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Urban Green Spaces in Kano City: Challenges and Prospects

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Abstract:

Urban Green Spaces play important role in our everyday activities, it is been identified as a key performance indicators in mitigating and human adaptation to the built environment as a result of constant urbanization, land used conversation, industrialization, climate change and host of other environmental issues. This paper assesses the important of urban green open spaces in the built environment of Kano Metropolis, Nigeria. Qualitative technique was explore through intensive used of literature review and published articles. This was supplement with field research on pilot area of the Kano metropolis, where observational checklist for the purpose of providing knowledge, new insight on fact of practical guides and description are recommended with appropriate policy. The study observed the disappearing and non-existence of this urban green spaces in streetscape and in the residential environment. The poor and congested environment in the city metropolis has been attributed partly to the inadequate, misuse and management of this urban open spaces, which affect the physical and social networking of the cityscape both welfare and productivity of the dwellers. The obvious challenges from climate change effects – lack of open spaces, overcrowding and development of unplanned Neighborhoods, excessive flooding and the environmental challenge manifested in failed adequate refuse disposal systems in city. The paper addresses the factors impeding and challenges in implementing urban green spaces in Kano metropolis, it benefits to the larger society. The study recommends policy programme responses are needed to apply the concept urban green spaces in Nigerian cities. Government stringent measures in control of neighborhood activities such as conversion to residential or commercial uses, as the disappearing urban green spaces remained threatened.

Keywords: Green Space, Residential housing, Urban Settlement, Landscape, Kabuga-Kano

1.0 Introduction

Cites continuous to develop and the interaction between man and his environment have become a great interest in all it functions for the need for green spaces to recreate cannot be over emphasis. This urban space that in co-operate the social activities have grown to become an integral part of the environment and it city scape. Open green space has consequently been pressure due to the rapid growth for residential, commercial, industrial and other uses has remained threatened. The constant and continuous conversion of this open green spaces (Maiwada, 2000) in urban fringe and in the inner cities into other uses resulting in the haphazard growth of many Nigeria cities today, in which large sectors spring up as contravention and the government is rendered helpless except for occasional carried out demolition exercises. Popoola (2002) posit this as the non-control of physical development of the environment which has resulted in disorderly development- incompatible land-use and inadequate access to various provisions of amenities which effect on

infrastructure and facilities within the built environment. Unah (2019a), Unah and Ibrahim (2019) opined that despite the changing skyline attribute by this urban changes, the alteration, conversion, modification, transformation and remodeling has apparently led to the violation of right ranging from easement of access-way, services such as waterline, electricity, drainage, refuse dump and open parking has effect on the people everyday activities. Ekong (2017) posit the growth and complexity of human settlements and particularly the process of urbanization have been phenomenal since it is increasing at a greater rate than the capacity and capability of urban managers, city dwellers especially migrants, Ding and Guaralda (2013) opt urban green spaces as stage upon which the drama of communal life unfolded. Barau (2018) further opted that the disappearance urban agricultural landscapes support livelihoods of some of the urban poor. It provides opportunity for users to have their recreational creativities and social interaction. Carr (1992) recognized public space as essential counterpart to the more settled places and

routines of everyday life, providing the channels for movement, the nodes of communication, and the common grounds for play and relaxation. Such space is often considered as green nucleus, void or breathing space which gives form to the ebb and flows of human exchange.

The quality open spaces that is lacking in most residential area of Kano Metropolis, were due to building encroachment, commercial activities and the large population of human (Maigari 2018). Roaming housing construction has plighted the much urban fringe peripheral settlement which has posed health hazard due to human waste, poor drainage blockage, run-off waste cistern, and breakage of septic tank, industrial waste and pollution. The urban fabric vegetation covers no more give room to existence of green open spaces even right from the planning of this neighborhood, cities in urban center Adeleke, Kudayisi and Adegbehing (2018).

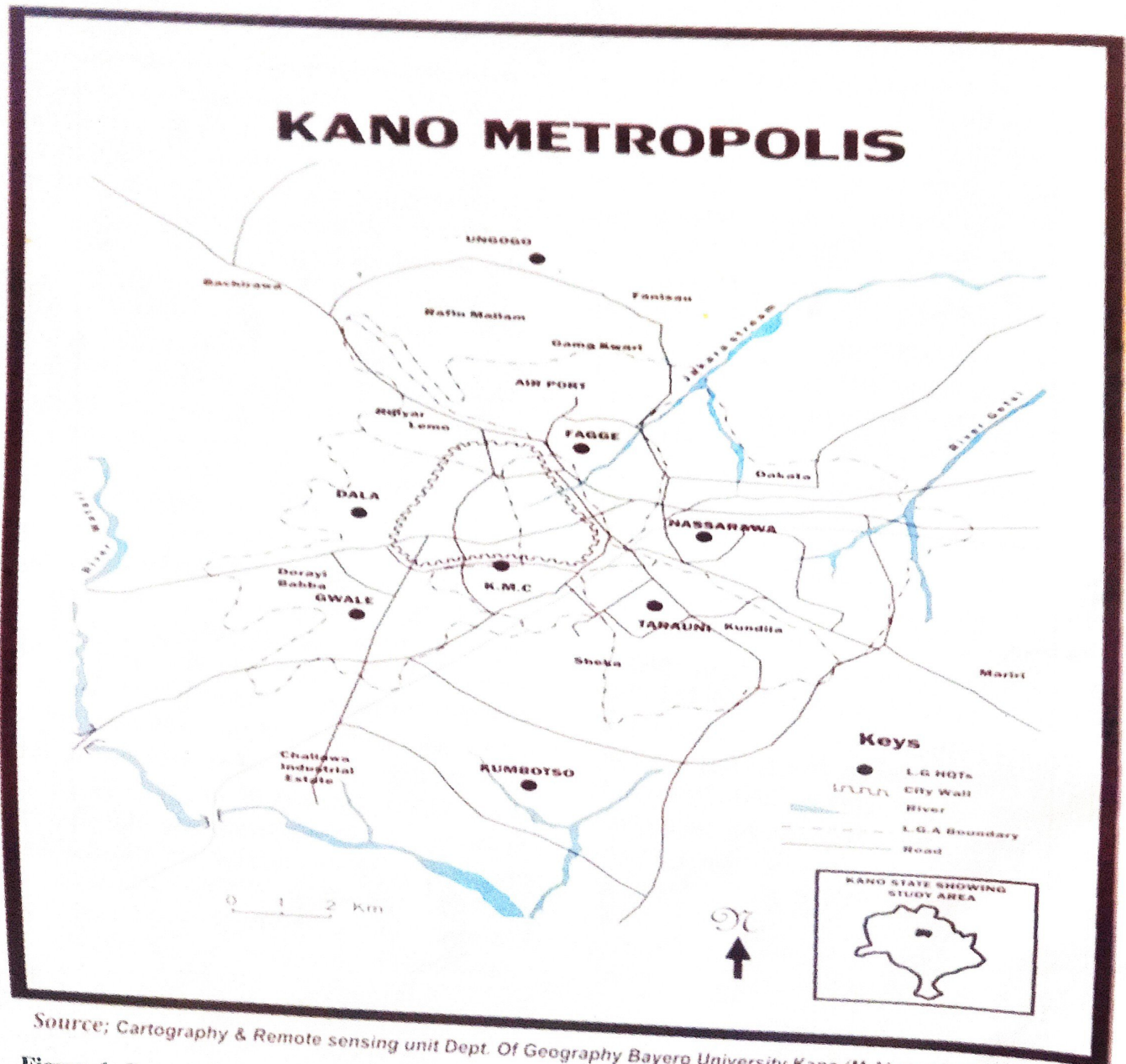
The effects of rapid urbanization-induced changes on the city's landscapes and environment which has seriously effect on open and green ecological spaces arising from loss of ecosystem (Maiwada 2000; Barau 2007b). in similar research, Okolo and Okole (2009) opined the present state of Nigeria cities revealing neglect, loss and improper functioning of green spaces, some whom have paved way, such as street walkway, pavements, parks, gardens, squares, and patches of abandoned vegetative enclaves. Open green spaces have been mis-used and built-up as urban land demand and expansion of human activities. Okolo and Okole (2009) opted this situation has been negatively impacting on the relationship between the urban dweller is important in the total functioning of humans and its physical natural environment. Meanwhile, Barau (undated) study documented "Gidan Rumfa" Kano as an exclusive urban landscape which proves to be a sustainable hub, because of its landscapes that reflect the earliest sustainability heritage of Kano city during the pre-colonial era where replete with open spaces.

The processes of industrialization and urbanization have however, caused great changes to the landscape of many civilized urban settlement with dense populations being required for sustaining the economic cycle by providing the labour for the maintenance. Barau *et al.* (2015) documented the progressive changes witnessed by urban Kano for the 19th century through its exacerbation in the 21st century, where the study mentioned the unprecedented change to landscapes of Kano and in particular green areas which include scrublands and

city ponds. The study of Maiwada (1995), Maiwada (2016) Barau and Abdulhamid (undated), Unah (2020) and Unah and Muktar (2020b) posit urbanization and population pressure to exert enormous pressure on urban and peri-urban lands which has effects on the number and complexity of human activities, and major challenges of uncontrolled development in urban Kano have necessitated a critical assessment of city landscape and hinterland (Unah and Ibrahim, 2019). It is important to note that improvement of these urban green spaces will enhance the restoration and provision of vegetation or other natural scenario. Barau and Abdulhamid (undated) noticing the role of local trees in the savanna region of Northern Nigeria and in Kano to have a direct link with ecosystem services, sustainability and resilience of dryland cities which are overwhelmed with the problem of land extensification and conversion of the farmed, parklands and green spaces into new urban spaces in Which Kano metropolis has been reported for over a decade. The study of Villalba *et al.* 2014; Racitiet *et al.* 2014) as cited in Barau and Abdulhamid (nd) have explored the social and ecological benefits and potentials of urban trees in addressing crises of rapid urbanization associated with pollution control, carbon storage, combating global warming, urban microclimate mitigation, and urban biodiversity conservation. In the wake of this, mankind has gradually moved from the "eco-friendly" approach where people and nature worked together, to an urban scene devoid of natural vegetation, to make way for commercial trade, transportation, entertainment, shopping etc. Green spaces studies on the Kano region in the past have illustrated a tradition of sustainable resource use despite increasing aridity and population intensity, Soils, trees, cultivars, moisture, domestic animals and human livelihoods which are managed and jointly sustainable. The study of (Mortimore 1993; Mortimore *et al.* 2005; Mortimore and Ahmed 2000; Tanko 2001; and Marshal *et al.* 2009) as cited in Barau, (undated) focused on rural and peri-urban agro-ecological / landscapes of the Kano Close-Settled Zone (KCSZ2), which is largely rural and partly peri-urban, while few study such as (maiwada 2000, Barau 2018) emphasizes on open spaces in the core Kano urban.

This paper presents a research on the city of Kano urban landscape focusing on its greenery with respect to housing environment, open spaces and vehicular circulation routes (especially the highways) with the aim of enhancing and to bridge the gap between the eco-friendly cityscape and the fast disappearing green open spaces, harsh weather

conditions that has engulf the metropolis. The paper also looked at the challenges and prospects of implementing the urban green open spaces in Kano city, the creation of public recreational spaces in the urban landscape, that will enhance the city's development, microclimate, more investor attraction, aesthetic quality and image enhancement, whiles improving on the living conditions of the residents and helping them create and develop sustainable green cities.



Source; Cartography & Remote sensing unit Dept. Of Geography Bayero University Kano (M.Ahmed 2009)

Figure 1. Some Key Settlements in Urban Kano

Kano Metropolitan

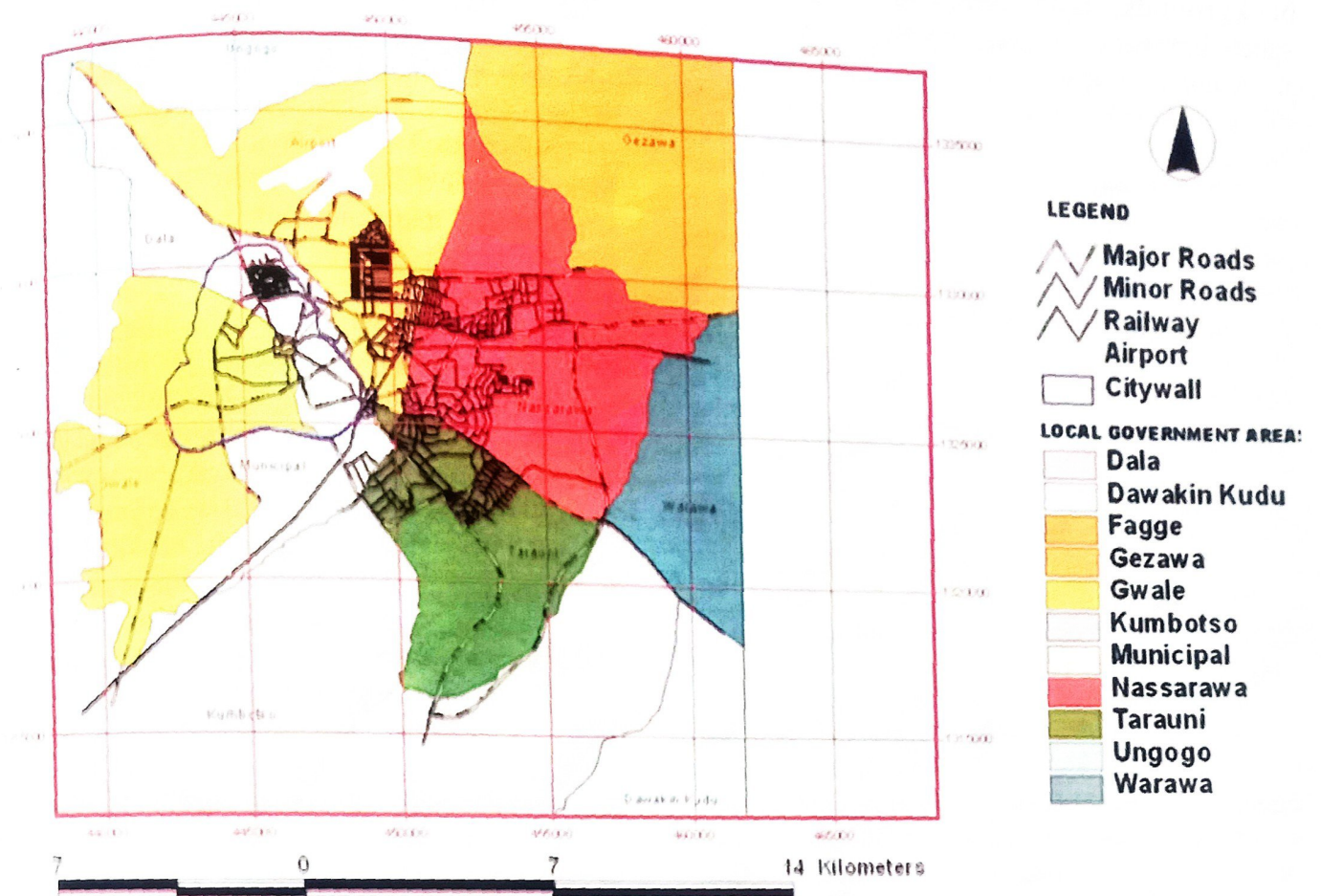


Figure 2: Administrative Borders of urban Kano

2. Materials and Methods

Urban Kano is located on the central plains of Northern Nigeria also called Kano Plains. The area best rides latitude 11,059059.57–12,002039.570 N and longitudes 8033019.69–8031059.690 E (Barau et al. 2020). The Kano Metropolitan area covers 137 sq km and comprises eight Local Government Areas (LGAs)—Kano Municipal, Fagge, Dala, Gwale, Tarauni, Nassarawa, Kumbotso and Ungogo (see figure 1 and 2). Kano lies in the northern part of Nigeria and is located about 840 km away from the edge of the Sahara Desert and 1140km from the Atlantic Ocean Barau (2007). Mohammed et al (2019) opined the population of the study area estimated to be approximately 4.5 million making it the second largest metropolitan area in Nigeria. The study used qualitative techniques were data were gathered from literature review of academic articles, textbooks, published journal and research book of Conferences Proceedings, internet related to the study on green urban open spaces was used for this study. A purposive target on residential neighborhoods and street access roads were conducted with the assistance of two postgraduate

students as a research assistant from the faculty of Earth and Environmental Sciences BUK.

2.1 Urban Green Space and Human Adaptation in the Built Environment.

The entire concept of urban greenery spaces is an integrated approach that involved the planting and careful management of the vegetative stock within the urban area. Zakkaab et al (2017) opined urban green space as aspect of urban forestry, urban agriculture, urban park and botanical garden. This urban green space can simply be considered as the composition of the natural landscape in an urban area, as it help in regulating the bio diversity of the urban environment and is of social economic and health value to human. The high ecological impact on urban life has contributes greatly to public health, improved life quality of the urban dwellers through recreational activities, aesthetic comfort and psychological well being.

Rapoport (1979) posit the city as relatively large, dense and permanent settlement of heterogeneous individuals, thus urban space craved a meeting place of people with different heterogeneous

backgrounds, who remain in each other sphere. Urban green spaces have free accessibility as it encompasses all the streetscape, square and right of ways in both a residential and institutional built environment. Evaluating these urban environments through restoration of green spaces will revitalize the much functions of the cities and creates a healthier and livable environment. Ajayi (2004) opines that Nigeria cities are congested and over populated, that need proper ventilation from consequence effect of uncontrolled and unplanned urban development. Urban green space therefore, should become the symbols of the contemporary city and tools of revitalizing it should be positioned to enhance environment and decongest dwelling. Clements and Croome (2006) as cited in Ayeni et al (2018) posit the design of the physical environment should satisfy and fulfill the sense of sight, touching, smelling, hearing and feeling. The three dimension of health: physical, mental and social wellbeing are influenced by the building design and quality. Heerwagen (1998) and Thompson et al (2007) opined that interesting visual scene, acceptable acoustic conditions, contrast and random changes for the sense to react, opportunities for exercise or switch over from work to other stimulating activities required fresh clean air are building design considerations relevant to the wellbeing of the occupants in relation to their environment. This must take into the need to introduce green spaces in the housing neighborhood with adequate landscape with tree shading as an integral part of the build design environment to enhance wellbeing of the occupants. Li and Sullivan (2016) opine that green landscape increase user's recovery stressful experience by enhance their wellbeing. Urban green space allows the natural view of the environment to have privacy from noise and unwanted sound and respite the environment. Poor air quality contributes to sick building syndrome and productivity loss of inhabitants. The lack of this green open spaces has effects on the environment which has contributed to distress, emotional exhaustion and burn-out, illness and annoyance. Green open space allows man adaptation for the purpose of existence in a particular environment.

Human's survival in an immense variety of conditions does not mean that he always thrives in them Osefoh (2009), but the construction of green open spaces in his environment has made it habitable to support their needs, even in the most hostile physical conditions. The adaptation of man and his built environment has allowed design and planning processes to provide physical and social support

system of green spaces without many pains to understand the built environment. Urban greenspace divides and connects urban built space, organized the way in which people behaviors and activities come together or remained apart. Similarly, Ulrich (1979) stressed that individuals feel significantly better after exposure to nature scenes. Also Klett (2004) stated that landscaping that includes trees, shrubs, lawns, gardens and flowers improve our quality of life. It enhances and helps the environment by cleaning the air, controlling erosion and providing shelter to wildlife. In addition to nature is the man made elements which also contribute to the quality of life through visually pleasing environment. Open greens are used to create relations of enclosure, continuity, containment, subdivision, accessibility and visibility. It allows the built space to be understood as a rational pattern of distinction, separation, interfaces, and connections at integrate, segregation or differentiate in relation to each other Osefoh (2009). This assumed the behavior setting of urban green space is the sole responsibilities of the design professional with others in the environmental studies. This cordial relationship provides for human sustainable environment as it give rise to urban cities. Crow et al (2006), Hwang et al 2006 as cited in Adeleke et al (2018) posit the organization of open spaces to affects the user's satisfaction levels regarding those spaces. This Hay (1998) opined users with the strongest sense of place are "unself conscious" and "totally at home". As this feeling of green space reciprocate the sense of environment. Register (2006) and Unah (2019a) opted the reason of creating good sense of place help in developing community interactive, pride and ownership, as this allows for chance for concreted community action and social change for space purpose. Kearney (2006) and Halpenny (2010) opted that individual spaces have a modest on the sense of the community, whereas urban green spaces strength this feeling, pedestrian friendly design green spaces encourages out space activities and interaction which play an important role in influencing their environmental behavior and offering scholar avenue on research of space relationship. Urban green spaces allow human behavior to generate from continuous evolution process as an active participation in his daily environment and the fact lies that there is no absolute perfect fit between environment and diverse people rather adaptation are made for purpose of existence in particular environment Osefoh (2009). Morris (2003) as cited in Ayeni, Ebohon and Taki (2011) posit the benefits of urban green spaces to include

psychological-stress reduction, physiological-physical health. This as noted by SEEDA(2005) research shows that nature, open spaces and countryside, bring health benefit such as lowering blood pressure significantly; SEEDA similarly, stated that visual contact with nature was beneficial to the emotional, psychological health of a city dweller and has a restorative effect on the individual. Morris (2003) summarized five key areas to which exposure to natural environment is beneficial to human health is as listed below:

- i. Enhancing personal and social communication skills || Recreating in landscape garden help encourage social interaction, meeting people and help foster a more socially beneficial society.
- ii. Increases physical health || . Walking and outdoor sports improves people physical health and mental well-being.
- iii. Enhances mental and spiritual health || Exercise can help improve psychological and spiritual health, carrying this out in a natural and well landscaped environment, and increased life-span, greater well-being and increased ability to function better at work and home. The aesthetics of natural and green landscapes can have an important impact upon mental health.
- iv. Enhances spiritual, sensory and aesthetics awareness || Outdoor recreation helps to free the mind; listening to water running in the pond or fountain, the wind rustling in the trees, smell from the damp soil and heat of the sun, encourage natural relaxation and bring a feeling of physical and mental well-being.
- v. Ability to assert personal control and increased sensitivity to one's own well-being || Elderly people allow physical activity to become a memory rather than a regular exercise. Participating in regular outdoor physical activities can contribute significantly to quality of life.

2.2 Some Impediment and Effective of Urban Green Spaces Planning in Kano Metropolis.

- i. Substantial increase in population influences and Government reluctance or inability to provide affirmative guidance for land development. Leading to undirected and haphazard development.

- ii. The inabilities and ineffectiveness of the planning authorities to implement the building bye-law as when necessary.
- iii. Lack of co-ordination in institutional frame work being marred by overlapping jurisdiction and power of various agencies.
- iv. Evolution of compact urban environment in keeping with the traditional pattern of physical development.
- v. Lack of government political will to adherence and implement physical development control measures (laws and regulations). as insufficient planning staff to carryout effective monitory and lack of equipment such as development control monitory vehicles.
- vi. The inabilities of government to compulsory develop the seizure / acquired parcels of land from the locals in the state. This is paramount in government attitude and non-readiness of to pay compensation.
- vii. Inappropriate plot sizes for both low and medium density layouts.
- viii. Building layouts not developed as planned.
- ix. Land reserved for public open spaces are being used illegally subdivides to facilitated individuals.
- x. Delay in the provision of facilities in allocated or designated open spaces.
- xi. Non- enforced of lease requirement of development undertaken within a fixed period.
- xii. Illegal development of lands/ properties without knowledge or approval of planning authority.
- xiii. Rapid urbanization and influx of people into urban areas;
- xiv. Inefficient public administration, inappropriate planning and inadequate land administration tools. Manifestations of informality are attributed to the lack of effective planning, effective land management system and zoning regulations for urban development.

2.3 Illustration of Urban Green Spaces within Kano Metropolis

Agboola and Zango (2014) and Umar et al (2019). posit Kano metropolis boosts one of the largest urban settlements in Hausa land, This large metropolitan city is highly build up with broad

streets dual carriage way that lack trees (shed, wind breaker) planting that dominates most existing settlement of residential, commercial and industrializes settlement known as urban Kano (See Fig. 1.)



Figure 3. Present-day Kano Metropolis

Source: Extracted from Quickbird Satellite image of Kano environment, Liman 2015.

This major route includes thus:

- i. Residential areas of Sharada Gwammaja, Naibawa, Yankaba, Kurna, tarauni, Fagge etc.
- ii. Commercial areas of Sabon Gari Market, Ibrahim Taiwo Fagg Road etc.
- iii. Administrative land uses (institutional State Secretariat, Gidan Murtala etc.
- iv. Educational areas (Institutional at Aminu Kano Way, Bayero University Road, Kano state Polytechnic, Yusuf Maitama University City Campus and Skyline University etc.
- v. Industrial spaces for processing raw materials to finished products i.e Sharada and Bompai industrial areas.
- vi. Recreation and sports include: playground, stadiums i.e – Pillars Stadium, Abacha Stadium, Kano zoological garden and other play grounds.
- vii. Transport and communication, Railway, B.U.K Road, Aviation centre, Kano Airport, Zoo Road, Zaria Road, Murtala Mohd Way, Ibrahim Taiwo Road and Air port Road (Kurna Road)
- viii. Other institutional includes both public and private/corporate building i.e Murtala Mohammed Way, Katsina Road, (Banks) Federal Secretariat, Army Barrack.

Table 1: Conversion of Proposed Open Spaces on Approved Plans into other Uses in Kano Metropolis.

	Plan No.	Location	Proposed Land Use	Existing Land Use
1	TP-MB-1a& 1b	Gwammaja	Open space	Public Building
2	TP-MB-5A	Gyadi-Gyadi	Open space	Residential
3	TP-MB-51	Sani-Mainagge	Open space	Residential
4	TP-MB-27	Zoo-Road Federal II Housing Estate I and II	Open space	Residential/ Commercial
5	TP-UDB-84	Hotoro	Open space	Residential
6	TP-UDB-105	Hausawa	Open space	Residential
7	UDB 2C	Airport Road	Open space	Residential /Commercial

Source: Maiwada (1995)

2.4 Function of Urban Green Spaces

1. Urban green spaces will improve the livability of neighborhood; this will function as good placed for interaction.
2. They are generally pleasant, close to or linked to services and shopping places.
3. Green space nurtures the neighborhood clean-up with solidarity of good feeling, taking the street back from drug dealers and gangs, as they advocate for increase in services.
4. Urban green spaces promote

individual cultural exhibition and understanding of human diversity in exchanges of traditional celebration with comfort and without fear and feeling of threat.

5. Urban green spaces provide safety and security for social interaction of the people within neighborhood to know each other eyes on the street and feeling of ownership that prevent crime and unsafety situation
6. Urban green space increases positive adult children role models by interaction with

different people and in contact with friends with different world view as well enhance religion way of life

7. It helps in building a sense of true community among people of diverse origin, backgrounds differences as well as their similarities.
8. It provides forum for exchanges of ideas as people engages in substantial societal activities together to build a common playing ground on the neighborhood, this help achieved common goal.
9. Urban green spaces increase equity of people of different economic class, mix and develop relationship, this help low income people with the opportunity of meeting higher class individual in the society.

The following are highlighted for Urban Green spaces in the city.

2.5 Environmental Quality and Landscaping

The preparation of public building should give preference to site planning, this Unah (2019b) and Rufai and Maina (2018) posit provides attractive facilities for landscaping features in the outdoor spaces in public buildings is to support stimulate physical activity in the urban buildings such as relaxation, leisure, being bored and refreshing into the natural scenery green, walking vis-à-vis chatting or chatting with friends, colleagues, and other activities being exhibited on daily basis in the open space. Building should give to drive way, walkways, parking and trees for shade, dividing opened space and greenery landscape element. This enhances good quality and character of the environment.

Vegetation-This includes the use of trees, shrubs, ground covers, palms, grasses, vines and hedges to link and connect external urban spaces to each other. Proper arrangement of Plants generally guides and directs both vehicles and pedestrian circulation and

movement within an urban space.

2.5.1 Trees belts and vegetative enclaves-Tree belt help to combat the harsh climatic conditions, it reduces air pollution and create a conducive ecosystem as they also act as windbreaker and provides home to wild animals and birds, shielding living spaces from obnoxious noise. Tree planting produces buffer from noise automobiles, vehicular movement plant and machineries.

2.5.2 Climatic use-Green belt in open spaces control climatic worse-off condition from wind, dust, sun and solar radiation, temperature and hamattan. This usual weather brings with it heat stroke related diseases, frost bite, pneumonia, meningitis and eye blindness. The provision of green spaces in our urban area through planting of canopy tree protects both human and landed properties in the built environment. Control wind disaster by considerable breaking it down and reduces the speed by ground vegetation and dust are minimally generated.

2.5.3 Environmental Comfort and Convenience

Green open spaces promote aesthetic and health benefits to the urban and rural settlements by generating clean respiratory air, regulates thermal conditions, aspirated clean water and allows for more active social lifestyle of outdoor activity. They also provide screen view and control privacy by tree and shrubs planting.

2.5.4 Circulation routes-These include both vehicular and pedestrian circulation throughout the urban area. They have been used to create a network of park connectors and greenways to reduce ambient temperature and introduce biodiversity into the city. The categories are as follows:

1. Planted streets (major): dual carriage with vast reservation before building line. This is mainly the Ring Road and the boundary of the metropolis.

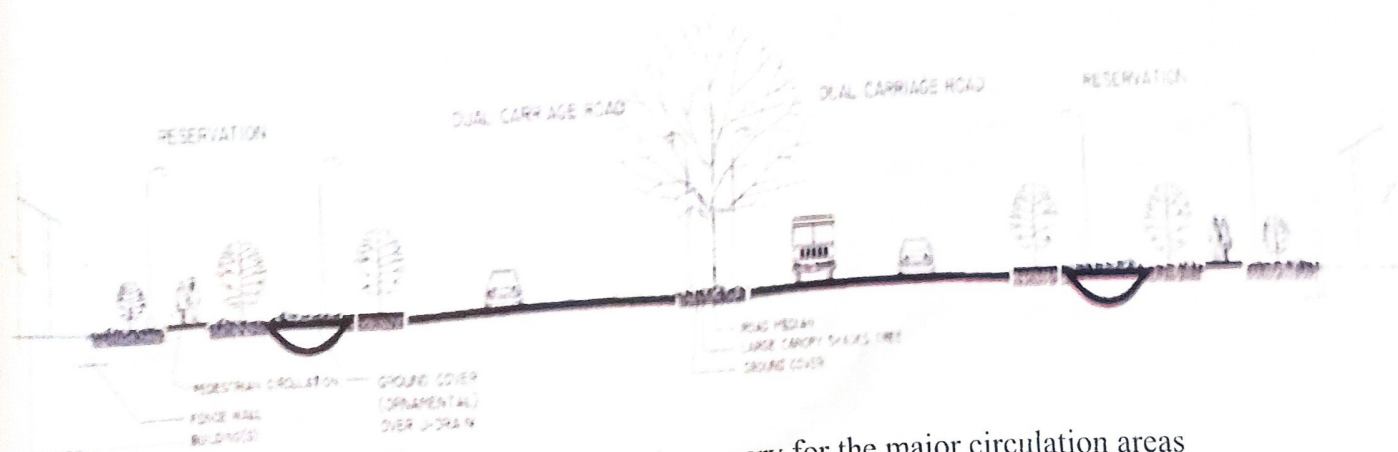
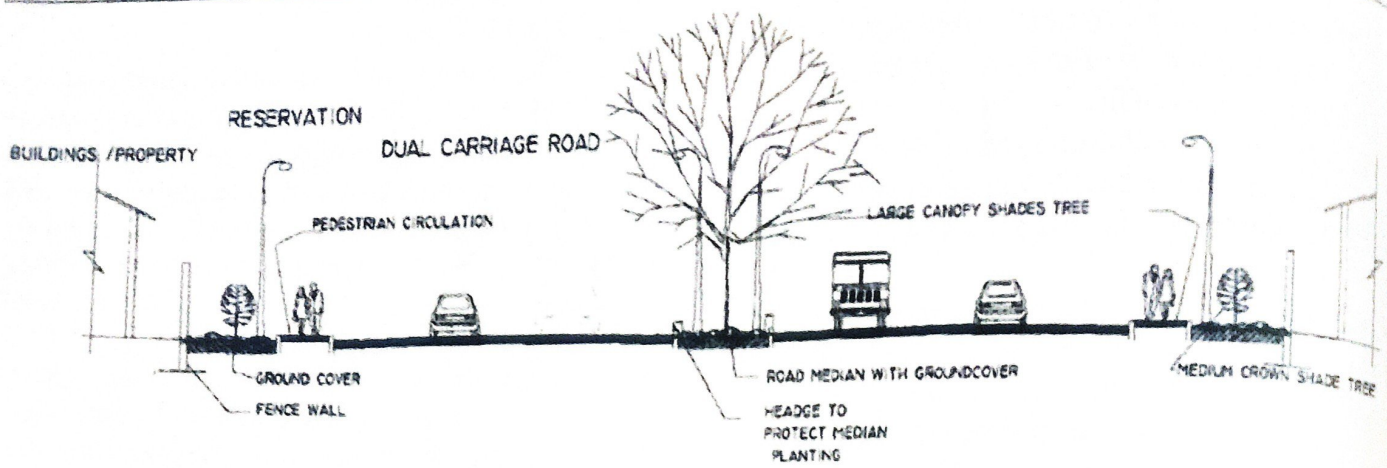


Figure 4: Schematic representation of proposed greenery for the major circulation areas



Planted streets (medium): dual carriage with median and ample reservation before building line. These include the all major road; underpasses and route exist from the municipal.

Figure 2: Schematic representation of proposed greenery for the medium circulation area

1. Planted streets (minor): single carriage road with enough reservation on either or both sides.

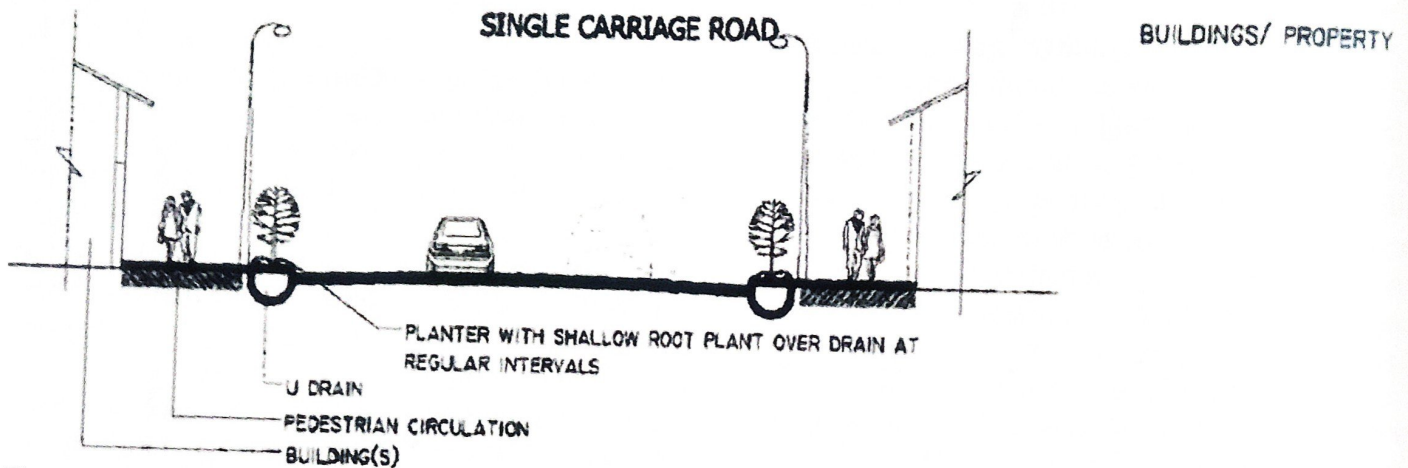


Figure 5. Schematic representation of proposed greenery for the minor circulation areas

3.0 Conclusions and Recommendations

Open green space in the city metropolis have an important role in improving the living environment; pollution control, arid wind erosion control, diminishing bacterial impact on man and animals by purifying the atmosphere, mitigating urban climate and improving the quality of urban living through healthy environments, physical, psychological and contribute to improved socio-economic benefits to the people. The integration of Green in urban open spaces in Kano metropolis is necessary being located in an area of natural beauty help the people to connect more with their environment. Therefore, government should developed strict policies and enforced with stringent measures in order to tackle uncontrolled city expansion and conversion of open green spaces into residential and commercial are prohibited. Environmental professional need to plan

the urban area with more interconnected of mix street trees, parks green roofs revitalizing abandoned open public spaces, planting of tree shelterbelt. This will produce an environment that is habitable and resilient against many environmental problems such as climate change challenges. The city metropolis should be redesigned to promote green infrastructures, street walking and encourage planting of urban tree canopies in all street roads and Green spaces should be inculcated in planning of new layouts in city and its peripheral fringing settlements. The government should developed a priority policies backed with political will and program to encourages private firms through tax incentives with interest on green infrastructure planning and implementation in the urban spaces such as recreational parks, urban agriculture, forest and street trees. Government should carried out public enlightenment and awareness campaign with urban professionals and the participation the

citizens on the importance of urban green space infrastructural planning, sustenance and survival of the green spaces in the environment. This paradigm of sustainable urbanism calls for compact city of vegetative enclaves as against sprawl of commercializing of urban green spaces in Kano city, embracing the concept for cities with green architecture.

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