



## Locational Impact of Public Housing Schemes On Sustainable Urban Well-Being In Lagos, Nigeria

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### ABSTRACT

Universally, the engagement of smart city inventiveness aided by both technological advancement and emerging innovations is targeted at enhancing well-being of citizens. Arguable advancement have been with Europe leading the initiatives followed by Asia Pacific, Africa, North America, Latin America and Caribbean in residential provision, innovative transportation systems, and mitigation against worsening effect of climate change. However, most smart municipal initiatives focused on smart living, that is, how technology enables new way of life but there is paucity of knowledge on how smart building design-oriented solutions can facilitate healthy lifestyles, better quality of life and physical well-being. Severally, government populist planning have been the main catalyst in residential provision; through implementing initiatives that are augmented by private sector partnership. This paper evaluated the placement of residential neighborhoods in regions predisposed to devastation from climate change and its influence on resident's health and physical well-being. Methodology adopted a combination of archival information from government initiatives in Lagos Metropolis in the 45 year period from 1972 - 2016, quantitative, physical measurement and explorational technique. Selected medium-income government residential design schemes were evaluated for locational innovation relating to healthy lifestyles beneficial to occupant's well-being. Findings proved that in the cleverness to accommodate the highest number of citizens within available budgetary limits, health and well-being problem solving design-oriented solutions were not explored. Residences were not designed to tap environmental resources in tandem with better quality of life for citizens. The gap between potential and real needs are not filled. This paper recommends that stakeholders should establish responsive multi-disciplinary innovation partnerships to collaborate with societies to identify, understand and resolve health and well-being challenges through smart residential planning, professional best practices and design solutions. The collaborations should disseminate and share their achievements, which could then be replicated through broader context of sustainable health and well-being structures.

**Keywords:** Health, quality of life, smart building design, well-being.

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### 1. BACKGROUND TO THE STUDY

Worldwide, government plays significant roles in providing suitable housing for citizens. Mabogunje (2002). Demographic and morphologic studies forecast that urban centers will be home to 75% of the world's population by year 2050. United Nations, (2001). This is a critical phenomenon that government initiatives and citizen's participatory efforts must address in the face of worsening climate change. It implies that urban economies as a milieu will then become central to the citizen's well-being. UN (2016). Another one of the most prominent challenge of world population growth is the increasing prevalence of the developing world. Presently, 81 million persons are added annually to the world's population—95 percent of them in developing countries.



According to the United Nations' long-term forecasts, the population of Africa will increase fourfold—from 700 million persons in 1995 to 2.8 billion in 2150. United Nations, (1998a). In a wider context of Sub-Saharan Africa, many municipalities with high populations are coastal cities with deficient infrastructures and capacities to cope with tsunamis, flooding, housing structure collapse, acute shortage of portable water power, and disruption of poor transportation system. Going by past researches, cities are currently centers for driving the economies, health and GDP of nations. Therefore, such residential investment misplacements usually led to huge financial losses. One of the major challenges of the 21st century will be to find residential infrastructural solutions that promote sustainable and resilient and sustainable physical well-being systems to serve the growing urban inhabitants. Out of 50 countries on in Africa, 38 of them have their main urban centers as coastal cities susceptible to climate change and its associated challenges of urbanization and poor infrastructure. CIA(2008).

This paper evaluated available empirical data of residential infrastructural capacity of Lagos, a coastal, former capital city and Nigeria's economic/commercial nerve center vis-a vis, the location of public residential schemes/ settlement in areas prone or vulnerable to effects of climate change and uncontrolled abuse of natural resource on occupants well-being. Lagos is one of the fastest growing mega-cities of Africa with an estimated population of around 20-22million. Lagos State Population Commission, (2016). It is annually beleaguered with problems like air and water pollution, poor air quality, ocean surge, loss of arable wetlands from intense land reclamation and climate change. Simmonds, (1983), Obiefuna, Idris & Uduma-Olugu(2015). These challenges are common to many cities located in coastal areas like Houston, Florida, USA, third world or poorer cities like Karachi, Bangladesh in Asia and cities of Central America devastated by hurricanes that displaces millions of urbanites with yearly fatalities WHO. World Report (2017)



Fig. 1: Coastal countries in Africa source-CIA The World Factbook.(2008).





In Nigeria, Lagos is the most populous rank first as the fastest growing mega-city within a geographical space 1,425 900km<sup>2</sup>, the built-up land area of Lagos metropolis is about 18,533 hectares. Residential coverage is about 9,609 hectares representing 52.1% of the built-up land area. Ninety-four percent of the city's population were classified as urban dwellers. It is also one of the fastest growing large urban agglomerations in Africa. One of Africa's largest sea ports is located in Lagos. The road network in Lagos covers about 650 km, with a traffic density of 222 motor vehicles per road kilometre, far above Nigeria's average of 11 motor vehicles. In the fifty-seven year period between 1950 and 2007, the population of Lagos grew from 300,000 to an estimated 17.0 million (Oyeleye, 2001; George, 2008). This substantial population growth has terrific consequences, particularly in terms of adequate housing provision for vulnerable rural-urban migrants in search of better opportunities. Mabogunje (2002), reports that the population density of Lagos is about 20,000 persons per square kilometre. This factor of high population density is particularly significant in addressing the problems of urban settlements, housing needs, housing demand and housing supply. Iweka (2012).

### 1.1 Medium-Income Housing

Out of over 50 housing schemes, three medium income residential neighborhoods- Ebute-Meta, Ketu-Alapere, Kosofe and Abraham Adesanya, Lekki of the Lagos State Property Development Corporation's (LSDPC) were selected for the study because they have been built and occupied for 25-30 years. Built with prefabricated components, this medium-income estate is located at the heart of Ebute-Metta, in Lagos Mainland. It is a gated community with boundary fence walls and only one access with a security post. The buildings are made up of three-storey blocks, with two apartments of four-bedrooms on every floor. There are altogether sixty-six blocks of eight apartments, totalling 528. The floor plans are prototypical units.

Ketu-Alapere medium housing scheme is located in the densely populated area of Ikeja on the Mainland. It is a neighbourhood with 105 medium income families with an estimated population of 800. 26% of occupants have lived here from 1 year to 30years. Surrounded by the wetlands, this residential scheme is at risk of inundation or ocean rise or sea encroachment. The third urban site is the Abraham Adesanya housing scheme is located on the former peri-urban Lekki Peninsular. This was mainly reclaimed wetlands formerly a popular or informal favela. It was later taken over by policy fiat with a view to upgrade the well-being of the resident. Lagos State government initiative developed over 10 large residential estates on this region to an estimated cost of \$20-\$30billion in housing provision investment.(LSDPC 2016).As an inundation zone, this Lekki Peninsular may also bear the brunt of climate-related changes over the next 25 years, according to a report by the Centre for Global Development. Mabogunje (2002) and Obiefuna( 2016).UN (2016). The assessment of vulnerability is based on the city's topographical vulnerability as well as its population.Obiefuna(2016) suggesting gross disparity and huge economic loss in the amplified impact of future disasters.

### 1.2 Statement of Problem

Amongst over 50 African Countries, 38 of them are shoreline nations with major urban areas along these vulnerable precincts. Lagos is considered at-risk of storm water drainage systems that are outdated or inadequate, principally in favela zones.A breakdown of the potentially worse-impacted cities by region .Mabogunje (2002).The most recent substantiation suggests that sea-level rise could reach 1000mm or more within the next 50years, Dasgupta, et al. (2009); Rahmstorf (2007) U.N. Intergovernmental Panel on Climate Change (2017) and OCHA, (2009)

### 1.3 Criteria for sustainability

Land capital or resource is central to human life. The availability of land, water, and sun at the disposal of populations determine their prospective affluence, while tangible wealth depends on the ability to proficiently manage these resources. Mishandled, these resources may be irretrievably lost while national wealth and well-being are proportionately and consequently depleted. The prime goal is to balance human endeavors with natural laws in order to take advantage of environmental assets for sustainable urban well-being. Sustainability is not just about 'being green'. It is about working together to bring about positive social change. It's about delivering long term value, about providing the best dwelling places and neighborhood environments whilst minimizing impact.Altman, I. (1993), Wilson & Wileman (2005).



#### 1.4 Smart Design Approach

Strategic Architectural design and planning aids to form the worth of the built environments and can improve health, happiness, and enhance well-being of urbanites. Karl Johnson. In 2012, the Clinton Global Initiative and American Institute of Architects (AIA) proposed a 10-year develop design and technology solutions for cities addressing public health, sustainability, and resiliency challenges. Placing human and environmental health and wellbeing centrally at the core of architecture discipline. The overall aim of this is to “designing for effective control. “In order to demonstrate the link between building design and the health of people who live or work there. Architectural best practices must “bring the force of design to bear in the public well-being domain.” AIA CEO Robert Ivy, (Karen & Kern, 2013).

Smart Neighborhoods are in a much better position to solve local problems and supply more cost effective and innovative solutions for the custom-built and adapted needs of their citizens. Attending to the connections between sustainability and residential well-being are the over-arching umbrella of any design or planning pursuit, finding ways to strengthen and illuminate these links demands people-oriented design solutions. Architectural education and practice should eradicate barriers to interdisciplinary collaboration, too often ignored, overlooked, or poorly quantified. Three key issues at the core of residential provision discovered are; residential design must be wide-ranging and inclusive, it must accept change and transformation, and must incorporate the user as part of the design decision-making process. Habraken (1972), Iwaka (2012), Johnson, Adebamowo, Adejumo (2017).

#### 1.5 Well-being concepts in residential environments

The term ‘wellbeing’ largely suggests or denotes that something is in a ‘good quality’. Veenhoven (2004). At the public and individual’s level, good quality refers to the physical condition of the built-environment as criteria or variable to measuring objective well-being. The term wellbeing includes an individual’s feeling about themselves in relation to the world or environment and is the result of a wide range of physical, mental and environmental factors. Residential buildings have a huge impact on our level of well-being and for us to experience healthy environment, the building must be in a healthy state and in a good location. A healthy building simply put, is a building that creates an environment that not only minimizes direct and indirect impacts on health, but also improves the wellbeing of occupants helping them function at their optimum.

The definition of healthy residential building cannot be overtly isolated from what is universally known as green buildings. Green building is defined by the Office of the Federal Environmental Executive, United Kingdom (2003) as the “practice of increasing the efficiency with which buildings and their sites use energy, water and materials as well as reducing building impacts on human health and the environment, through better siting, design, construction, operation, maintenance and removal throughout the complete life cycle of the building.” The issues of citizen’s well-being in the urban conundrum in relation to climate change are converging to create challenges. Responding to these problems effectively and sustainably is a key objective for governments, authorities, institutions, and other organizations involved in urban development processes. As suggested by Simmonds, (1983), each human settlement is best conceived as an integral part of the natural environment. (Karen & Kern, 2013). Wellbeing is defined as the state of good health, happiness, fulfilment and living in perceptually healthy conditions physically, socially and mentally. The World Health Organization (WHO, 1948) and research scholars agreed that in improving the quality of life, three main aspects impact, namely; housing quality, the quality of the close neighborhood environment and the quality of the urban site UN-HABITAT, (2007); Mohit, Ibrahim & Rashid, (2010).

The concept of wellbeing is widely used in social and economic research, but not constantly with a distinct explanation or understanding of what constitutes wellbeing. An extensive body of literature developed aimed at expounding the conception of wellbeing and identifying its constituents. Fundamental to this are two contrasting insights: one in which well-being is concomitant to satisfaction of desires or predilections (hedonic), and the other in which it is associated with the life activities in which people participate (eudaimonic). Conceição & Bandura (2008). Well-being in housing is directly impacted by the natural balance, environment and physical safety amongst other variables. The framework recognizes well-being as dynamically built by factors through connections between their circumstances, locality, and activities for residents. Knight & McNaught (2011). Other research studies on well-being has been hypothesized largely and correlated very pragmatically to an individual's locality and functioning in society, with significant attention being paid to their operational, social and recreational relationships. Rapoport (1975) ;Katy (2002); Kellert, Judith, & Mador (2008).



### 1.6 The Map of the Study area.



**Fig. 2: Map of the Study Area**  
(Source-CIA The World Factbook.(2008).

### 1.6 Objective

This paper evaluated the location of residential neighborhoods in areas predisposed to devastation from climate change and its influence on resident's health and physical well-being.

## 2. RESEARCH METHODOLOGY

This paper approached the study of smart design for well-being using a triangular approach. This is a combination of archival information from government initiatives in Lagos Metropolis over a period of 50 years from 1972 – 2016. Quantitative, physical measurement and observational research methods. A survey was designed to evaluate the innovation in 3 medium income government residential schemes (Abraham Adesanya, Lekki, Ebute-Meta and Ketu – Alapere) to evaluate design innovation for healthy lifestyles beneficial to user's well-being. The quantitative survey method was adopted to collect data in order to confirm whether there are design responsiveness to take advantage of resources present in the natural environment with the view to reducing dependence on artificial resource and enhance resident's well-being. The relationship between the objective and subjective aspect of occupants' well-being was carried out through user self-measurement technique. See (table 1). Observatory mechanisms evaluated the physical architectural characteristics or variables like roads, accessible open spaces, car-parking, parks, wide-enough sidewalks, bike trails spatial adequacy and other well-being influencers in the selected typologies of LSDPC Methods adapted to reach the aim and objectives include the review of the relevant literature made by other researchers in order to provide a suggestion for improvement. Define the term Smart design and its benefits. Hoornweg, Freire, Lee J, Bhada-Tata & Yuen, (2011).



### 3. DATA PRESENTATION

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.891	.906	6

**Table 2: spatial adequacy in typical LSDPC 3-bedroom apartment.**

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
How adequate is the size of Living room/parlour	15.83	33.275	.657	.504	.882
How adequate is the size of Dining Room	15.00	28.846	.717	.524	.872
How adequate is the size of Bedroom	15.40	31.626	.805	.678	.863
How adequate is the size of Kitchen	15.28	32.588	.749	.598	.871
How adequate is the size of Store	14.40	27.000	.651	.472	.896
How adequate is the size of Toilet & Bath	15.02	28.615	.840	.725	.851

### 4. FINDINGS

This explorational review underscores research findings by Mabogunje, Obiefuna that water levels in the selected residential neighborhoods had risen by 450mm in the past 20years. Ketu Alapere on the Odo Iya Alaro-Agboyi creek axis is highly affected by indiscriminate land reclamation, Abraham Adesanya on the Lekki Peninsular is prone to ocean surge as evident in flooding in heavy rainfall of 2017. No effective drainage scheme, the prevailing land reclamation is also a major challenge for the future. The resultant variations in coastal morphology will heighten the effects in some areas, while largely over-spilling to others. Obiefuna (2016). Well-being as the goal of both government and citizens is at low-level, the study confirmed that in the fast developing Lekki-Epe free trade corridor, accessible physical amenities like open space, natural parks, pedestrian sidewalks, bike-trails, people friendly recreational spaces are not available. These are criteria for determining sustainable well-being. Evans *et al* (2003) and Wells *et al* (2008, 2010); Evans, Erica, Wells & Saltzman (2000).

All residential neighborhoods in the area are vulnerable to flooding by ocean surge if the water level should rise by 1000mm from the existing level. Our results suggest gross inadequacy in the heightened impact of future disasters, with the most severe effects likely to affect major residential areas of Lagos Metropolis, thus further compounding the urban problem of residential inadequacy. 86% of respondents expressed concern about environmental safety and security of housing investment in view of the incessant annual flooding in Abraham Adesanya scheme. There is no policy standard and building control measures to enforce that foundation datum levels are above an established neighborhood safety mark to alleviate vulnerability to flooding or ocean rise during the raining seasons especially. 76% of residents are planning to move out of these residential schemes to the Lagos Mainland in view of affective factors like flooding, non-existent well-being enhancing physical infrastructures like open spaces, adequate parking, wide-enough walkways, easily accessible recreational parks and other people-responsive smart design initiatives for sustainable urban well-being. UN-HABITAT, (2007). In Ketu-Alapere housing scheme is a gated community, comfort, happiness rated 39.% and 30.1% by respondents respectively. (See table 3).



**Table 3: resident’s self-measurement for safety, security and quietness**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Excellent	26	37.7	37.7	37.7
	Very Good	21	30.4	30.4	68.1
	Good	22	31.9	31.9	100.0
	Total	69	100.0	100.0	

## 5. CONCLUSIONS AND RECOMMENDATIONS

Governments should increase the capability and proficiency of metropolitan and urban authorities as safety measure for the physical well-being of public housing environment, in order to answer to the need of all residents in their locations for environmental safety and capacity building of basic residential infrastructure to eliminate health and well-being problems. Government as a key player in residential provision should embark on strategic phase-by-phase upgrading of prone residential neighborhoods by design best practices for coastal protection, prevention and gradual relocation of vulnerable populations. Provision of alternative residential areas that are not prone to or safer from damaging natural occurrences to minimize future loss or damage to available residential capacity and enhance resident’s well-being resilience. Similarly, uncontrolled and indiscriminate reclamation of natural wetlands, encroachment of river banks, lagoons, and poor spatial planning should stop to minimize flooding and ocean surge effects on resident’s well-being. Smart architectural design innovations and practices should be engaged to mitigate against damages and maximize environmental potentials for future well-being needs.

## 6. CONTRIBUTION TO KNOWLEDGE

This study underlines the engagement of smart-design resourcefulness as an instrument for urban planners and private residential investors in building sustainable housing in terms of inhabitant’s well-being. It also illustrated that physical well-being is measurable through physical evaluation of neighborhood characteristics in terms of location and neighborhood attributes.

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