
THE DEVELOPMENT OF A SLUM SETTLEMENT: A STUDY OF NYANYA

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ABSTRACT

Abuja, a planned city conceived in 1976 was largely developed in four phases to accommodate 36 urban and 5 suburban districts. However, the corresponding development of satellite towns within the FCT and the neighbouring states of Nasarawa Kaduna, Kogi and Niger has been haphazard in nature. This is largely due to the rapid urban migration from the largely rural heartland of Nigeria. The emergence of slums is the antithesis of sustainable cities. Indeed, slums are the emerging human settlement of the 21st century and unfortunately, they are here to stay. According to UN HABITAT, by 2007, 50% of the human population live in cities, with an estimated 75% by the year 2030. Of this urban populace, one-third of the population are slum dwellers. Slums develop largely due to changing dynamics of the urban economics. Ill-defined and conceived government policies also contribute to the urban blight which results in slum development. This paper used a case study methodology to examine the issues of slum development in the satellite development in Nyanya, Abuja. This research instrument enabled the study shed light on the unique characteristics of slum settlements based on the findings. Two principle data types, spatial and attributes were considered, drawn from primary and secondary sources. The findings highlight the factors that attract slum dwellers to slum settlements, which hinder sustainability development of Abuja as a city. This study also gives pointers to sustainability in city development and is relevant in itemizing factors which are critical in determining strategies that can be used by stakeholders in the design and construction of the built environment of cities.

Keywords: *Federal Capital City (FCC), Slum Settlements, Squatter Settlements, Sustainable City, Sustainable Development.*

INTRODUCTION

The prevalence of slum households varies dramatically across cities of the developing world. In some cities, a relatively small percentage of households experience shelter deprivations, or many experience only one barrier to adequate housing. In other cities, a majority of dwellings suffer from two or more shelter deprivations, threatening the health, safety and wellbeing of their inhabitants (UN HABITAT, 2008). This paper examines the impact of slums on cities focusing on the spatial component of slum prevalence. In the analysis of slum areas, UN HABITAT (2008) defines any specific place, whether a whole city or a neighbourhood, as a slum area if half or more of all households lack adequate water supply and sanitation, sufficient living area, durable housing. Secure tenure or combinations thereof. An area or neighbourhood deprived of improved sanitation alone may experience a lesser degree of deprivation than an area that lacks any adequate services at all, but both

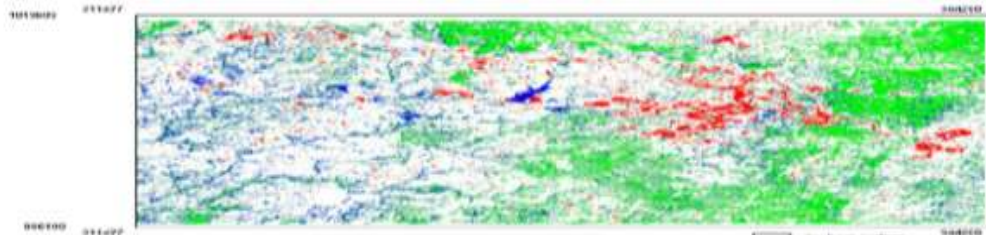
are considered slums in this definition. This position is further strengthened by a rigorous review of literature to chart the development of slums and establish the indicators in the Federal Capital City (FCC) to evolve strategies for sustainable development in the FCC. The initial target for movement from Lagos to Abuja was put at the year 1986. So the initial implementation strategy for the Master Plan envisaged that the workers would be housed in the "Accelerated District" within the Phase 1 of the FCC. This "Accelerated District" was to be developed for low-income workers to prevent the emergence of shanty towns in the periphery of the capital city. It was also to serve as a "model" for testing out the detailed plan concepts (Jibril, 2006). The decision to move the date forward from 1986 to 1982 and 1983 led to the emergence of number of shanty-towns and squatter settlements occupied by workers and the growing service population in such places as Nyanya where a labour camp was built in 1982. These settlements developed rapidly and were generally unplanned, overcrowded and lacking in basic amenities and infrastructure. Accordingly, the major questions which this paper seeks to answer are: How has the multiple and often contradictory Government policy and the resultant rapid urbanization encouraged and accelerated the tempo of slum formation? Is the nature of housing design and costing a factor in opting for squatter housing?

CONCEPTUAL FRAMEWORK

In establishing conceptual framework, this study examines three areas namely; environmental sustainability; sustainable development and spatial determinants to urban sprawl. The goal of environmental sustainability is to minimize environmental degradation i.e. the damage to the biosphere as a whole that results from human activity. Environmental degradation occurs when: natural resources are consumed faster than nature can replenish them, when pollution results in irreparable damage to the environment, or when human beings destroy or damage ecosystems in the process of development (Agbola and Agunbiade, 2009). The relevance to the designer is twofold. Theoretically, the final long-term outcome of environmental degradation would therefore be local environments that are no longer able to sustain human populations. In the short-term, environmental degradation leads to declining standards of living, health problems in the human population, security issue, water scarcity, which are all matters that the architect, planner or builder has to address in designing a sustainable city. The sustainable development concept encompasses the materials to build and maintain a building, the energy and water needed to operate the building, and the ability to provide a healthy and productive environment for occupants of the building. The largest primary development challenge is urbanization as the world population is projected to reach 4.9 billion by 2030 (Sori, 2012). Ninety per cent of this growth is in developing countries like Nigeria. Since cities are the engines of economic growth, job creation, and poverty reduction, a sustainable city is expected to improve living conditions through good governance, investments in infrastructure, and by building solid policy frameworks that encourage the private sector to thrive. Many cities are vulnerable to extreme weather events and other natural hazards as seen in the recent flooding in some Nigerian cities. The issue of urban migration and city growth will increase the demand for urban services, infrastructure, and affordable housing. These needs must be met in order to address informal settlements and urban poverty as people move in search of greener pastures. Nigerian cities are especially vulnerable due to the existence of informal settlements, lack of infrastructure, and limited institutional

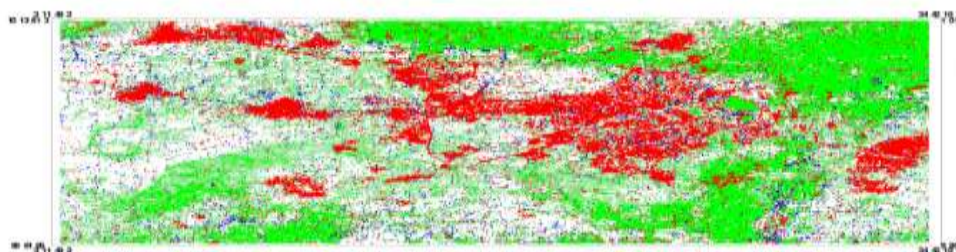
capacity. The urban poor are most vulnerable as they tend to occupy locations that are more exposed to hazards, and they have limited adaptive capacity. The need for sustainable development action in cities is immediate, and delay is costly. Delays are always costly since infrastructural development is expected to stand the test of time in order to be termed sustainable. Urban areas in developing countries are faced with similar challenges, including economic viability, deteriorating infrastructure, environmental pollution, social disintegration, loss of community, crime and violence, urban blight, and population growth. In fact, they represent the challenges of sustainability-maintaining quality of life while facing increasing fiscal constraints, resource limitations, and population growth. Frequently, these challenges are seen as the result of growth and development. Traditional approaches to planning and development are seen, by many, as creating or contributing to these problems, rather than solving them. *Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own need. The core of this movement is the idea that a city can develop economically without destroying the community or the environment it's located in. Therefore healthy economy and community are prerequisites for sustainable development.* Sustainability can be a direction rather than a destination (Danmole, 2007 in Ola-Adisa and Enwerekowe, 2012).

Adama (2007) in Ola-Adisa and Enwerekowe (2012) opines that well designed buildings and systems are in harmony with the ecological patterns in which they are embedded. Poorly designed buildings undermine those larger patterns, creating pollution, higher costs, and social stress. Urban sprawl is a significant concept and closely associated with slum development, a term to define unplanned, incremental urban development, characterized by a low density mix of land uses on the urban fringe. Sprawl is commonly used to describe physically expanding urban areas. Such a modified landscape reveals a situation where cities are spreading, thereby minimizing the time and distances between and in-and-out of the cities. Figures 1-4 digitally demonstrate the rapid rate of development in the FCC over a 19 year period from 1987-2006. These phenomena can be documented with geo-information technologies which provide complementary information to field surveys that aim to characterize field surveys that aim to characterize and identify slums. Earth observation Satellite-based remote sensing provides synoptic overviews over settlements and cities and thus an opportunity to locate slum areas (UN-HABITAT, 2008). The satellite images can also provide a description and identification of the physical structure of housing and housing patterns, which may be indicators for slum conditions. This technology forms the source of the secondary data collected in this study, since Earth Observation-based measures always need to be confirmed with field information which is the primary source of data for this study. Earth observation-based measures always need to be confirmed with field information which is the primary source of data for this study. Earth observation can contribute to measuring the durable housing criterion-one of the indicators used to define slum households. Slums are often recognized through satellite imagery as they often show dwellings of a smaller size than non-slum dwellings (see figure 7). Slums have little vegetation, while more wealthy residential areas show evident presence of green areas. Often only a combination of indicators is needed to differentiate slum and non-slum areas.



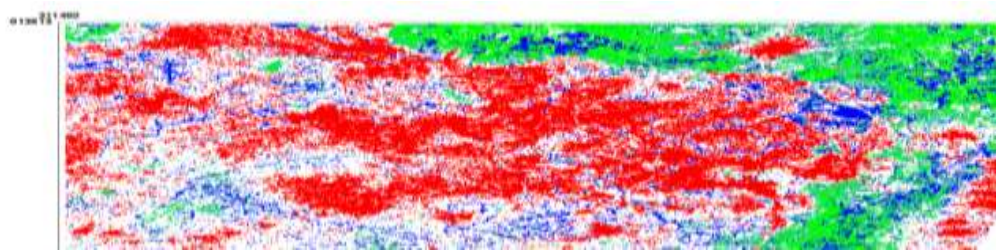
	CL	Cultivated Land
	BUA	Built - Up Area
	BS	Bare Surface
	VG	Vegetation
	WV	Wetland Vegetation

Figure 1: Land Use Land Cover (LULC) Map of Study Area in 1987 (not to scale)
 Source: Ujoh, Kwabe & Ifatimehin (2010) in Ola-Adisa and Enwerekowe (2012)



	CL	Cultivated Land
	BUA	Built - Up Area
	BS	Bare Surface
	VG	Vegetation
	WV	Wetland Vegetation

Figure 2: Land Use Land cover (LULC) Map of Study Area in 2001 (not to scale)
 Source: Ujoh *et al.* (2010) in Ola-Adisa and Enwerekowe (2012)



	CL	Cultivated Land
	BUA	Built – Up Area
	BS	Bare Surface
	VG	Vegetation
	WV	Wetland Vegetation

Figure 3: Land Use Land Cover (LULC) Map of Study Area in 2006 (not to scale)
Source: Ujoh *et al.* (2010) in Ola-Adisa and Enwerekowe (2012)

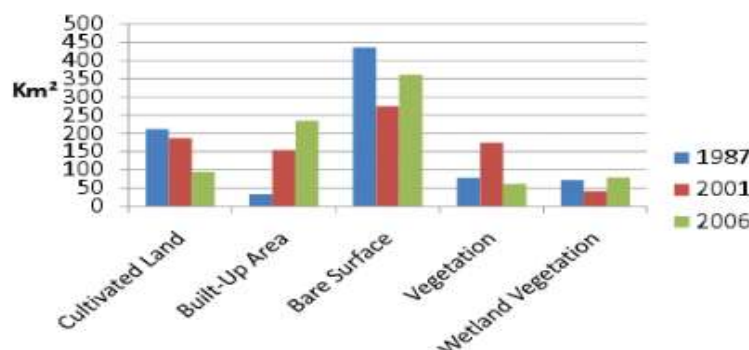


Figure 4: Distribution of Land Use Land Cover (LULC) in FCC in 1987, 2001, 2006
Source: Ujoh *et al.* (2010) in Ola-Adisa and Enwerekowe (2012)

NIGERIA'S URBANIZATION AND UNPLANNED DEVELOPMENT

Africa is witnessing the fastest rate of urbanization at about 67% when compared with other developed and developing countries. In Nigeria, the growth and complexity of human settlements and in particular the process of urbanization and urban sprawl have been phenomenal as seen in figures 1-4 (Ujoh *et al.*, 2010). When the FCT was conceived in 1976 and plans made to move a decade later, the planners could not conceive the rapid pace of development and the multi-faceted nature of the urban dwellers. In planning for the administrative and institutional facilities, the provision of residential units was not well anticipated, particularly for the lower income cadre, where housing was provided for the civil servants. It was grossly inadequate and where it was available it was often at a prohibitive price. The policy statements by Government also worked at cross purposes to sustainable city development. The first major policy statement made by government also worked at cross purposes to sustainable city development. The first major policy statement made by Government in 1976, when it decided to move the federal capital of Nigeria from Lagos (in the coastal area) to Abuja (in the central part of the country), was for complete relocation of all the aborigines to land outside the new Federal Capital Territory, of about 8000 square kilometers. This was aimed at freeing the territory

from any primordial claims, and to enable Government take direct control, plan and develop the new city without any encumbrance. The first policy Change (1978) occurred after an ecological survey was conducted in 1977 and the report indicated that a large part of the territory was still provided breeding grounds the carrier of the disease vector giving rise to River Blindness (Mabogunje, 1978). There was a need a resettle the inhabitants, however as they were 316,000 as opposed to the projected 25,000 issues of compensation became difficult, hence a shift in the resettlement policy of 1978 (Mabogunje, 1978). It was then decided to allow the inhabitants to remain, but could be resettled within the territory, should their places of abode be affected by city development project. This major shift in policy direction can be said to be root cause of problems of squatters and I and Administration within the FCT Policy inconsistencies as well as lack of serious efforts and political will by the government have militated against a lasting solution to these problems within the FCT.

In 1992 Government make a complete U-turn opting for an "Integration Policy" for those who had chosen to remain in the FCT as against complete resettlement accordingly Garki Village within Garki II District of the City in Phase 1, and a focus of this study, was allowed to remain. The exception were those who were resident in areas allocated for construction of access roads and other infrastructures in 1999 the "integration Policy" was reversed for that of complete resettlement again. This time, the settlements of Jabi Kano Gwarinpa among others within phase II of the city were slated for resettlement outside the Federal Capital City (FCC). The El-Rufai administration decided change of 2003 set the clock of resettlement programme years back. This administration decided to take a bold step to resettlement that is the complete resettlement of all areas hitherto earmarked for resettlement by the Pan these series of policy changes and inconsistencies by Government have a lot of serious implications on the implementation of the provisions of both the Abuja Master Plan and the Regional Development Plan of the FCT (Jibril, 2009). As earlier stated the original purpose of the FCT Act was to evacuate the original inhabitants of the Territory and Vesting all land within the absolutely in the Federal Government. This succeeded in alienating the original inhabitants from their ancestral land, while less scrupulous Nigerians perceived movement into the Territory as license to gain access to any parcel of land without any restriction. This has laid a solid foundation for squatter settlements within the FCT. Since development control apparatus were inadequate, law and regulations were not strictly imposed, hence the rampant cases of illegal development within the Territory. The literature reviewed reveals that these series of inconsistencies and changes in Government resettlement policy has led to the springing up and massive development of squatter settlements within the areas earmarked for the City and other areas within the FCT, particularly those very close to the City strategies (Jibril, 2009; Ola-Adisa and Enwerekowe, 2012).

DEVELOPMENT OF INFORMAL SETTLEMENTS

Abuja was designed as an efficient and attractive environment at each stage of its growth-from phase 1, which was designed to accommodate 230,000 residents through phases II and III, which were to accommodate 585, 000 and 640,000 respectively, to phase IV aimed at accommodating 1.7 million, with an ultimate population estimated at 3.1 million. According to the 2006 population census, the population of the FCT was 1,406,239. Like Brasilia, the master plan was based on

Ebenezer Howard's Garden city with a parkway concept. The master plan was designed to be crescent shaped master plan with the phases radiating from the centre. Phase I was located in the centre and phase IV on the periphery, the concept of spatial differentiation was used locating housing for higher income the phase I highbrow areas, proposing for lower income housing to located in the Accelerated District. Unfortunately, the master planners were unable to test their theories of appropriate housing through the Accelerated District because of the rushed relocation to the FCT from Lagos. The resulting lack of affordable housing units for civil servants and other residents, the failure of the relevant FCT agencies to establish proper regulatory mechanisms for development control, and the series of inconsistencies and changes in the Government's resettlement policy as stated above led to the series of inconsistencies and changes in the Government's resettlement policy as stated above led to the establishment and growth of informal settlements within the FCT strategies (Ola-Adisa and Enwerekowe, 2012). The resulting lack of affordable housing units for civil servants and other residents, the failure of the relevant FCT agencies to establish proper regulatory mechanisms for development control, and the series of inconsistencies and changes in the Government's resettlement policy as stated above led to the establishment and growth of informal settlements within the FCT strategies (Ola-Adisa and Enwerekowe, 2012). The compensation policy also contributed to the growth of informal settlements, as compensations did not reflect a value for bare land, rather on crops the built 'improvements' This led to the indiscriminate sale of land on the open market, exploiting the weaknesses in Government machinery, leading to the development of at least 28 squatter settlements (Jibril, 2009).

The existence of these settlements within the Federal Capital City (CC) and its environs distorted the Master plan, straining the already inadequate infrastructure and making any implementation of sustainable development difficult. Features of these communities include, increased crime rate within the city and it's environ. Revenue generation through tax collection and service provision is also hindered as there are no significant 'government presence'. The lack of planning in these settlements (open sewers, lack of drainage etc) poses serious health hazards not only to the people leaving within the settlements, but to other inhabitants of the FCT because of their squalid conditions. The "integration policy" as practiced in Garki Village and similar settlements has also created an urban slum within what could have been a beautiful city. There are unregulated activities including substandard educational and health institutions and facilities within these areas. All these features are indicators of inability of the city to sustain planned development (Ujoh et al, 2010).



Figure 5: Map of Nigeria showing the Relocation from Coastal Lagos to Central Abuja, FCT, (not to scale).

Source: (AGIS, 2006) in Jibril (2009)

METHODOLOGY

This study adopted a case study methodology to examine the informal settlements identified in the Federal Capital City (FCC). This research design was used because it sheds light on the unique characteristics of the populations in different slum locations, and because it helps to compare the findings of this research with earlier studies. Two principal data types spatial and attributes – were considered for the study, and were drawn from primary and secondary sources. The secondary data involves the use of information already in existence and this was sourced largely through rigorous literature review. Based on the literature review 28 squatter settlements were identified in Federal Capital (FCC) using the indicators of urban blight, tenancy, availability of facilities, and environmental issues. Nyanya, a satellite town with a high concentration of squatters was then selected for in-depth analysis. Descriptive analyses as well as quantitative and inferential analyses were conducted. All attributes and indicators of urban blight were considered and analysed for each category of the blighted areas.

PROFILE OF FCT AND NYANYA

With a land area close to 1 million square kilometers and a population of well over 160 million, Nigeria had 43.5% of its population living in urban areas in the year 2000, up from 39% in 1985, with projections that the urban population 65% by 2020. The rate of urban population growth is thought to be 5.5% annually, roughly twice the national population growth rate of 2.9%. The FCC is not an exception, with a growth rate of 4.5%. Abuja is found on latitude $8^{\circ} 25''$ and $9^{\circ} 25''$ North of the Equator and longitude $6^{\circ} 45''$ and $7^{\circ} 45''$ East of the Greenwich. It is bordered to the North by Kaduna State, to the east by Nasarawa State, to the west by Niger State and to the south by Kogi State. The Federal Capital City (FCC) is located on the north-eastern part of the FCT (Figure 6). The area is characterized by a hilly, dissected terrain and is the highest part of the FCT with several peaks that are 760m above sea level. Rocks are the most significant topographical feature in the Federal Capital City (FCC). The Aso Rock, a product of water erosion is a very prominent feature in the FCT. The geology of the area is underlaid by basement complex rocks. The annual rainfall is highest within the Federal Capital City (FCC) and its environs which about

1,631.7mm. The annual mean temperature ranges between 25.8 ° C and 30.2 ° C. The Federal Capital City (FCC) infrastructure includes an expanding road network, drainage and sewage systems, and pipe borne water (Ujoh et al, 2010 in Ola-Adisa and Enwerekowe, 2012). Nyanya is one of the five suburban districts of Abuja. The site is a major slum, with an estimated multi-ethnic population of 400,000. It is the fastest growing slum in Nigeria (Adama, 2007 in Ola-Adisa and Enwerekowe, 2012). Purposely designed to house lower income civil servants, it is a classic example of the concept of master plan-aided spatial segregation on the basis of income and on specifications of types of buildings and their location (Vale, 1992) the majority of the people occupying this settlement are engaged in trading as well as other informal activities, such as carpentry, brick laying etc. This is hardly surprising since the area is dominated by poor migrants and is characterized by the informal activities that are uniquely associated with low income groups. Nyanya is the site of a labour camp which was built in 1982 as an alternative accommodation for the construction workers that were employed to build the FCC. Over time, the labour camp has been neglected and even though the structures are temporary, it forms a major part of Nyanya. The camp is designed in compounds with communal kitchens and bathrooms.

However, due to overcrowding, many of these structures have been converted into residential units, which are of course substandard. Beyond the labour camp, Nyanya extends into the village of Nyanya which is one of the original Gbagyi settlements (founded 1923) which were to be relocated to New Nyanya in Nasarawa State. Most of the houses located here are of poor quality and an unplanned road network. There is also the so called New Layout which was carved out by the government. It includes a housing estate and individual houses built on plots that were allocated by the government. Due to Nyanya's proximity to Abuja (it was 17 km away from the FCC in 1989), it is said to house the bulk of Abuja's work force (Ola-Adisa and Enwerekowe, 2012). Unfortunately for the hapless lower income dweller, the latest government policy calls for the demolition of Nyanya and resettlement in New Nyanya.

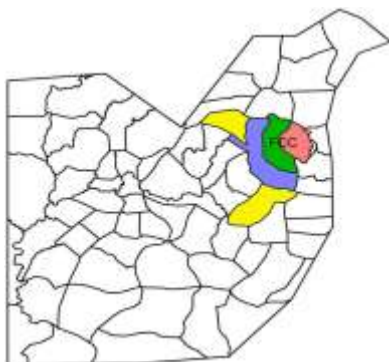


Figure 6: Map of the Federal Capital Territory, Showing the Location of the City of Abuja (not to scale)

Source: AGIS (2006) in Jibril (2009)



Figure 7: Nyanya Satellite Image. Typical Slum Development Circled
Source: Google Earth (2012)

RESULTS

Primary data used were acquired from direct field measurement, questionnaire survey, interview methods. A random sample method of data collection was employed with seventy questionnaires distributed in the satellite town of Nyanya, however, only thirty-nine were returned in Nyanya representing a 55% return. The questionnaire which was used to gather primary data was divided into four broad sections, with each section containing variables such as condition of houses, physical and social infrastructural facilities and services, and socio-economic/cultural setting. In order to aid primary data collection, a series of interviews were conducted with the few willing residents to gather additional data. Primary data collection was severely hindered by the insecurity challenges in the country. This was further hampered by the recent policy announcement of upcoming demolition of Nyanya. Very few people approached were receptive and in one instance led to the brief arrest and release of the data collecting staff. The demographic data on the sample population in figure 8 reveals that traders represent the majority of occupations (52%). All the respondents were tenants (Figure 9), and most of them (70%) lived in single room housing (figure 10). The distribution of the sampled population by occupation shows that 67% of respondents lived in accommodation that cost less than N50,000 per annum (Figure 11); while the distribution of the sampled population by occupation shows that 51% of respondents earned between ₦100,000 and ₦200,000 per annum (figure 12). Table 1 indicates that the distribution of the sampled population by services provided shows that the major service provided is electricity (100%). There is no pipe borne water (0%). The results indicated that while there were hospitals and schools, the roads, sewage systems and waste disposal systems were inadequate.

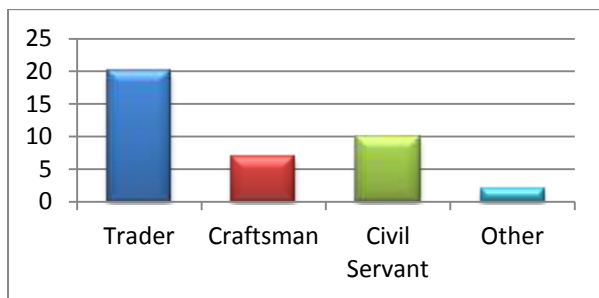


Figure 8: Respondents by Occupation
Source: Authors' Field Studies

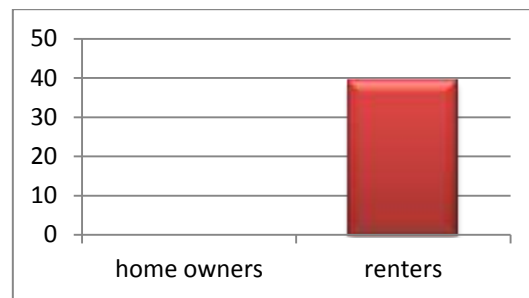


Figure 9: Respondents by Home Ownership
Source: Authors' Field Studies

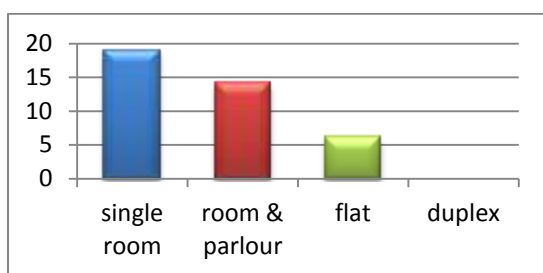


Figure 10: Type of Accommodation
Source: Authors' Field Studies

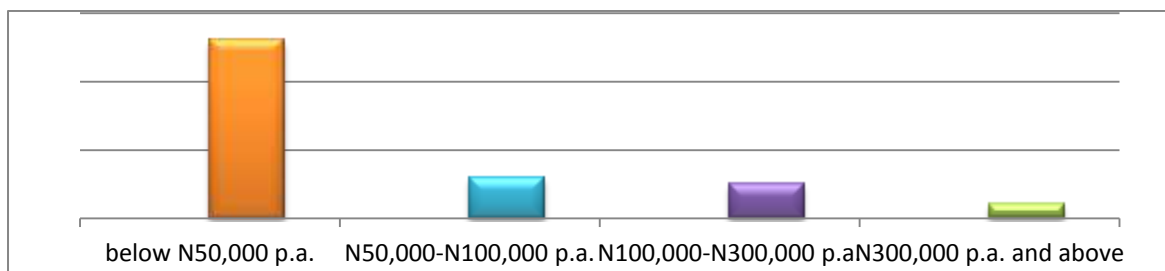


Figure 11: Range of Average Rent Cost
Source: Authors' Field Studies

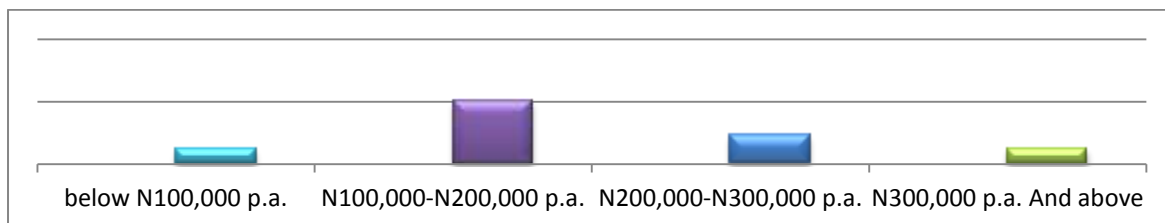


Figure 12: Distribution of the Sampled Population by Income Range
Source: Authors' Field Studies

Table 1: Distribution of Service Facilities Provided in Study Area

Electricity		Toilet		Water			School/Hospitals		Roads		Waste Disposal			
PHCN	Other	Public	Private	Field	Pipe	Other	Govt	Private	Tar	Dirt	Sewage		Solid	
											yes	no	yes	no
39	0	20	10	9	0	39	15	38	4	35	3	36	10	29
100%	0%	51%	26%	23%	0%	100%	38%	99%	10%	90%	8%	92%	26%	74%

Source: Authors' Field Studies

DISCUSSION

This study found that while an overwhelming majority of the city inhabitants are low-income civil servants who earn ₦200,000 per annum or below, there is a larger number of migrant traders who are also inhabitants. The income earned does not reflect the cost of the housing. In effect, the exponential rise in the cost of renting accommodation in Abuja poses even a greater challenge to the accessibility and affordability of housing in the well-planned layouts. This explains the rush for squatter settlements where rent is altogether lower and seemingly affordable (Social and Economic Rights Action Centre (SERAC), 2006 in Ola Adisa and Enwerekowe, 2012). Further the predominant housing type-the single room; coupled with the size of the households is disparate (most respondents reflected households of 4-5 people). Overcrowding typically correlates with urban growth in the absence of adequate housing supplies to satisfy demand generated by additional households. UN-HABITAT (2008). The government has compounded urban growth by restricting the amount of available land, leading to inflation in the housing market. Land prices have skyrocketed over the last several years in Abuja. Though the cost of building materials has not followed the inflationary trends in the land market, there is not enough land to provide a home of suitable size for their households. Many residents of Abuja's squatter settlements are also deprived of adequate sanitation facilities. The lack of basic services in slum communities like Nyanya cannot be attributed only to the informality of the settlements-indeed, entire cities cannot comprise squatter settlements-but are rather an outgrowth of inadequate planning, construction and social services. If government will not provide adequate urban infrastructure, Abuja may not achieve sustainable development (UN-HABITAT, 2008).

RECOMMENDATIONS

This study is a wake-up call to policy-makers and stakeholders in the city of Abuja. Urbanization and its attendant processes are a necessary part of modernization. However, the negative socio-economic and environmental consequences of this process need to be curtailed both to solve currently observed problems and establish a sustainable city. In the FCC, where the urban landscape is dominated by slums, improving the lives of slum dwellers for the sustainable development of Abuja can be achieved by adopting the following strategies (Ola-Adisa and Enwerekowe, 2012):

- A total review of the operations and activities of the Federal Capital Development Authority (FCDA), Ministry of Federal Capital Territory (MFCT) and the revamped Satellite Town Development Authority.
- The practice of good urban governance as advocated by UN-HABITAT through actual accountability to the taxpaying citizenry through efficient public services delivery; promoting local economic development; transparency and accountability in decision making; and the security of individuals and their living environment.
- A periodic and proactive review of the Abuja Master plan.

- d. Adoption of participatory approach to city planning and management in line with the current democratic dispensation as opposed to the 'militarised' approach that actually conceived the new capital and facilitated the rushed movement from Lagos to Abuja.
- e. Advocacy through public enlightenment programs.

CONCLUSION

This study establishes that slum settlement hinders sustainable development in cities. The growth and development of the FCC can be considered sustainable only when it can meet the needs of not just the mid to higher income dwellers of the city, but to the needs of every urban dweller particularly the disenfranchised urban poor in the Nyanyas of the FCC. The Garden city dream of Abuja master plan can still be achieved in spite of the massive distortions. If the recommendations are followed and a country grown implementation of the UNHABITAT MDG Targets adopted this dream can be achieved by utilizing a structure that optimizes the socio-economic benefits available without jeopardizing the potential for similar benefits in future.

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