Sustainable Low-Income Housing and Practicable Minimum Design Standards in Bayelsa State, Nigeria

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The sustainability of low-income housing in Nigerian cities vis-a-vis building regulation/minimum design standards is discussed in this paper. Thus, the papers appraised the practicability of the existing minimum housing standards regarded as a borrowed idea in relation to the socio-economic realities of the low-income urban dwellers. Data collection involved both qualitative and qualitative data from the private owners and rentals /users of low-income housing available in the study area. This study employs non-probability sampling designs which are a combination of purposive and expert sampling techniques. Sample frame of 20 housing units in the low-income neighbourhood and respondents were selected for in-depth study and interview, while only 15 key informants were interviewed. This was complemented with 1440 questionnaires distributed across the low-income residential neighbourhoods. The quantitative data were analysed using both simple descriptive and inferential statistics; this was done using the Minitab Statistical Package (MSP), Version 14 and Statistical Package for Social Sciences (SPSS) version 22 which involved the calculation of the Chi-Square test while the qualitative data were analyzed using content analysis from where themes and conclusions were drawn. Findings show that the existing housing standards are not realistic and the low-income urban dwellers cannot afford the conventional standard houses because it requires high construction cost, building material and labour due to their poverty level. The paper further re-developed a proposed minimum housing standard which is practical and affordable to the urban poor. Finally, it is recommended that housing standards should be based on the concept of "low and upgradable" which is relaxed and flexible for the low-income group while also encouraging incremental housing approach including the provision of basic infrastructure services by the government to enhance liveability.

Keywords: housing, minimum standard, low-income, liveability, sustainable, upgradable.

Introduction

The complicated problems of housing shortage especially housing for the low-income as well as the rapid development of substandard urban housing in developing countries like Nigeria goes beyond mere lack of funds, construction of mass housing or construction techniques but mainly due to inappropriate planning practice, regulations and unrealistic housing design standards applicable across the countries (Fin-Mark Trust, 2010).   According to Bourennane, (2007), due to failure of several housing delivery strategies some governments of developing countries have adopted new enabling regulations that include relaxation of development control codes and appropriate housing standards. This enabling concept means flexibility and relaxation of the codes so that the low-income households can use their resources and energy to construct houses of their choice.

Most cities in developing countries including Nigeria are dominated by the low-income populace; therefore any housing policy that does not consider the low-income group is bound to fail. This is why the existing minimum housing standards and regulations which are essentially foreign and imported are very unrealistic and may certainly not have direct relevance to Nigerian environment and should be reviewed to accommodate the larger population called the low income group who are believed to be poor.

Meanwhile, survey of Awofeso (2010), Olotuah and Aiyetan (2006), Federal Government of Nigeria (FGN, 2006) shows that over 70% of heads of household in the city are low income and earn ₦216,000 per annum (based on national minimum wages of ₦18,000) or less, ₦70,000 (by definition of low income in Nigeria) and presently over 90% of Nigerians within the low-income range cannot afford decent or standard housing even if they saved 100% of their income for a period of ten years. The implication is that the poor could only wish to own a house built to meet minimum standard and regulations.

There are still diverse views as to the question of what constitutes housing standard. The first is that there should be a minimum housing standards for all categories of income groups, the second advocates an total maximum standards for all irrespective of income level which seem segregational making cities livable only by the few wealthy ones (Bramley et al., 1995). The third opinion which forms the core of this paper is the one that advocate relaxed and socially acceptable standards for low income housing otherwise referred to as "low and upgradable housing". Their argument is based on the fact that housing must be seen as a continuous incremental process, and not as a physical artifact designed and built at one moment in time (Turner, 1976; Burgess, 1982; Hamdi, 1991).

Undoubtedly, the vast low-income populace across cities in Nigeria can barely eat three square meals a day and are living below the poverty line, hence cannot afford to construct houses with the prevailing design standard on their own or live in standard built houses as tenants due to high rents charged by developers. This is why this study intends to develop practical minimum design standards for low-income residential housing in Bayelsa State, Nigeria.

Literature review

Theory of minimum housing standards and space for low income. The subject of design standards in housing is a complicated issue that is all-encompassing, cutting across all facet of the urbanization process, from theoretical explanations of function and satisfactoriness, to practical consideration in housing construction and servicing. Thus, differences exist in opinions among professionals and policy makers as to what should constitute an acceptable and practicable minimum housing standards.

However, for housing to be termed affordable, both to the state and to the low income urban dwellers, the capability of the poor to pay their own way must be reflected in the application of realistic standards (RSA, 1994).

A critical look at the current national building code and housing standards across the states of Nigeria shows a complete adoption from the developed nations especially Britain which is not practicable here in Nigeria and other developing nations of the world. Thus, by this standard, most of the houses in our cities including the government reserved quarters (GRA) do not qualify as habitable houses. This is largely because these "borrowed" standards require high construction techniques and are costly for the poor low-income populace who can hardly afford the requirements (Jinadu, 2007). This is why it is very difficult or almost impossible for the poor to observe and comply with the established standards. Mabogunje et al. (1978) opined that standards in the developed countries evolved to protect the low-income groups of the country against the sub-standard buildings produced for them by exploitative landlords, such standards seems to protect the wealthier and educated against the incursion of lower levels of dwellings in the developing countries.

However, promoters of relaxed and socially acceptable standards for low income housing are of the opinion that the low income housing should operate the concept of "low and upgradable hous-

ing". This means, they should be allowed to produce initial lower standard housing using artesian production techniques and technology and over time make improvements to the housing to bring it up to socially acceptable standards. Their argument is based on the use-values of houses in conformity with socially acceptable standards, which are permanently redefined in the context of an on-going social struggle (Walker, 2001). Consequently, Turner (1992) opined that housing seen as deficit and defined by standards that the majority of the populace cannot afford and which the city agencies or government cannot supply in large quantities, is practice of depression.

However, the relaxed standard advocated does not in any way suggest that certain indisputable minimum standards especially those that promote health and safety and endanger life should not be clearly considered, rather they should be strongly preserved and enforced while others remain very flexible (Harber, 1995). This will further engender social inclusion, promote healthy living and ultimately promote longevity.

This is in line with the characteristics of housing standards according to the United Nations (1974), which stipulates that effective standards:

a   Are normative propositions, which imply and express what is desirable rather than what exists;

b   Are feasible, that is, the required performance can be expected from those for whom the standards are made;

c   Contain the promise and prediction of sanctions, that is, reward for compliance and penalty for non compliance;

d   Originate from recognized authorities that are capable of enforcing them.

Accordingly, Turner (1992) opined that the imposition of modern minimum standards on informal housing occupied by the low income group is an assault on the traditional function of housing as a source of social and economic security and mobility maintaining that standards should be proscriptive in nature, and related to minimum performance requirements.

Nevertheless, it is imperative that satisfactory agreement be reached regarding opinion of standards within realistic affordability and resource constraints, so as to ensure a sustainable housing process that will satisfy the basic needs of the low income urban dwellers.

Theory of enabling housing strategies. Housing problems in cities of developing nations including Nigeria will have to be determined and solved within the framework of an all-inclusive urbanization strategy that is fair and objective in its response to all income levels in housing concerns and paying attention on the management of urban areas. It should be acknowledged that informal housing, being occupied by the low income on sites with basic services and neighbourhood facilities, forms the basis of a long-lasting process of rapid urbanization (Gilson, 1990). One basic problem of low income housing development in most countries of developing nation is the unfavourable official housing policy that these so called informal settlements should be pulled down while formal minimum standard housing units in "permanent" building materials produced according to strictly regulated urban plans replaces them. This model has never been successful in developing countries.

Enabling strategy simply means the full involvement of low income urban dwellers in solving their housing problem through self-help construction methods with gradual improvement process with the government removing obstacles through relaxed and flexible land tenure, plot sizes and space design standards (Vestbro, 2007). This idea was developed by the British architect John Turner describing it as the survival strategy of the poor to have a roof over their head in cities. To him affordability is more important to the low income than standards. The enabling strategy is not in any way opposed to standards as professional guidance but such standards should be relaxed for the low income city dwellers.

The summary of Turner's theory of enabling strategy is that low-income urban dwellers can usually not afford standards such as several rooms, durable building materials, drainage, paved roads or clean water from the start. The low-income person needs a job which makes it compulsory for him to stay in the city centre within walking distance to where the jobs are available or where customers are found for small-scale business since the poor person cannot afford transport costs. As the poor gets regular and better income, priorities change and standards can now be discussed (Turner, 1992).

Methodology

Data used in this study were collected from multiple sources. The sources are both primary and secondary. The data sources used in this study were in-depth interviews, physical observation, recording of artefacts, use of sketches, photographs, use of questionnaires and document reviews which include working papers, housing programme brochures, government's official documents especially the housing policy of Bayelsa State in particular and Nigeria in general.

This study employs non-probability sampling designs which are a combination of purposive and expert sampling techniques. Sample frame of 20 housing units in the low-income neighbourhood and respondents were selected for in-depth study and interview, while about 15 key informants were interviewed. This was complemented with 1440 questionnaires distributed across the low-income residential neighbourhood in the study areas.

The data collection combined qualitative and quantitative methods. The quantitative data were obtained using questionnaires responses from respondent's rating on the standard of the dwelling unit in the low-income residential neighbourhood using a 5-ponit Likert scale where 1 - very poor standard, 2 - poor standard, 3 - fair, 4 - good standard, 5 - very good standard. The data were analyzed using inferential statistics; this was done using the Minitab Statistical Package (MSP), Version 14 and Statistical Package for Social Sciences (SPSS) version 22 which involved the calculation of the Chi-Square test while the qualitative data were analyzed using content analysis from where theme and conclusions were drawn. The quantitative data provided this study with essential basic statistics, while qualitative data enriched the research discussion developing a better context for interpreting the results from statistical data

The Study Area. Bayelsa State was created in October 1, 1996 out of the old Rivers State, in the core Niger Delta region. The state is bounded on the east by Rivers State, on the west by Delta State and south by the Atlantic Ocean. The State lies between Latitude 4° 15' N and 5° 23' S and Longitude 5° 22' W and 6° 45' E. It has an estimated population of 1 998 349 (2005 census) with Yenagoa as the state capital (BMICT, 2002).
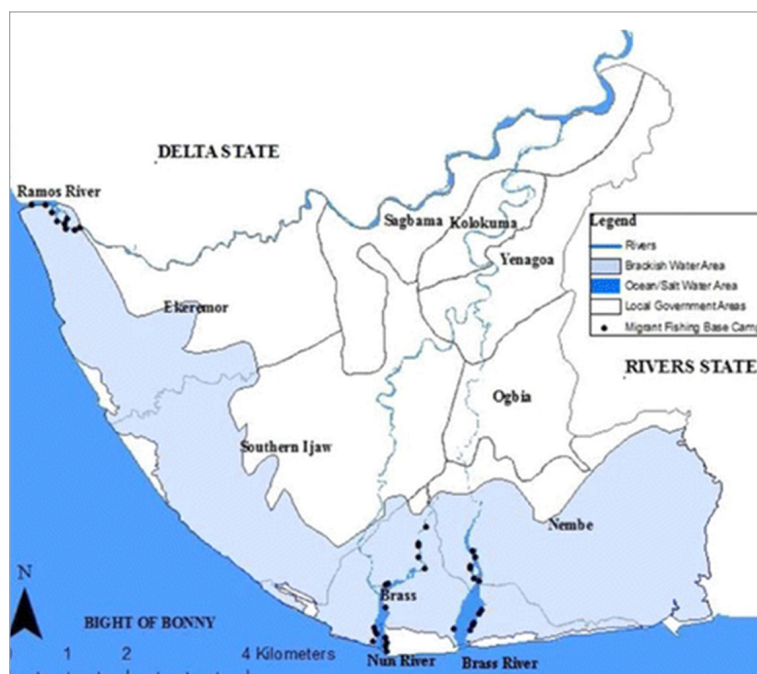

Fig. 1

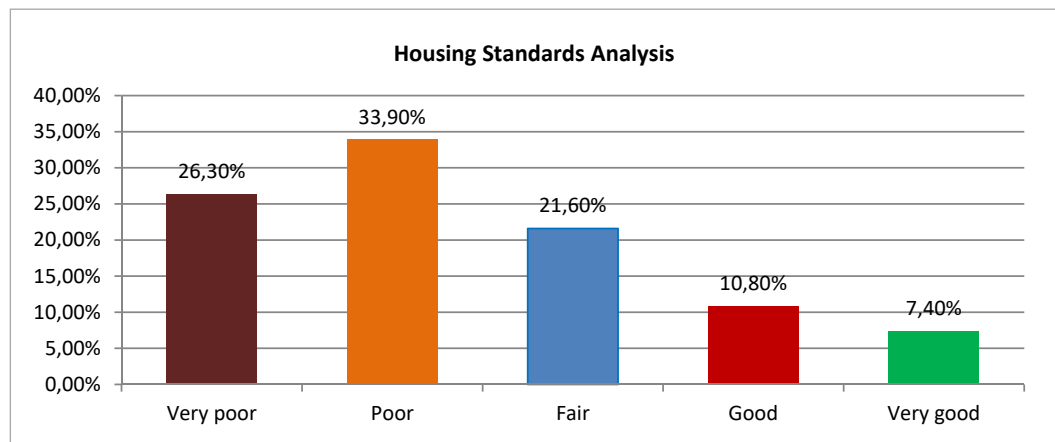Bayelsa State, Nigeria.
Source: BMICT (2002)

Discussion and findings

Overall housing standards analysis

In the analysis of the housing standards, which is one of the objectives and core of the study, eighteen (18) housing units and housing services attributes were used for the analysis. Respondents across the study areas were asked to rate the standards of their housing units using a 5 point Linkert scale rating of very poor standard (1), poor standard (2), fair standard (3), good standard (4) and very good standard (5) respectively. The study shows that 33.9% of the respondents rated the housing units as poor standard, 26.3% agreed it was very poor standard, 21.6% rated it as fair (neither good nor poor) standard, 10.8% claimed it was good standard while only 7.4% agrees it was very good standard. This implies that majority of the respondents (60.2%) claimed that the standards was poor.

Fig. 2

Overall housing standards analysis. Source: Authors' survey (2016)

Analysis of standards of selected housing sub–components

The analysis of the floor areas of the investigated housing units (**Fig. 3**) in relation to the existing minimum housing standards were made possible with the help of research assistants who evaluated the housing units by carrying out direct physical measurement and sketches as most of the respondents lacked the knowledge of what was being investigated. In most cases, the content of the questionnaires was interpreted to respondents for easy responses.

Standard of size of living /dining room

Respondents were asked to rate the standard of the size of their living / dining rooms. This was based on the minimum housing standard that is operational at the moment. Thus, for the living room, the space requirement used was 12 m^2 as the basic minimum area while the dining room was 7.5m^2. The results showed a larger proportion of the respondents (40.3%) rated them as poor. 27.4% of the respondents rated it as very poor. Also, 21.6% say the standard is fair while 6.3% say it is good and only 4.3% rated it as very good. The implication here is that very high proportion of the respondents (67.7%) is of the opinion that standard of the living / dining room in their apartment is poor.

Dining rooms were non-existent in the houses studied in detail but during the questionnaire administration, it was discovered that in less than 5% of houses that had dining room, its floor areas were less than 7.5 m^2 minimum standards required.

Standard of size of bedrooms

The minimum space requirement for a bedroom used for this analysis based on the current standard is 13 m^2. Hence, on the standard rating of the size of the bedroom, 32.1% rated it as poor; while 26.9% respondents say the standard is fair. 23.3% rated it as very poor. The percentage of

those who rated the standard as good and very good was 10.6% and 7.1% respectively.

Standard of kitchen and store

The basic minimum requirements for a kitchen in residential bungalow used for the analysis are 6 m^2, while that of a store is 3 m^2. Respondents rated the standard of their cooking and storage spaces as follows: 45.9% say it is very poor, 31.6% say it is poor; while 9.0% rated it as fair, 7.7% and 6.5% rated it as good and very good standards. This is an indication that about half of the respondents rated their kitchen and stores as very poor and put together, very high proportion of respondents (77.5%) rated the standard as poor.

Standard of security measure

Respondents' standard rating of the security measures in their dwelling units reveals that a higher percent (33.2%) say it is fair; 22.9% say it is poor; 20.5% say it is good, while 13.9% agree it is very good and only 9.5% say it is very poor. This measurement was against the inclusion of burglary proof and type of doors at the external of the housing units. These show that on the average the standard of the security measures is fair tilting towards good.

Standard of level of privacy

The level of privacy in the housing units was measured based on the number of persons living in a room and number of persons sharing facilities such as toilets and bathrooms. The standard rating by respondents on the level of privacy in their dwelling units show that larger proportion of 39.3% describe it as poor, 25.3% say it is very poor, 19.6% say it is fair; while 9.6% and 6.2% rated it as good and very good respectively. This reveals that respondents experience a very poor level of privacy in their dwelling units.

Respondents average monthly income

The study in **Table 1** shows that majority of the respondents (36.6%) earn an average monthly income of between ₦31 000 and ₦50 000. The respondents who earn between ₦16 000 and ₦30 000 stood at 24.2%. This was closely followed by respondents who earn between ₦6 000 and ₦15 000 which is 22.5%. Those

Fig. 3

Some of the housing units studied in the study areas. Source: Authors' survey, 2016

Income	Percentage (%)	Frequency
31000 – 50000 Naira	36.6%	474
16000 – 30000 Naira	24.2%	313
6000 – 15000 Naira	22.5%	291
51000 – 70000 Naira	11.2%	145
71000 and above	5.5%	71
Total	**100%**	**1294**

who earn between ₦51 000 and ₦70 000 were put at 11.2%. A small proportion of the respondents (5.5%) earns above ₦71 000, while the 0% proportion of respondents earns below ₦5 000.
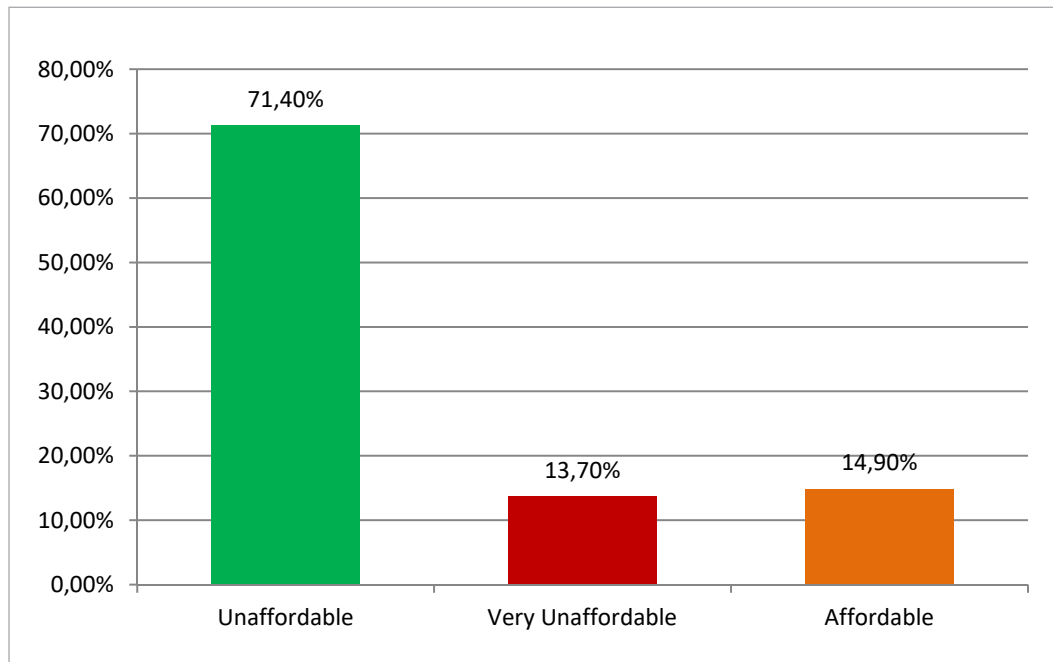
Respondents affordability of the housing units

The respondents were also asked to evaluate the cost of acquiring or renting their housing units. The evaluation indices were from very unaffordable, unaffordable, affordable to very affordable. Greater proportion of the respondents 71.4% indicated that cost was unaffordable. This was followed by 13.7% respondents who agreed the cost of housing was very unaffordable, this was closely followed by 14.9% respondents who claimed that the cost of housing was affordable while very affordable had 0% respondent. This is an indication that the low-income urban dwellers in the study areas see the cost of acquiring and or renting their housing units as generally unaffordable.

Fig. 4

Respondents level of affordability. Source: Authors' survey (2016)

Summary of findings

The study also evaluated the standards of the components of the housing unit as well as the provision of infrastructure services in the neighbourhood of the study areas. On the standard of the size of living / dining room, larger proportion (67.7%) of respondents rated it as poor, while the standard of the bedroom was rated by larger proportion (55.4%) as poor about 26.9% rated it fair (neither good standard nor poor standard). The study also shows that for the standard of kitchen / store, very high proportion of respondents (77.5%) rated the standard as poor. This is not surprising as most of the dwelling units surveyed had their kitchen outside the building and constructed with waste woods or aluminum roofing sheets or simply absent in some other cases. The study

equally evaluated the level of privacy of individuals in their dwelling units and the results showed that larger proportion of 64.6% describes it as poor.

Table 2 shows the data derived from the in-depth study of some housing units in the study area, which shows the floor areas of functional spaces in respondents housing units measured against the basic minimum area specified by the existing design standards. The proposed space standards are based on the average sizes of the surveyed housing units, which is practicable taking into consideration the health and comfort of the occupants as well. For example, the size of bedroom space in area according to the minimum standards is 13.6m^2. The study shows that almost all the housing units studied had area of bedroom less than the basic minimum required; but with an average size of 8.6 m^2. However, the study is proposing an area of 9.0 m^2 as the basic minimum area required for bedroom for practicability, health and comfort of the occupants. Also, the study showed that none of the houses studied had dining room/space. This suggests that the low-income urban dwellers do not necessarily require dining spaces in their housing units or simply do not place importance on that part of the housing unit. Therefore, in this proposal, dining spaces shall be optional for any low-income housing development. However, where it is provided, the minimum space required shall be 5.0m^2 as against 7.5 m^2 required by the building regulations.

Housing units no.	Living room existing (m²)	Required min. area (m²)	Bedroom existing (m²)	Required min. area (m²)	Kitchen existing (m²)	Required min. area (m²)	Location of bath & WC	Location of Kitchen
1	9.0	15.0	9.0	13.6	3.4	6.0	within	within
2	9.4	15.0	9.0	13.6	5.4	6.0	within	within
3	13.0	15.0	10.8	13.6	5.8	6.0	outside	outside
4	10.8	15.0	9.0	13.6	4.0	6.0	within	within
5	8.1	15.0	8.1	13.6	5.0	6.0	outside	outside
6	15.0	15.0	10.8	13.6	5.0	6.0	within	within
7	8.0	15.0	7.2	13.6	3.8	6.0	nil	outside
8	8.6	15.0	7.2	13.6	nil	6.0	nil	nil
9	9.0	15.0	9.0	13.6	3.4	6.0	outside	outside
10	13.0	15.0	9.0	13.6	4.5	6.0	within	outside
11	9.0	15.0	7.2	13.6	5.8	6.0	outside	outside
12	9.0	15.0	7.5	13.6	4.8	6.0	outside	outside
13	9.4	15.0	9.0	13.6	nil	6.0	nil	nil
14	9.0	15.0	9.0	13.6	nil	6.0	nil	nil
15	10.8	15.0	8.6	13.6	5.5	6.0	outside	outside
16	8.6	15.0	8.6	13.6	nil	6.0	outside	outside
17	9.0	15.0	9.0	13.6	4.4	6.0	outside	outside
18	9.0	15.0	7.2	13.6	nil	6.0	outside	nil
19	9.0	15.0	7.2	13.6	nil	6.0	outside	nil
20	10	15.0	9.0	13.6	nil	6.0	within	within

Table 2

Existing space sizes compared to minimum areas required by building laws. Source: Authors' survey (2016)

The proposed minimum housing design standards

From the Table above, the study has shown that the compliance level of the low-income housing in Bayelsa urban centres with the existing minimum housing design is low. This is due to the un-affordability of the standards by the low-income as well as the alien nature of the standards. Consequently, the study evaluated various architectural components of the existing minimum standards and regulation vis-a-vis the realities of the low-income housing in the study area. The most important aspects of the standards and regulations considered in this study are sizes of habitable and functional spaces, lighting and ventilation, location of facilities, furnishing, housing design type and approval processes. These are what the researchers opine is crucial and meaningful to the low-income housing design and construction.

The use of in-depth interviews from the respondents, key informants, and observation as qualitative data tool as well as measurements, sketches and photographs (data presentation instruments) used during the field work helped to form the basis for the formulation of the proposed minimum housing design standard that will be suitable for the low-income urban dwellers in Bayelsa state in their quest to build their houses.

The proposed minimum housing design standards recognize that socio-economic realities categorizes people into different income level, thus in urban residential layout and zoning there are low density areas for the high-income earners, the medium density areas for the middle-income group and the high density areas for the low-income earners. Therefore, the proposed standards recognize the place of indigenous housing type where all functional and service areas are not all located within the building enclosure like the conventional "foreign" housing type. Secondly, the building plans shall incorporate the principle of incremental housing designs stipulating the number of phases required. Also, the approval process of these building plans shall be in phases too to reduce cost and encourage the poor to build. Thirdly, only architectural drawings shall be required for the approval of low-income residential housing units.

Based on the above, the following constitute the minimum housing standard for residential housing scheme in Bayelsa State Nigeria:

a Every dwelling unit shall have a living room of not less than 12.0 m^2 floor area;

b Dining spaces /areas shall be optional in low-income dwelling units. Where provided, it shall have not less than 4.0 m^2;

c Every dwelling unit shall have at least one room, which shall have not less than 9.0 m^2 of floor area;

d All habitable rooms or spaces within a dwelling unit shall be provided with natural ventilation by means of at least one openable exterior opening (window) with an area of not less than 0.9 x 1.0 m. Such openings are directly onto a street or public alley or a yard or court located on the same plot as the building;

e All habitable rooms within a dwelling unit shall be equipped with natural light by means of exterior glazed openings with an area not less than 0.9 x 1.0 m;

f Every dwelling unit shall be provided with a toilet and bathroom within the dwelling unit with an area of 1.2 m^2 for toilets equipped with squatter WC that requires small quantity of water for flushing and 1.8 m^2 for bathroom equipped only with shower/tub within a housing unit for a single family;

g All bathrooms, toilets and similar rooms shall be provided with natural ventilation by means of open-able exterior openings with an area not less than a minimum of 0.36 m^2;

h The dwelling unit shall have a source of water prevalent in such areas;

i Every dwelling unit shall be provided with kitchen within or outside the unit, with an area not less than a minimum of 4.0m^2. The kitchen may not have a working sink, and hot / cold running water.

l Width of habitable rooms other than kitchen shall be not less than 2.40 m;

m The dwelling unit shall have a store of suitable size for the family.

The above analysis has shown that the minimum housing standards in use at the moment are far beyond what the low-income urban dwellers can comprehend and comply with as most of their housing designs in terms of space requirements, functional space provisions are inadequate and basic services required in any housing unit are lacking, hence it is not practicable. Thus, the dire need to propose and re-develop practical minimum housing design standards becomes very important in order to encourage the low-income urban dwellers to build their houses, which will further reduce homelessness among the low-income urban dwellers and prevent the further growth of urban sprawl. It is the belief of the researchers that these proposed standards if implemented by the relevant government agencies would help curb the growing urban sprawl and reduce to the barest minimum the housing deficit and homelessness in Nigerian cities.

According to the findings in this study, low-income urban dwellers in Bayelsa State are living in housing units considered sub-standard judging from the minimum housing standards and building regulation currently being used in the State, consequently, they do not comply with the existing minimum standards. The reason for this non-compliance is the affordability problem and non-suitability of the standards to the socio-economic and life style of the low-income earners who view these standards as foreign.

As a result of the unrealistic nature of the existing minimum building regulations and standards in Bayelsa State, this study is emphasizing a paradigm shift to the adoption of new enabling regulation that include relaxation of development control codes and practicable minimum housing standards. The enabling concept has as its by-product the idea of self-help housing, preference for local building materials and labour for housing sustainability, housing type suitable for the low-income as well as with "relaxed" and flexible planning and building regulation / housing design standards, which this study has proposed.

The Bayelsa State government should as a matter of urgency embark on the review or revision of the building standards and regulations used in the State and produce standards and regulation of their own taking into account the peculiarity of the State. This should be holistic and must include standards for floor space, densities, dwelling sizes, plot sizes, flexible / suitable designs for all classes of income earners, building types, building materials specification and incremental policies (designs, construction, approvals and payments). Above all, the building regulations and standards when revised should be implemented, enforced and should be flexible.

Discussion and conclusions

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