8%)	108 (38.0%)	284 (100%)
Fenced building				
Yes	36 (22.0%)	81 (49.3%)	47 (28.7)	164 (57.7%)
No	7 (5.8%)	52 (43.3%)	61 (50.8%)	120 (42.3%)
Total	43 (15.1%)	133 (46.8%)	108 (38.0%)	284 (100%)
Provision of green space and plants				
Yes	37 (33.9%)	60 (55.0%)	12 (11.0%)	109 (38.4%)
No	6 (3.4%)	73 (41.7%)	96 (54.9%)	175 (61.6%)
Total	43 (15.1%)	133 (46.8%)	108 (38.0%)	284 (100%)
Conservation of existing trees				
Yes	10 (66.6%)	5 (33.4%)	Nil	15 (13.8%)
No	54 (57.4%)	36 (38.8%)	4 (3.7%)	94 (86.2%)
Total	64 (58.7%)	41 (37.6%)	4 (3.7%)	109 (100%)

Source: Field Survey, 2022

Residential building environments are commonly protected with concrete fences, especially in some African countries where Nigeria is prominent. The study discovered that 57.7% of the buildings were fenced, affording them privacy and the advantage of green plant cultivation. Of all the respondents in the study area, only 38.4% provided space for green in their residential compound. Some of the spaces provided are occupied by herbs, vegetables, fruit plants, and wild fields, among others. Notably, respondents of low residential zones top the list of residential areas where provision is made for green space. As high as 33.9% of respondents in low residential areas provided space for green while only 3.4% did not provide space for green. The situation was different in high-density areas where only 11.0% provided space for green while 54.9% did not make provision (Table 1). It is remarkable that some respondents srecognised the worth of green plants in a human residential environment. Of all those who have green space and plants, 13.8% conserved some existing plants found on the plot of land they built. The low-density area has the highest proportion (66.6%) of those who conserved existing trees, while the rest live in medium-density areas.

Reasons for green spaces within the residential compound

Green plants are provided within residential locations by respondents for several reasons. The study showed that 30.5% provided green plants around their building to serve as windbreakers and beautify the house environment. This purpose is encompassing because the green is meant to secure the roof and ornament the building environment. However, such plants supply fresh air, reduce carbon monoxide simultaneously, and may provide fruit provided if it is a fruit plant. Similarly, the finding revealed that 28.5% of respondents cultivated green plants to increase the air quality of the surroundings. This purpose is very critical to human health; its benefit is not restricted to the cultivation point but is useful to adjourning residents. Another revelation unfolded by 27.5% of the respondents is carbon monoxide reduction in the surroundings. This purpose is among other biological benefits of green spaces and plants. Similarly, some respondents (11.9%) grow green plants for vegetable and medicinal purposes. These revelations have underscored the inevitability of green plants in residential areas. Furthermore, it was revealed that some adjourning buildings have green plants, encouraging as high as 41.3% of the respondents that establish green plants in their homes. Overall, above average, 55.6% of the respondents considered green space and plants provided as pleasant.

However, some respondents refused to make provisions for green space or grow plants in their houses due to some reasons provided in this section. As high as 40.6% of respondents did not understand the benefits of green space within the living compound. A proportion 12.1% ignored green plants because they could house harmful animals such as snakes. This reason is fundamental but may not be sufficient to forbid green plant adoption. Also, 8% and 12% refused green space and plants in their homes because it could be dangerous to buildings when the plants are grown, and there is a lack of sufficient space in residential compounds. Another revelation of the study was that some respondents (45%) were resisted by their neighbours who were against the cultivation of green plants.

Maintenance of green space

The provision and maintenance of green infrastructure is very crucial to its sustainability. Particularly, green plants require regular and proper maintenance of their aesthetic value and growth for the fulfilment of their visual and environmental benefits. Some respondents are worried about the cost of maintenance of green plants in their residential houses (Table 3). The study revealed that 29.7% rely on professional gardeners to maintain their green space. Similarly, 61.5% of the respondents perform the maintenance by themselves while 9.2% use tenants to do the maintenance. On a residential density basis, 59.4% and 37.5% in low and medium densities zones rely on gardeners. Similarly, some respondents, 46.3% and 37.5% in low and medium densities areas, respectively, performed the task by themselves. As high as 38.8% of the respondents perform the gardening personally because of financial charges of a professional gardener, 35.8% are doing it as a hobby while 25.4% claimed to be a horticulturist. The field observation showed that significant part of the latter group is not practising horticulturists.

Table 3: Reasons for and against green space in a residential compound

Reasons	Frequency	Percentage (%)
Ornamental and windbreaker	33	30.3
Supply of good air quality	31	28.5
Reduction of carbon monoxide	30	27.5
Source of food and medicine	13	11.9
It has economic value	2	1.8
Total	**109**	**100.0**
Reasons against		
It attracts snakes	23	12.1
Not useful	71	40.6
The house is not mine	45	25.6
Dangerous to the building at maturity	14	8
Lack of water to wet the plant	3	1.7
No space	21	12
Total	**175**	**100.0**

Source: Field Survey, 2022

The future of green space development in the study area

The development of green infrastructures in residential and public places is inevitable. Its benefits are enriching and unavoidable if human sustainability is guaranteed. Therefore, the study assessed the willingness of the respondents to have green space and plants within their residential homes. Of all the respondents, 54% are willing to have green space while only 48% are ready to bear its development cost. The revelation showed that some respondents appreciate green space while some are unwilling to bear the cost involved. Similarly, 35% are willing to engage the services of professionals for green space provision. Among these potential green space developers, 42% had provided space within their residential premises for future green cultivation. The survey showed that 70% provided space less than $10m^2$, 22% eye marked $10m^2$ to $20m^2$ while 8% apportioned more than $20m^2$ to green space. Notably, 65% of the potential green space developers are convinced that the green will cause no future harm to their buildings. The prospective green space builders desire to cultivate different green plants for several purposes. The study revealed that 20% expected to grow greens for ornamental, 50% for vegetable use, 15% wanted green plants for medicinal purposes, 10% for spiritual value and only 5% had no specific use.

The study revealed that the propensity to cultivate green plants at residential homes may suffer some form of resistance. A proportion of 65.8% envisaged opposition from different sources like landlords (52%), co-tenants (27.5%), and disturbance from roaming animals (30.5%). The latter is worrisome and a major disturbing factor responsible for serious urban green plant development shortage. However, it must be on record that some respondents (58%) have a phobia of green plants around their living homes. They are uncomfortable and unsafe living where there are green plants.

Table 4: Domestic green Maintenance methods

Who performs the maintenance	Frequency	Percentage
Gardener	30	29.3
Myself	67	61.5
My Tenant	10	9.2
Total	107	100.0
Green maintenance cost		
Very expensive	64	58.7
Not Expensive	45	41.3
Total	109	100.0
Reasons for self-maintenance of domestic green		
No money to pay gardener	26	38.8
A form of exercise	24	35.8
Being a horticulturist	17	25.4
Total	67	100.0

Field survey, 2022

Strategies to improve green space in residential areas

Green space is inevitable due to its biological and environmental benefits to man. Despite the benefits derived by residents from green plants, less than fifty per cent of residential buildings have green space. This revelation suggested that there should be some decisive efforts and strategies to improve the current situation. The sum of 27.5% of the respondents encouraged the government to enforce green space regulation that stipulates the cultivation of vegetation around residential buildings. Through the Ministry of Urban Planning and Physical Development, the state government should be responsible for the enforcementto ensure strict compliance with green space regulations. Similarly, 25.4% of the respondents suggested that green space can be enforced and increased through stringent enforcement of physical planning regulations. The existing planning regulation allowed a maximum of 45% of the total residential plot size to be built while the remaining space should be used for other ancillary facilities such as a waste storage bay, sewage, green space, septic tank, and well location, among others. Site inspection is essential during construction and after if strict adherence will be encouraged. In addition, 26.1% suggested absolute enforcement of the Landuse Decree of 1978 in Nigeria, which confined sole ownership of land to the government. The respondents opined that this enforcement ould empower the government to have total control over land use, building patterns, and other essential building attributes. Public enlightenment on the benefits of green plants in residential locations was suggested by 21.1% of respondents to boost the cultivation of green plants.

Conclusion and Recommendations

Greenery in and around residential homes and apartments is suitable for climate regulation, and indoor and outdoor living environments, with positive effects on residents' health and general well-being. Despite the environmental and social benefits of green infrastructures, the facility is limited in major cities of Nigeria, particularly in traditional areas of cities. This dearth is prominent in all parts of cities except for the Government Reservation Areas (GRA) built by colonial administrators and a few planned estates where residents built green plants for aesthetic purposes. The socio-economic attributes of residents do not influence their taste for green infrastructures and establishing green space and plants in residential homes. Many residents refused to develop green space because of fear of associated harmful animals, such as snakes, that may hide in green plants. Some other respondents disliked green plants around their residences because they did not understand their usefulness to man or the cost of maintenance of green space. At the same time, a proportion is not the owners of the building, while lack of space is a constraint to some residents. Regardless of the constraints, some respondents made provision for green space because of its ornamental and environmental benefits.

The revelation of this paper is noteworthy as it unfolds the state of green space in cities, particularly in residential areas. Its contributions to the existing body of knowledge on sustainable urbanism should be recognised and heightened by relevant stakeholders' involvement. The government at different levels, through their relevant agencies, should herald the crusade of residential greenery. There should be a rapid shift to green roofs, green buildings, and green architecture in our residential areas. Community sorganisations in residential areas should expand their services with counsel on the greenery of residential homes. Essentially, urban residents themselves must be concerned about the development of green infrastructure in urban residential areas. It is necessary to make green space expansion materialise concurrently with urban growth. Urban greening master plans should be a major component of the city master plan to mastermind green development.

It is evident that trees provide habitat and food for man and animals and support human health. Trees and associated greens are valuable infrastructure in human living areas to manage stormwater and improve the quality of health. Money spent on urban forestry and green space in residential apartments has a high return on health investment. As we live in this human-dominated era, we need policies to improve the built environment and mandate residential house owners and prospective developers to provide space for green plants and implement them. The study recommends tenement tax reduction for house owners that offer space and build green within the residential compound.

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