CEDTECH International Journal of Environmental Science & Biotechnology
Volume 5, Number 1, March 2024
http: / /www.cedtechjournals.org
ISSN: 2756-4541

EXPLORING THE ADEQUACY OF ABUJA'S PUBLIC PRIVATE MASS HOUSING SCHEMES

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ABSTRACT

Public Private mass housing schemes referred to as PPP, generally represent a wide range of institutional arrangements between public and private sectors in sharing responsibilities, benefits and risks in housing, infrastructure and service provision. These housing delivery partnerships are effective strategy in the provision of adequate housing, not only in developed countries, but also developing countries. Thus, this study assessed housing adequacy in the implemented PPP mass housing schemes across 22 districts of phases 2 and 3 of FCT Abuja, Nigeria. The study established that households perceived their residential environment as being adequate with a housing adequacy index of 60.72. A further analysis on each component of housing adequacy shows Legal Security of Tenure has the highest adequacy index of 74.49. While Design of residence in relation to local residents' natural lifestyle has the lowest adequacy index of 42.95 thus, perceived as being inadequate. Therefore, end users' participation in the design and construction process is low.

Keywords: *Public Private Mass Housing Schemes; Housing Adequacy*

INTRODUCTION

Access to adequate housing is fundamental for economic well-being, human dignity, physical and mental health and overall quality of life (Bah, Issa, & Geh, 2018). Thus, housing adequacy is defined based on seven dimensions which are consistently found to be relevant to quality of human lives embedded in the sustainable development Agenda 2030: security of tenure, availability of services, affordability, habitability, accessibility, location and cultural adequacy (United Nations, 2022 b)

In spite of this widely acknowledged importance of access to adequate housing, studies (World Economic Forum, 2019; United Nations, 2020; International Finance Corporation, 2021& United Nations, 2022) have shown that about one (1) in four (4) urban dwellers lived in inadequate or

informal settlements across the globe. This literally translates into more than one billion and it is projected to rise globally to about 2.5 billion people by 2050 (World Economic Forum, 2019). Regarding the deficit at the dimensional level of housing adequacy, it is estimated that at least 603 million households in emerging economies lack access to at least one of the seven dimensions of adequate housing (International Finance Corporation, 2021).

In Africa, over 50% of the population live in inadequate housing conditions (Florida, 2017). Further empirical analysis shows that one (1) per cent increase in Africa's urban population growth will increase the slums incidence by 2.3 per cent(United Nations, 2022). Whereas Nigeria's urbanization rate is at 4.8 per cent with housing deficit of about17 million units (FMLHUD, 2014&Bah, Issa, & Geh, 2018) and the current demand is estimated at 37 million houses (FMPWH, 2017). These deficit figures are cited for over a decade not factoring in population and urbanization (4.8 per cent) growth that might have increased the deficit. Further studies highlights about 15.56 million housing units are currently inadequate which is affecting about 87 million people. These inadequate housing units are projected to reach 20 million housing units by year 2030 (International Finance Corporation, 2021).
Federal Capital Territory (FCT) Abuja is Nigeria's capital city. Although the original master plan of the capital city was designed to accommodate 3.1 million (Ibrahim & Kwankur, 2012), the population as at last census was about 1,406,239 million (National Population Commission, 2009). With a housing deficit between 1.7 to 2.5 million units (Mohammed, 2014) and estimated growth rate at 11.8 %, the city's population by year 2030 will be over 4 million, even though less than 50% of the planned development has been achieved.

In order to address the highlighted adequate housing deficit and also achieve vision 20; 2020 set out target of adding 10 million adequate and affordable homes to the national housing stock by the year 2020, government came up with strategies in which significant effort in partial disengagement from housing provision will be made and encourage privately developed housing through Public- Private-Partnerships (PPP) (National Planning Commission, 2009; Federal Republic of Nigeria, 2012). Consequently, FCT Administration allocated 12,691 hectares of land to 360 real estate developers for the construction of 35,659 adequate and affordable mass housing and tertiary infrastructure linking the housing

estates to the government provided primary infrastructure (Federal Republic of Nigeria, 2009; and Ukoje & Kanu, 2014).

However, the outcomes of this policy are yet to be empirically evaluated in terms of achieving or otherwise the seven dimensions of housing adequacy (security of tenure, availability of services, affordability, habitability, accessibility, location and cultural adequacy).
This study therefore undertook an in-depth evaluation of housing adequacy in the implemented PPP mass housing schemes across 22 districts of phases 2 and 3 of FCT Abuja, Nigeria. It examined residents' perceptions in terms of adequate housing, with a view of providing empirical data required for feed-back into current housing stock as well as feed-forward into future PPP mass housing projects.

Concept of Adequate Housing

Housing adequacy or adequate housing has been defined and interpreted in different ways by authors and scholars. According to Oxford Advanced Learner's Dictionary (2022), the word "adequate" means sufficient in quantity or quality, for a particular purpose or need. Thus, adequate housing simply means a residential environment that is quantitatively and qualitatively sufficient in meeting households' needs. Definitions and descriptions of what constitutes adequate housing were identified from literature review and summarized in Table 2.1. These definitions and descriptions of what constitutes adequate housing are closely related in content and meaning. Furthermore, the reviewed literature helps to understand that adequate housing can be viewed from the perspectives of housing stock and also from the viewpoint of quality of housing as explained by Ibem & Alagbe (2015). However, it should be noted that under international law, what is considered 'adequate' varies from country to country and from community to community. Thus adequate housing depends on specific cultural, social, environmental and economic context (Leilani, 2020).

Table 2.1: summaries of adequate housing definitions from literature

Authors	Definition of adequate housing	Context
UN-HABITAT (1996:Paragraph 60**)**	Adequate housing must provide more than four walls and a roof. It means adequate privacy; adequate space; physical accessibility; adequate security; security of tenure; structural stability and durability; adequate lighting; heating and ventilation; adequate basic infrastructure, such as water supply, sanitation and waste management facilities; suitable environmental and health related factors; and adequate and accessible location with regard to work and basic facilities: all of which should be at an affordable cost	The Istanbul Declaration and the Habitat Agenda, Second United Nations Conference on Human Settlements (Habitat II), Istanbul,1996
Ibem and Amole (2011)	Housing with characteristics features required to satisfy households need, expectations and aspirations	Qualitative housing adequacy survey of newly constructed public housing in Ogun State, Nigeria
Office of the United Nations High Commissioner for Human Rights (OHCHR), 2021	Adequately housed means having secure tenure that is not having to worry about being evicted or having your home or lands taken away. It means living somewhere that is in keeping with your culture and having access to appropriate services, schools, and employment.	The right to adequate housing
Office of the Secretary to the Government of the Federation(OSGF) 2023	Adequate housing means safe, comfortable, attractive, functional, affordable and identifiable shelter in a proper setting within a neighbourhood, supported by continuous maintenance of the built environment for the daily living activities of individuals/families within the community, while reflecting their socio-economic, cultural aspirations and preferences.	National housing policy

This study uses the housing adequacy definitions outlined by International Finance Corporation (2021), Office of the United Nations High Commissioner for Human Rights (2021), United Nations (2022), United Nations (2022 b) and OSGF (2023). These definitions have seven components in defining adequate housing: namely legal security of tenure, affordability, availability of services, habitability, accessibility, location, and cultural adequacy. These components of adequate housing can further be categorized into nonphysical and physical aspects. Nonphysical aspects include: tenure security, affordability, accessibility and cultural adequacy. While physical aspects include: housing unit (habitability), housing services and infrastructures(availability of services) and neighbourhood environment (location)(Ibem & Alagbe, 2015; Xiaolong, Jian, Tao, & Yujuan, 2019).

The seven identified components are comprehensive in addressing housing adequacy as summarised in table 2.1. Furthermore, these components were adopted by International Finance Corporation (2021) to estimate the adequate housing deficit within and across emerging economies and by United Nations (2022) to evaluate the adequacy of housing in developing countries. Consequently, using such a definition is logical and reasonable as FCT Abuja, Nigeria, the focus area of this study is a developing country. Therefore, adequate housing in this study means housing should have legal security of tenure, be connected with services, accessible, habitable, culturally adequate, as well as provided in an adequate location with affordable cost.

Nonphysical Components of Adequate Housing

a) Tenure security

Tenure security is a central component of the right to adequate housing, which guarantees legally enforceable right to protect against threats such as: harassment, forced eviction among others(OHCHR , 2022). Furthermore, it is understood as a set of relationships with respect to housing and land established through statutory or customary law or informal or hybrid arrangements that enables one to live in one's home in security, peace and dignity (OHCHR, 2021). Therefore, security of tenure has a close correlation with individual wellbeing and gives households the confidence that their tenure is guaranteed for a specified period of time to which they have agreed (Habitat for Humanity, 2022).

b) Affordability

The phrase affordability in housing or affordable housing is multi-faceted thus, it has been perceived differently by several researchers who have used various definitions and methodological approaches in measuring it and also in describing several components of housing needs such as housing condition, housing costs, housing quality, household income, overcrowding among others (Mattingly & Morrissey, 2014; Mulliner & Maliene, 2015; Ezennia & Hoskara, 2019a).

Despite the different perspectives in the definition of affordable housing, there are common consensuses as to what constitutes affordability and this forms the bases for affordability assessment in this research. First, affordability deals with ability of individual households to pay for some given standard of housing in terms of quality. Secondly, housing cost either

rent or mortgage should not be a burden to households. Thirdly, non-monetary dimensions which include; dwelling features, dwelling condition and neighbourhood facilities are important variables in determining affordability.

c) Accessibility

Housing is inadequate if the needs of disadvantaged and marginalized groups are not taken into account (OHCHR, 2021). Thus, adequate housing should be accessible, or readily attainable to those entitled to it. Furthermore, accessibility requires the freedom from discrimination in access to housing and related services based on gender, race or any other status (Xiaolong, Jian, Tao, & Yujuan, 2019). This means that disadvantaged groups, such as the elderly, the physically disabled, HIV-positive individuals, persons with persistent medical problems and other vulnerable groups should be provided with a suitable design that allows them to live comfortably in their houses and also more freedom to choose their preferred housing type and size.

d) Cultural adequacy

Cultural adequacy requires that the design, construction, materials and policies relating to housing should incorporate and reflect cultural identity and diversity of households (Xiaolong, Jian, Tao, & Yujuan, 2019; Kabir A. , 2002). Thus, for housing to be culturally adequate, the design should be in accordance with households' lifestyle. Additionally, building materials, architectural appearance and space compositions of the buildings should also express the cultural values of residents (OHCHR , 2021; Ibem, 2011 c).

Physical Components of Adequate Housing

a) Habitability

This component of housing adequacy relates to housing unit and mainly includes the housing size, functional layout and indoor environmental conditions (Huang & Du, 2015). Additional, bedroom(s) layout and sizes, common entrance, kitchen and bathroom were further identified as the important attributes for residential satisfaction thus adequate housing (Ibem & Amole, 2013). Furthermore, attributes of the indoor environment such as lighting, ventilation, noise insulation, thermal and humidity comfort have also been suggested to affect adequate housing (Xiaolong, Jian, Tao, & Yujuan, 2019). Therefore, housing is inadequate if it does not

guarantee physical safety or provide adequate space as well as protection against the cold, damp, heat, rain, wind, other threats to health and structural hazards (OHCHR, 2021).

b) Availability of services

Housing services and infrastructure component of adequate housing relates to the non-discriminatory access to basic energy supplies ranging from water, electricity, telecommunication among other and basic housing support infrastructures such as sanitary and drainage facilities, garbage disposal and recycling facilities, fire fighting facilities and road networks (Noura, 2015; Ibem & Amole, 2013). Therefore, housing is not adequate if its occupants do not have safe drinking water, adequate sanitation, energy for cooking, heating, lighting, food storage and refuse disposal (Habitat for Humanity, 2022).

c) Location

The housing location or neighbourhood environment is the seventh component and has been adopted as one of the critical dimensions of evaluating housing adequacy (Ibem & Alagbe, 2015; Noura, 2015; Xiaolong, Jian, Tao, & Yujuan, 2019). As OHCHR (2021) argued, housing is not adequate if it is cut off from employment opportunities, schools, childcare centres, health-care services and other social facilities or if located in polluted or dangerous areas. Therefore, public facilities should be available within the neighbourhood environment.

Research Framework

Housing adequacy as discussed in 2.1 is based on a complexity of subjective and objective parameters associated with households previous experience, personal attributes, cultural values, aspirations, as well as generally defined and acceptable standards (Ibem & Amole, 2011; Xiaolong, Jian, Tao, & Yujuan, 2019).

Based on the foregoing, the proposed conceptual framework (figure 2.0) was developed. It includes the seven components of adequate housing, housing institutions / programme, demography and socio-economic characteristics of households. The framework further indicates direct and indirect relationships among the different components and presents the basis for the research design, literature review, data collection and analysis as well as interpretation of results. Furthermore, a total of 43 attributes of measuring adequate housing were identified from literature review and summarised in table 2.2.

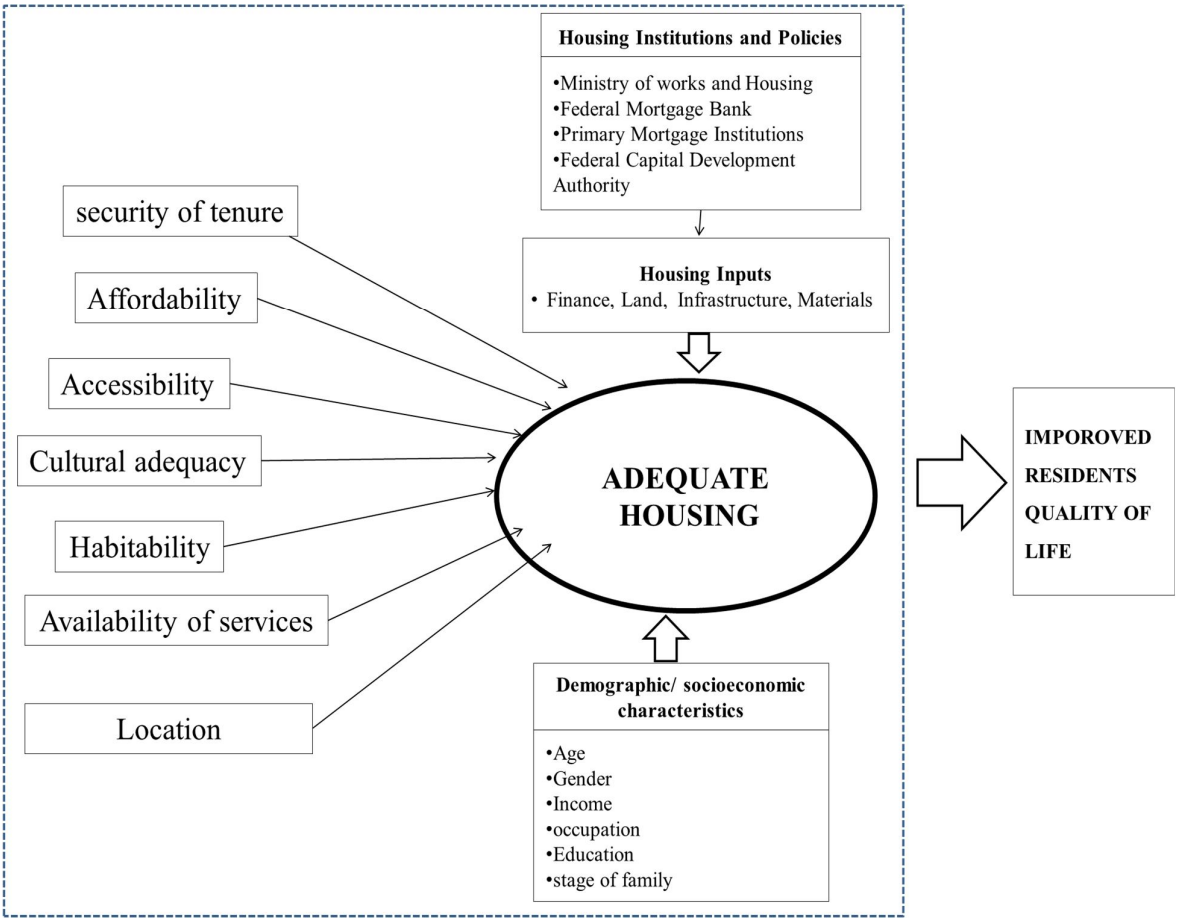

Figure 2.0: Conceptual framework of the study adapted from Ibem, (2011 c).

Table 2.2 Results of housing adequacy from literature review.

Code	Attributes of Housing Adequacy	References
	Tenure Security	
HA1 HA2	Legal security of tenure Tenure guaranteed for a specified time	OHCHR (2022), United Nations (2022b), OHCHR (2021)
	Affordability	
HA3 HA4 HA5 HA6	Cost of rent and related services Cost of mortgage and related services Expenditure on transportation Disposable income to cover other living costs	OSGF (2023), Joseph & Andrew (2020), Ezennia & Hoskara (2019), CMHC (2019), Cai & Lu, (2015), Ibem & Amole, (2013), Andrews, (1998)
	Cultural Adequacy	
HA7	Design of residence in relation to local residents' natural lifestyle	

HA8	Materials and architectural appearances of buildings expressing local cultural value	OSGF (2023), United Nations (2022b), Noura (2015), Ibem & Amole (2013), Thiele (2002)
HA9	Spaces and facilities for cultural activities	
	Accessibility	United Nations (2022b), Noura (2015), Thiele (2002), Kabir (2002)
HA10	Unprejudiced allocation regulations	
HA11	Freedom to choose preferred type and size	
HA12	Facilities for handicapped and social welfare	
HA13	Accessible to terminally ill, HIV-positive individuals, persons with persistent medical problems, and the mentally ill.	
	Habitability	
HA14	Number of bedrooms per household	United Nations (2022 b), UN-Habitat (2020), Xiaolong, Jian, Tao, & Yujuan (2019), Ibem & Alagbe (2015), Maina, (2013), Waziri, Yusof, & Salleh (2013), Mehdi, Muhammad, & Omidreza, (2012), Yasemin (2007), and Ukoha & Beamish (1997)
HA15	Size and layout of bedrooms	
HA16	Number of living rooms	
HA17	Size and layout of living rooms	
HA18	Number of bathrooms	
HA19	Size and layout of Bathroom	
HA20	Size and layout of kitchen	
HA21	Size and layout of common entrance	
HA22	Thermal and humidity comfort in the residence	
HA23	Natural lighting and ventilation of the indoor environment	
HA24	Quality of exterior and interior construction	
HA25	Quality of floors, doors and windows	
HA26	functioning of the plumbing fixtures	
HA27	Structural durability and safety	
HA28	Functionality of unit layout	

Code	Attributes of Housing Adequacy	References
	Housing Services and Infrastructure	
HA29	Supply of telecommunications, water, electricity	United Nations (2022 b), Ibem & Alagbe (2015), Noura (2015), Ibem & Amole(2013), Thiele (2002)
HA30	Sanitary and drainage facilities	
HA31	Road networks	
HA32	Garbage disposal and recycling facilities	
HA33	Firefighting facilities	
	Location (Neighbourhood Environment)	
HA34	Public transportation facilities	OHCHR (2022), Addo (2015), Noura (2015), Thiele (2002)
HA35	Medical care facilities	
HA36	Commercial facilities	
HA37	Sport and recreational facilities	
HA38	Education facilities	
HA39	Management measures regarding life and property security	
HA40	Cleanliness and maintenance services within estate	
HA41	Landscape, scenery, or green areas	
HA42	Business and employment opportunities	
HA43	Distance to workplace	

Research Methodology

Drawing from the review of literature with respect to the research designs used in similar studies, correlational research design is adopted for this study. The choice of correlational research was determined by factors which include the aim and objectives of the study and the nature of required information to achieve research objectives. It is a non-experimental quantitative design which measures two or more variables to determine or estimate the extent to which the values for the variables are related or change in an identifiable pattern (Privitera, 2019).

Sampling Frame

The sampling frame include: 360 estates across 22 districts of phases 2 and 3 of FCT, 35,659 houses, households, 360 real estate developers, Department of Development Control (DDC), Department of Mass Housing (DMH) and Federal Mortgage Bank (FMB). DDC and DMH are government agencies responsible for monitoring and implementation of housing developments in the study area. While FMB is responsible for the provision of estate development loans and other mortgage related services.

Sampling Procedure

Sampling procedure involves identification and selection of samples from the study population. The sampling technique most suited for the study was proportionate stratified. This method was used in selecting the housing units because of different typologies available in each estate. Thus, there was need to select them based on their typologies and according to the proportion of their number in the sample frame.

Sample Size Determination

Study samples for houses and households are drawn out of the 35,659 mass housing across 22 districts of phases 2 and 3 of Federal Capital Territory, Abuja. In order to determine needed sample size, Yamane (1967) formula was adopted. The formula computes sample size as:

$$n = \frac{N}{1 + N(e)^2} \quad \text{..... eqn 1}$$

Where: n = required sample size; N = population size; e = level of precision or sampling error (assumed to be ± 5%).

The needed sample size calculated based on the above formula is 395. However, retrieval rates from previous studies in housing such as Waziri, Yusof & Salleh (2013),Abdullahi (2015) and Ibem & Alagbe (2015) are between 70 -77%. Therefore, the study adopted a sample size of 530

houses. This sample size was drawn from 10 out of 360 mass housing estates. That is 5 estates from each of phases 2 and 3 of FCT, Abuja.

Instruments for data collection

For this research, both primary and secondary instruments were used for data collection. The questionnaire design was based on the 43variables of assessing housing adequacy identified from literature review and summarised in table 2.4. It included three sections. The first section was designed to collect respondents' demographic, socioeconomic characteristics and number of family members to housing type. The second section served to measure the adequacy level of the 43attributes of housing adequacy by using 5-point Likert scale (1 = very inadequate, 2 = inadequate, 3 = slightly inadequate, 4 = adequate and 5 = very adequate). While in the third section, respondents were required to express their opinion on the overall housing adequacy of their residential environment by using a 5-point Likert scale similar to the second section.

Data Analysis

The adequacy index proposed by Ibem and Amole (2011) was adapted to measure housing adequacy level based on the seven dimensions of housing adequacy in the study area (research objective 2). This method was also applied by Xiaolong, Jian, Tao, et al. (2019) to explore the adequacy of massive constructed public housing in China and by Addo (2016) to assess residential satisfaction of low-income households in Accra. The adequacy index is categorized into four sections: very inadequate = 0–39; inadequate = 40–49; adequate = 50–69; and very adequate = 70–100.

The adequacy index for each housing attribute can be computed using equation 2.

$$AI_j = \frac{\sum_{i=1}^{i=N} y_{ij}}{\sum_{i=1}^{i=N} Y_{ij}} \text{ X } 100 \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{eqn 2}$$

Where AIj is the adequacy index of housing attribute, j; Yij is the maximum possible score of housing attribute j; yij is the actual score given by respondents, i, regarding attribute j; and N represents the number of respondents.

Furthermore, the adequacy index of a component can be examined using equation 3.

$$AI_C = \frac{\sum_{i=1}^{i=N} y_i}{\sum_{i=1}^{i=N} Y_i} \quad \text{..... eqn 3}$$

Where AIc is the adequacy index of a component, C, as given by a respondent; N is the number of variables being scaled under C; yi is the actual score by a respondent on the i*th* variable; and Yi is the maximum possible score that the i*th* respondent could give with the scale used.

STUDY FINDINGS

The data for the study were collected between June 2021 and January 2022 through personal visits to each of the estates and housing units. As shown in table 4.0, total of 530 questionnaires were distributed out of which a total of 421 valid questionnaires representing 79.4 per cent of the distributed questionnaires were retrieved. Furthermore, the questionnaires were distributed proportionately to the number of housing units per estate. Additionally, the data collection instrument (questionnaire) was administered only to household heads or an adult member in each of the housing units found at the time of the visits.

Demographics of the respondents

The socio-economic and demographic profiles of respondents are presented in Table 4.0The majority of the respondents were males (55.34%) and 44.42% aged between 31 and 45 years. 90.02% of the respondents were also educated to tertiary level, 66.75% of them earned between N146, 000 and above and 47.74% living in owner-occupied houses. The result further shows that55.34 % of the respondents had lived in their current residences for more than five years. Thus, the respondents can be considered suitable in providing reliable data on the levels of adequacy of their current housing environment.

Table 4.0 socio-economic and demographic profiles of respondents

Variables	*N = 421*	(%)
Respondent's gender		
Male	233	55.34
female	188	44.66
Age group (years)		
No response	5	1.19
18-30	28	6.65
31-45	187	44.42

46-59	158	37.53
60 and above	43	10.21
Variables	*N = 421*	(%)
Household size		
No response	2	0.48
1-3	51	12.11
4-6	202	47.98
8-10	143	33.97
11 and above	23	5.46
Highest educational attainment		
No response	8	1.90
Apprenticeship	0	0.00
Primary education	3	0.71
Secondary education	31	7.36
Tertiary education	379	90.02
Average monthly income (Naira)		
No response	27	6.41
Below 30,000	0	0.00
31,000-70,000	21	4.99
71,000-145,000	92	21.85
146,000 and above	281	66.75
Tenure type		
No response	4	0.95
Private renting	79	18.76
Mortgage	132	31.35
Owner-occupation	201	47.74
Official quarters	5	1.19
Length of residency (years)		
No response	0	0.00
Less than one year	3	0.71
one-three years	81	19.24
four -five years	104	24.70
More than five years	233	55.34

Housing Adequacy Level in the Study Area

This seeks to address objective two which aims at measuring housing adequacy level based on the seven dimensions of housing adequacy (security of tenure, availability of services, affordability, habitability, accessibility, location and cultural adequacy) in the study area. As discussed in section 3.6 (data analysis), the adequacy index is categorized into four sections: very inadequate = 0–39; inadequate = 40–49; adequate = 50–69; and very adequate =70–100.

The housing adequacy index of the overall residential environment in the study area as shown in figure 4.1 is 60.72 thus, indicating that respondents perceived their residential environment as being adequate.

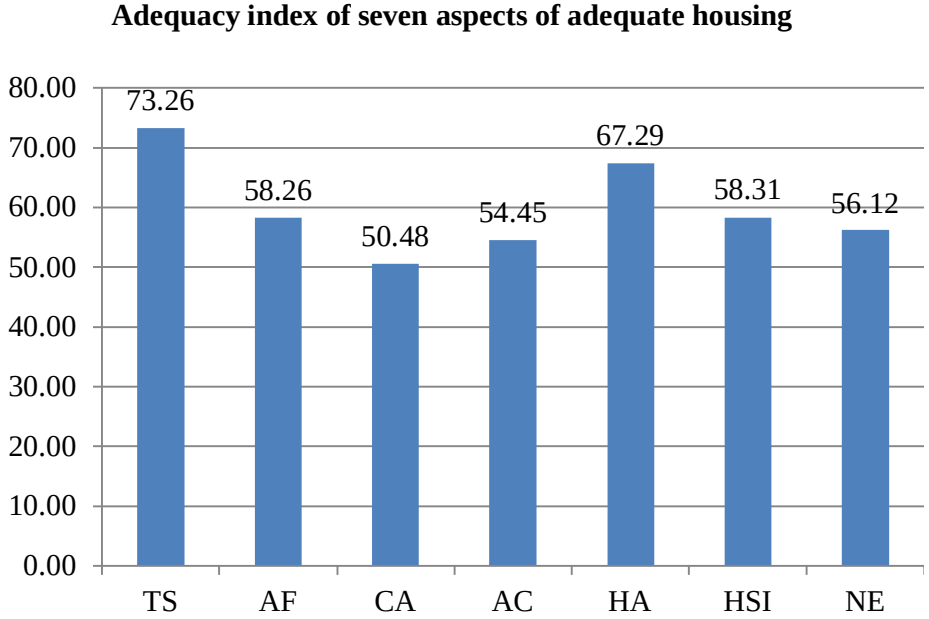

Figure 4.1: Adequacy index of seven aspects of adequate housing. TS = tenure security; AF = affordability; CA = cultural adequacy; AC = accessibility; HA = habitability; HIS = housing services and infrastructure; NE = neighbourhood environment.

Furthermore, tenure security (TS) was suggested by respondents as being adequate (73.26) and has the highest adequacy level compared with other components of adequate housing. The habitability (HA) had the next highest score of perceived adequacy (67.29) followed by housing services and infrastructure (58.31). The results further show that respondents perceived cultural adequacy (CA) as adequate (50.48) however, it has the lowest housing adequacy index.

A further analysis on adequacy index for each housing attribute was carried out and presented in table 4.1. Legal security of tenure (HA1) and Tenure guaranteed for a specified time (HA2) have the highest adequacy indexes of 74.49 and 72.02 respectively. This further indicates that respondents perceived their security of tenure to be adequate. Furthermore, all attributes of habitability were also perceived to be adequate by the respondents with the Number of bathrooms (HA18), Size and layout of kitchen (HA20), Size and layout of living rooms (HA17) having 70.40, 68.84and 68.12 respectively. This indicates that the respondents perceived addition of visitor's toilet in all the housing types in the study area as

highlighted in section 4.2 (types and components of housing) as adequate. Additional, the average kitchen size in the study area is 14 square meters while living room is 42.7 square meters. These were also perceived to be adequate (HA20 and HA17).

Meanwhile, Design of residence in relation to local residents' natural lifestyle (HA7) has the lowest adequacy index of 42.95 thus, perceived as being inadequate. This suggests that end users' participation in the design and construction process is low.

Table 4.1: Adequacy index for each housing attribute

Attributes of Housing Adequacy	Code	Mean	HAI
Tenure Security	HA1	3.72	74.49
	HA2	3.60	72.02
Affordability	HA3	2.78	55.70
	HA4	3.19	63.88
	HA5	2.89	57.81
	HA6	2.78	55.63
Cultural Adequacy	HA7	2.15	42.95
	HA8	2.74	54.82
	HA9	2.68	53.68
Accessibility	HA10	2.92	58.34
	HA11	2.90	58.00
	HA12	2.39	47.79
	HA13	2.68	53.68
Habitability	HA14	3.30	65.99
	HA15	3.35	67.08
	HA16	3.39	67.74
	HA17	3.41	68.12
	HA18	3.52	70.40
	HA19	3.38	67.55
	HA20	3.44	68.84
	HA21	3.30	65.94
	HA22	3.32	66.37
	HA23	3.36	67.17
	HA24	3.35	66.94
	HA25	3.31	66.18
	HA26	3.34	66.79
	HA27	3.35	67.08
	HA28	3.36	67.22
Housing Services And Infrastructure	HA29	2.70	54.06
	HA30	3.12	62.33
	HA31	2.93	58.62
	HA32	2.96	59.14
	HA33	2.87	57.39
Location (Neighbourhood Environment)	HA34	2.43	48.50
	HA35	2.67	53.30

	HA36	2.99	59.76
	HA37	2.97	59.43
	HA38	2.86	57.20
	HA39	3.09	61.85
	HA40	2.87	57.48
	HA41	2.92	58.34
	HA42	2.64	52.73
	HA43	2.63	52.64

In terms of affordability**,** Cost of mortgage and related services (HA4) has the highest adequacy index of 63.88. Further analysis shows that respondents were not paying more than 30 per cent of their income on mortgage thus, HA4 was perceived as adequate in the study areas. Whereas for the 79 respondents (18.76% of the total respondents) that are paying rent, they perceived Cost of rent and related services (HA3) to be high (55.7 adequacy index). Respondents further indicated that the average cost of two bedrooms in the study area is one million, four hundred thousand naira (N1,400,000) per annum while three bedrooms is two million two hundred thousand naira (N 2, 200, 000) per annum. Thus, for the respondents (26.84%of the total respondents) that earns below N145, 000 per month, all their yearly earning (maximum of N1, 740,000) will go to cost of rent and related services. These respondents are considered to be under housing affordability stress because they are paying more than 30 per cent of their income on housing rent. Chung, et al. (2020) have shown that housing affordability stress affects physical and mental health of households, hence it's not surprising that respondents in the study area perceived HA3 to be high (55.7 adequacy index).

The results from accessibility component of housing adequacy shows that respondent perceived facilities for handicapped and social welfare (HA12) to be inadequate (47.79 adequacy index). A further analysis on the floor plans and field observations all shows the absence of entrance ramp and toilet facilities for handicapped. Furthermore, light switches and door handles were positioned at high level thus; handicapped persons may have difficulty in reaching. However, the average floor areas and functional layout of living room (42.7 square meters), bedrooms (16 square meters) and kitchen (14 square meters) are adequate for circulation. Unprejudiced allocation regulations (HA10) have the highest adequacy index of 58.34 under the accessibility component. This means the houses in the study area are accessible or readily attainable to those entitled and free from

discrimination based on gender, age, educational qualification or size of households.

Housing Services and Infrastructure (HSI) component has Sanitary and drainage facilities (HA30) as the attribute with the highest housing adequacy index (HAI) of 62.33 (adequate). Through field observations, it was observed that the estates in the study area have sanitary and storm water sewer systems thus, this attribute was perceived as adequate by the respondents. Supply of telecommunications, water and electricity (HA29) has the lowest HAI of 54.06 under the HSI component. Although all the estates have water supply through estate water treatment plants, have access to telecommunications network services and are connected to the national electricity grid, HA29 was perceived as the lowest HAI by the respondents. This is perhaps due to epileptic power supply from the national grid. In terms of the Neighbourhood Environment (NE) component, Management measures regarding life and property security (HA39) has the highest HAI of 61.85 (adequate). It was observed that all the estates in the study area have made provisions for private security guards to offer security and safety precautions. While Public transportation facilities (HA34) was perceived as inadequate with a HAI of 48.50.

CONCLUSION

The thrust of this study was to evaluate housing adequacy in the implemented public private partnership mass housing schemes across 22 districts of phases 2 and 3 of FCT, Abuja. Data from ten (10) selected estates were collected and analysed using both quantitative and qualitative methods. The study established that households perceived their residential environment as being adequate with a housing adequacy index of 60.72. A further analysis on each component of housing adequacy shows Legal Security of Tenure (HA1) has the highest adequacy index of 74.49. While Design of residence in relation to local residents' natural lifestyle (HA7) has the lowest adequacy index of 42.95 thus, perceived as being inadequate. Therefore, end users' participation in the design and construction process is low. In terms of affordability and cost of mortgage related services, the study shows that respondents were not paying more than 30 per cent of their income on mortgage. However, for the respondents (26.84% of the total respondents) that are paying rent and earns below N145, 000 per month are considered to be under housing affordability stress because they are paying more than 30 per cent of their income on housing rent. These

findings provide empirical evidence for policy and decision makers to aid the provision of adequate PPP mass housing schemes in FCT, Abuja.

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